Series : LKN3M

SET ~ 1

रोल नं.
Roll No.

प्रश्न-पत्र कोड
Q.P. Code **31/3/1**

विज्ञान
SCIENCE

निर्धारित समय : ***3*** *घण्टे* | *अधिकतम अंक :* ***80***

Time allowed : ***3*** *hours* | *Maximum Marks :* ***80***

नोट / NOTE []

(I) कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **31** हैं।
Please check that this question paper contains **31** printed pages.

(II) प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।
Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

(III) कृपया जाँच कर लें कि इस प्रश्न-पत्र में **39** प्रश्न हैं।
Please check that this question paper contains **39** questions.

(IV) **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें।**
Please write down the Serial Number of the question in the answer-book at the given place before attempting it.

(V) इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक परीक्षार्थी केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।
15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

सामान्य निर्देश :

निम्नलिखित निर्देशों को ध्यानपूर्वक पढ़िए और उनका पालन कीजिए :

(i) *इस प्रश्न-पत्र में **39** प्रश्न हैं। **सभी** प्रश्न **अनिवार्य** हैं।*

(ii) *प्रश्न-पत्र **तीन** खण्डों – **क, ख** और **ग** में विभाजित है।*

खण्ड क : जीव विज्ञान (30 अंक)
खण्ड ख : रसायन विज्ञान (25 अंक)
खण्ड ग : भौतिक विज्ञान (25 अंक)

(iii) *इस प्रश्न-पत्र में बहुविकल्पीय, अति लघु उत्तरीय, लघु उत्तरीय, दीर्घ उत्तरीय और केस/स्रोत-आधारित प्रश्न हैं। प्रत्येक प्रश्न के अंक उसके सामने दिए गए हैं।*

(iv) *केस-आधारित प्रश्न **4** अंक के हैं, जिनमें तीन उप-प्रश्न हैं।*

(v) ***अपनी उत्तर पुस्तिका को प्रश्न-पत्र के अनुरूप तीन खण्डों में विभाजित कीजिए –***
खण्ड क (जीव विज्ञान), खण्ड ख (रसायन विज्ञान) तथा खण्ड ग (भौतिक विज्ञान)।
प्रत्येक प्रश्न का उत्तर उसके संबंधित खण्ड में ही लिखना अनिवार्य है। एक खण्ड के उत्तर दूसरे खण्ड के उत्तर के साथ नहीं लिखने हैं।

(vi) *आवश्यकतानुसार प्रत्येक खण्ड और प्रश्न के साथ निर्देश दिए गए हैं।*

(vii) *कृपया ध्यान दें कि दृष्टिबाधित परीक्षार्थियों के लिए एक अलग प्रश्न-पत्र दिया गया है।*

(viii) *प्रश्न-पत्र में कोई समग्र विकल्प नहीं है। यद्यपि, कुछ प्रश्नों में केवल आंतरिक विकल्प का प्रावधान दिया गया है। इन प्रश्नों में से केवल एक ही प्रश्न का उत्तर लिखा जाना चाहिए।*

खण्ड क
जीव विज्ञान

1. मानव में अवायवीय श्वसन प्रक्रम से संबंधित कुछ अभिलक्षणों की सूची प्रवीन को निम्न तालिका के रूप में दी गई :

	अवस्थिति	परिस्थिति	अंत्योत्पाद
अभिलक्षण	(i) पेशी कोशिका	(ii) ऑक्सीजन (O_2) तथा कार्बन डाइऑक्साइड (CO_2) की उपस्थिति की आवश्यकता	(iii) 3-कार्बन अणु

उपर्युक्त अभिलक्षणों में से कौन-सा/से अभिलक्षण उपर्युक्त प्रक्रम से संबंधित है/हैं ? *1*

(A) (i) तथा (ii)
(B) (i) तथा (iii)
(C) (ii) तथा (iii)
(D) केवल (i)

General Instructions :

Read the following instructions carefully and follow them :

(i) *This question paper contain **39** questions. **All** questions are **compulsory**.*

(ii) *The question paper is divided into **three** sections — **A**, **B** and **C**.*

Section A : Biology (30 marks)

Section B : Chemistry (25 marks)

Section C : Physics (25 marks)

(iii) *The question paper has MCQs, VSAs, SAs, LAs and CBQs. Marks are given against each question.*

(iv) *There are case based questions (CBQs) with three sub-questions and are of **4** marks each.*

(v) ***Divide your answer sheet into three sections as per the question paper –***

Section A (Biology), Section B (Chemistry) and Section C (Physics).

It is compulsory to answer each question in its respective section. Do not mix answers of one section into the other section.

(vi) *Instructions are given with each section and question, wherever necessary.*

(vii) *Kindly note that a separate question paper has been provided for visually impaired candidates.*

(viii) *There is no overall choice in the question paper. However, an internal choice has been provided in few questions. Only one of the choices in such questions must be attempted.*

SECTION A
BIOLOGY

1. Pravin was given a list of characteristics associated with the process of anaerobic respiration in humans, in the table given below :

	Location	Condition	End Product
Characteristic	(i) Muscle Cell	(ii) Requires presence of Oxygen (O_2) and Carbon dioxide (CO_2)	(iii) 3-Carbon molecules

Which of the above characteristics is/are related to the above process ? *1*

(A) (i) and (ii) (B) (i) and (iii)

(C) (ii) and (iii) (D) (i) only

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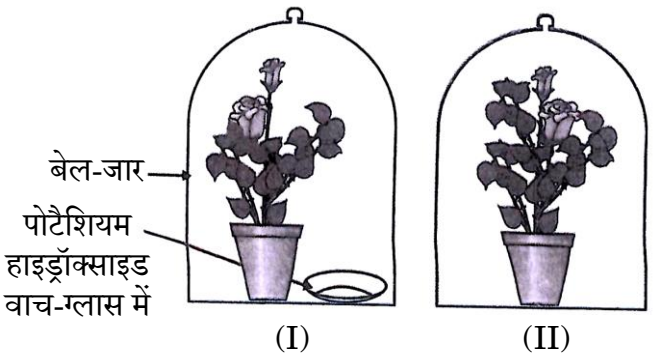
2. नीचे दिए गए चित्र का प्रेक्षण कीजिए तथा इस कार्यकलाप के संयोजन में ***ग़लत*** चरण की पहचान कीजिए : *1*



(A) दोनों पौधों को शीशे के अलग-अलग जार में रखने से पहले तीन दिनों तक अँधेरे कमरे में रखा।

(B) दोनों पौधों को अलग-अलग लकड़ी के बेल-जार से ढक दिया।

(C) जार के तलों को सील करने के लिए काँच पट्टिका लगा कर वैसलीन का उपयोग किया।

(D) मंड की उपस्थिति के लिए आयोडीन परीक्षण करने से पूर्व कुछ घंटों के लिए दोनों पौधों के गमलों को सूर्य के प्रकाश में रखा।

3. सीधी रेखा में चलना तथा साइकिल चलाना जैसे क्रियाकलाप मस्तिष्क के कौन-से भाग के समन्वय के कारण संभव होते हैं ? *1*

	(मस्तिष्क का भाग)	*(मस्तिष्क के क्षेत्र का नाम)*
(A)	अग्रमस्तिष्क	प्रमस्तिष्क
(B)	मध्यमस्तिष्क	अनुमस्तिष्क
(C)	पश्चमस्तिष्क	अनुमस्तिष्क
(D)	पश्चमस्तिष्क	मेडुला

4. एक अंतर्ग्रथन (सिनेप्स) में, रासायनिक संकेतों का संचरण होता है : *1*

(A) एक तंत्रिका कोशिका के द्रुमिका सिरे से दूसरी तंत्रिका कोशिका के तंत्रिकाक्ष के अंतिम सिरे तक।

(B) उसी तंत्रिका कोशिका के तंत्रिकाक्ष से कोशिका काय तक।

(C) उसी तंत्रिका कोशिका के कोशिका काय से तंत्रिकाक्ष के अंतिम सिरे तक।

(D) एक तंत्रिका कोशिका के तंत्रिकाक्ष के अंतिम सिरे से दूसरी तंत्रिका कोशिका के द्रुमिका सिरे तक।

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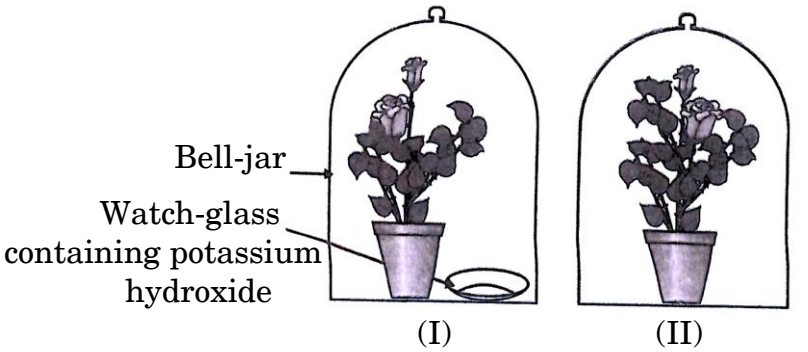
2. Observe the figure given below and identify the ***incorrect*** step for the activity set-up : *1*



(A) Both plants are kept in the dark room for three days before placing them in separate glass jars.

(B) Both plants are covered with separate wooden bell-jars.

(C) Use vaseline to seal the bottom of the jars with the glass plates.

(D) Both potted plants were kept in sunlight for a few hours before the iodine test for the presence of starch.

3. Walking in a straight line and riding a bicycle are activities which are possible due to coordination of which part of the brain ? *1*

	(Part of the Brain)	*(Name of the area of the Brain)*
(A)	Fore-Brain	Cerebrum
(B)	Mid-Brain	Cerebellum
(C)	Hind-Brain	Cerebellum
(D)	Hind-Brain	Medulla

4. In a synapse, the chemical signal is transmitted from : *1*

(A) Dendritic end of one neuron to axonal end of another neuron.

(B) Axon to cell body of the same neuron.

(C) Cell body to axonal end of the same neuron.

(D) Axonal end of one neuron to dendritic end of another neuron.

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5. उच्चतर पोषी स्तर के जीव जो निम्नतर पोषी स्तर से संबंधित अनेक प्रकार के जीवों को खाते हैं, मिलकर बनाते हैं : *1*

(A) आहार जाल (B) पारितंत्र

(C) पारिस्थितिक पिरैमिड (D) आहार श्रृंखला

6. किसी पारितंत्र में आहार श्रृंखला के माध्यम से उच्चतर पोषी स्तर में हानिकारक (विषैले) पदार्थों के संचयन में, निम्नलिखित में से कौन-से जीव सर्वाधिक प्रभावित होते हैं ? *1*

(A) छोटे जलीय पादप (B) मानव

(C) छोटी मछलियाँ (D) बड़ी मछलियाँ

7. अंगूर के पौधों में प्रतानों की वृद्धि निम्नलिखित के कारण होती है : *1*

(A) प्रकाश का प्रभाव

(B) गुरुत्व का प्रभाव

(C) अवलम्ब (आधार) के संपर्क में आई प्रतान (प्ररोह) कोशिकाओं में त्वरित कोशिका विभाजन

(D) अवलम्ब संपर्क की सतह से विपरीत (परे) प्रतान (प्ररोह) कोशिकाओं में त्वरित कोशिका विभाजन

प्रश्न संख्या 8 तथा 9 के लिए, दो कथन दिए गए हैं – जिनमें एक को अभिकथन (A) तथा दूसरे को कारण (R) के रूप में अंकित किया गया है। इन प्रश्नों के सही उत्तर नीचे दिए गए कोडों (A), (B), (C) और (D) में से चुनकर दीजिए।

(A) अभिकथन (A) और कारण (R) दोनों सही हैं और कारण (R), अभिकथन (A) की सही व्याख्या करता है।

(B) अभिकथन (A) और कारण (R) दोनों सही हैं, परन्तु कारण (R), अभिकथन (A) की सही व्याख्या ***नहीं*** करता है।

(C) अभिकथन (A) सही है, परन्तु कारण (R) ग़लत है।

(D) अभिकथन (A) ग़लत है, परन्तु कारण (R) सही है।

8. *अभिकथन (A) :* सूक्ष्मजीवों की अनुपस्थिति में मृदा की प्राकृतिक पुन:पूर्ति नहीं होगी।

कारण (R) : जीवाणु तथा कवक जैसे सूक्ष्मजीव जीवों के मृत अवशेषों तथा अपशिष्ट उत्पादों का अपघटन (अपमार्जन) करते हैं, और ये मृदा (मिट्टी) में चले जाते हैं। *1*

5. Organisms of a higher trophic level which feed on several types of organisms belonging to a lower trophic level form the : *1*

(A) Food web (B) Ecosystem

(C) Ecological pyramid (D) Food chain

6. In accumulation of toxic substances at higher trophic levels of an ecosystem through the food chain, which of the following organisms is affected the most ? *1*

(A) Small aquatic plants (B) Human beings

(C) Small fish (D) Large fish

7. The growth of tendrils in grapes plants is due to : *1*

(A) Effect of light

(B) Effect of gravity

(C) Rapid cell division in tendril cells in contact with the support

(D) Rapid cell division in tendril cells that are away from the support

For Questions number 8 and 9, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

8. *Assertion (A) :* Natural replenishment of soil will not take place in absence of microbes.

Reason (R) : Microbes, comprising of bacteria and fungi, break down dead remains and waste products of organisms, and they go into the soil. *1*

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9. *अभिकथन (A) :* वृक्क में आधारी निस्यंदन एकक, फुफ्फुस की तरह ही, बहुत पतली भित्ति वाली रुधिर केशिकाओं का गुच्छ होता है।

कारण (R) : वृक्क में प्रत्येक केशिका गुच्छ, एक कप के आकार के वलयित नलिका के सिरे के साथ संबद्ध होता है, जिसे बोमन संपुट कहते हैं। *1*

10. (i) ओज़ोन परत के अवक्षय के लिए क्लोरोफ्लुओरोकार्बनों (CFCs) को मुख्य कारक माना गया है। 1987 में, संयुक्त राष्ट्र पर्यावरण कार्यक्रम (UNEP) में सर्वानुमति बनाने में सफलता मिली। इस सर्वानुमति का उल्लेख कीजिए।

(ii) हमारे वायुमंडल में ओज़ोन की क्या भूमिका है ? *2*

11. किस प्रकार का श्वसन अधिक ऊर्जा प्रदान करता है और क्यों ? *2*

12. हृदय का दायाँ तथा बायाँ बँटवारा ऑक्सीजनित तथा विऑक्सीजनित रुधिर को मिश्रित होने से रोकने में लाभप्रद है। विभिन्न जीवों में भिन्न-भिन्न प्रकार के हृदय होते हैं।

(I) जीवों के प्रकार और रुधिर परिसंचरण के संदर्भ में उनके विकास के अनुसार रिक्त स्थानों (i) से (iii) की पूर्ति सही ढंग से कीजिए :

जीव	हृदय में कोष्ठों की संख्या	परिसंचरित रुधिर का प्रकार	परिसंचरण का प्रकार
मछली	(i) _____	मिश्रित	एकल (एक चक्र)
(ii) _____	त्रि-कोष्ठीय	मिश्रित	अपूर्ण दोहरा परिसंचरण
पक्षी तथा स्तनधारी	चार-कोष्ठीय	ऑक्सीजनित तथा विऑक्सीजनित रुधिर का अलग-अलग परिसंचरण पथ	(iii) _____

(II) किस प्रकार का परिसंचरण अधिक दक्ष है ? *2*

9. *Assertion (A) :* The basic filtration unit in the kidneys, like in the lungs, is a cluster of very thin-walled blood capillaries.

Reason (R) : Each capillary cluster in the kidney is associated with the cup-shaped end of a coiled tube called Bowman's capsule. *1*

10. (i) Chlorofluorocarbons (CFCs) have been linked to depletion of ozone layer. In 1987, the United Nations Environment Programme (UNEP) succeeded in making an agreement. State this agreement.

(ii) What is the role of ozone in our atmosphere ? *2*

11. What kind of respiration provides more energy and why ? *2*

12. Separation of right side and left side of the heart is useful to keep oxygenated and deoxygenated blood from mixing. Various organisms have different types of heart.

(I) Fill in the blanks (i) to (iii) correctly according to the type of organisms and their evolution in terms of blood circulation :

Organisms	Number of chambers in heart	Type of blood being circulated	Type of circulation
Fish	(i) _____	Mixed	Single
(ii) _____	3-chambered	Mixed	Incomplete double circulation
Birds and Mammals	4-chambered	Separated circulation path of oxygenated and deoxygenated blood	(iii) _____

(II) Which type of circulation is most efficient ? *2*

13. ज़ाइलम ऊतक में जड़ों, तनों और पत्तियों की वाहिकाएँ और वाहिनिकाएँ आपस में जुड़कर, जल-संवहन वाहिकाओं का एक सतत जाल बनाती हैं, जो पादप के सभी भागों से संबद्ध होता है। व्याख्या कीजिए कि यह किस प्रकार प्राप्त होता है। *3*

14. जब मेंडल ने मटर के शुद्ध लंबे पौधे का मटर के शुद्ध बौने पौधे के साथ संकरण कराया, तो उसके F_1 पीढ़ी में प्राप्त क्रॉस तथा संतति में प्रेक्षित परिणामों को दर्शाइए। *3*

15. निम्नलिखित परिच्छेद को पढ़िए तथा उसके नीचे दिए गए प्रश्नों के उत्तर दीजिए :

सभी पौधों में प्रकाश-संश्लेषण की क्रियाविधि एकसमान नहीं होती। अधिकतर पौधों में, यह गैसीय कार्बन डाइऑक्साइड पर निर्भर करती है जो सीधे पत्तियों में विसरित हो जाती है। परन्तु, कुछ पौधों में कार्बन डाइऑक्साइड पत्तियों की कोशिकाओं की रिक्तिकाओं में जटिल कार्बन यौगिक के भाग के रूप में भण्डारित हो सकती है। यह यौगिक क्लोरोप्लास्ट में स्थानांतरित हो जाता है और प्रकाश-संश्लेषण प्रक्रिया के लिए आवश्यकतानुसार कार्बन डाइऑक्साइड को मुक्त करता है। ऐसा माना जाता है कि इस विशेष प्रणाली का विकास उन पौधों में अनुकूलन के परिणामस्वरूप हुआ है जिनके रंध्र (स्टोमेटा) दिन में नहीं खुलते हैं, ताकि जल का संरक्षण हो सके और वे शुष्क (मरुस्थलीय) परिस्थितियों में जीवित रह सकें।

(क) अथवा (ख) में से किसी एक का उत्तर दीजिए :

(क) (i) शुष्क परिस्थितियों में जीवित रहने के लिए इन पौधों में कौन-सा प्रक्रम पौधे की सहायतार्थ न्यूनतम दर से कार्य करता है ?

(ii) प्रकाश-संश्लेषण की अवधि में पत्ती का कौन-सा भाग गैसों के विनिमय के लिए उत्तरदायी है ? *4*

अथवा

(ख) (i) प्रकाश-संश्लेषण के प्रक्रम के दौरान संपन्न होने वाली घटनाओं की सूची बनाइए।

(ii) अन्य पादपों से विलग ऐसे मरुस्थलीय पौधे पर्यावरण से कार्बन डाइऑक्साइड कब प्राप्त कर सकते हैं ?

(iii) एक खुले हुए रंध्र छिद्र के साथ रंध्र (स्टोमेटा) का नामांकित चित्र बनाइए। *4*

13. In xylem tissue, vessels and tracheids of the roots, stems and leaves are interconnected to form a continuous system of water-conducting channels reaching all parts of the plant. Explain how this is achieved. *3*

14. Show the cross and observations made by Mendel when he crossed pure tall pea plant with a pure short pea plant to get F_1 progeny. *3*

15. Read the following passage and answer the questions that follow :

Not all plants carry out photosynthesis by the same mechanism. In most plants, it depends directly on gaseous carbon dioxide that diffuses into the leaf. However, some plants can store carbon dioxide in the vacuole of the leaf cells as part of a complex carbon compound. This compound is transported to the chloroplast and releases carbon dioxide when required for photosynthesis. This special mechanism is believed to have evolved as an adaptation in such plants which do not open stomata during the daytime to conserve water for survival in dry conditions (desert conditions).

Attempt either (a) or (b) :

(a) (i) Which process in these plants is minimised to help the plants survive in dry conditions ?

(ii) Which part of the leaf is responsible for exchange of gases during photosynthesis ? *4*

OR

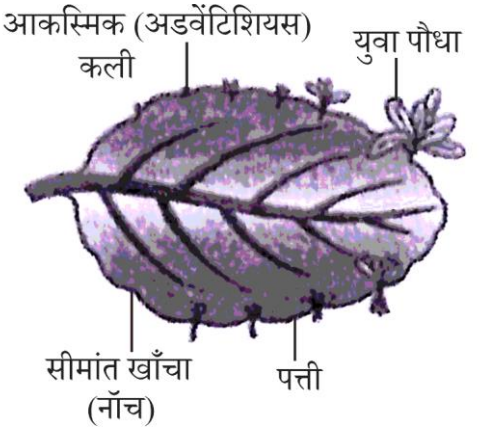
(b) (i) List the events that occur during the process of photosynthesis.

(ii) When are such desert plants likely to take in carbon dioxide from the environment, unlike other plants ?

(iii) Draw a labelled diagram of stomata with open stomatal pore. *4*

16. (क) अथवा (ख) में से किसी एक का उत्तर दीजिए :

(क) दिए गए चित्र का प्रेक्षण कीजिए तथा उसके नीचे दिए गए प्रश्नों के उत्तर दीजिए : *5*



(i) उपर्युक्त चित्र में दिखाई गई संरचना का नाम तथा जनन का प्रकार बताइए।

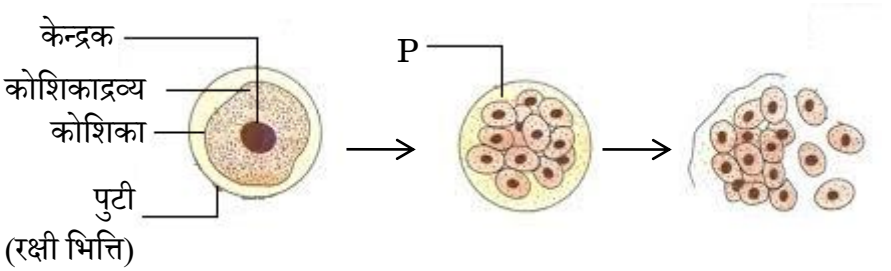
(ii) उपर्युक्त में उल्लिखित जनन की विधि का एक लाभ तथा एक हानि लिखिए।

(iii) कारण बताइए : अलैंगिक प्रजनन में आनुवंशिक विभिन्नता (विविधता) का अभाव होता है।

(iv) लैंगिक जनन प्रक्रम के जटिल होने के बावजूद उच्चतर जीवों ने इसे ही क्यों चुना ?

अथवा

(ख) दिए गए चित्र का प्रेक्षण कीजिए तथा उसके नीचे दिए गए प्रश्नों के उत्तर दीजिए : *5*



(i) उपर्युक्त चित्र का नाम तथा जनन का प्रकार बताइए।

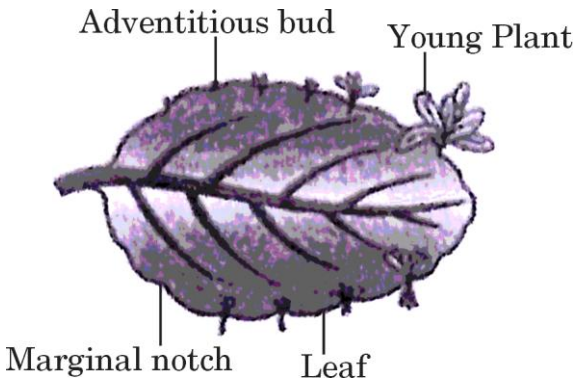
(ii) चरण P में होने वाले प्रक्रमों पर टिप्पणी कीजिए।

(iii) उपर्युक्त में उल्लिखित विधि से जनन करने वाले किसी एक जीव का नाम लिखिए।

(iv) उस विधि का नाम लिखिए जिसका उपयोग उन पौधों को उगाने के लिए किया जा सके, जो बीज उत्पन्न करने की क्षमता खो चुके हैं। इस प्रकार की विधि द्वारा पौधों को उगाने के किन्हीं दो लाभों की सूची बनाइए।

16. Attempt either (a) or (b) :

(a) Observe the given diagram and answer the questions that follow : *5*



(i) Give the name of the structure and type of reproduction shown in the above diagram.

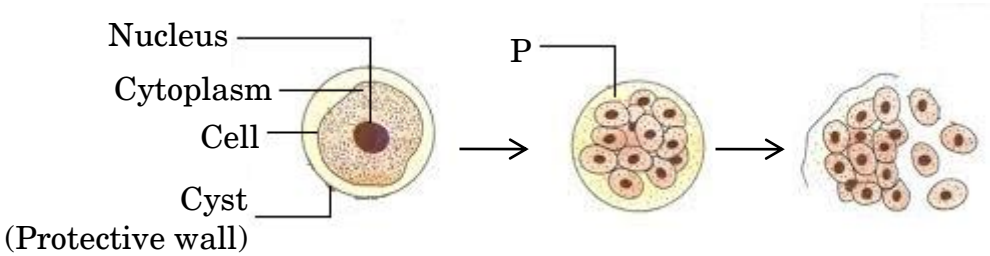
(ii) State one advantage and one disadvantage of the above mentioned method of reproduction.

(iii) Give reason : Asexual reproduction lacks genetic variation.

(iv) Why have higher organisms resorted to sexual reproduction in spite of its complexity ?

OR

(b) Observe the given diagram and answer the questions that follow : *5*



(i) Give the name and type of reproduction shown in the above diagram.

(ii) Comment on the processes taking place in stage P.

(iii) Name an organism which reproduces by the above mentioned method.

(iv) Name the method that can be used to raise plants that have lost their capacity to produce seeds. List any two advantages of growing plants by such a method.

खण्ड ख
रसायन विज्ञान

17. निम्नलिखित में से कौन-सा विस्थापन अभिक्रिया का उदाहरण है ? *1*

(A) प्राकृतिक गैस का दहन
(B) अभिक्रियाशील धातु की तनु अम्ल के साथ अभिक्रिया
(C) जल का विद्युत-अपघटन
(D) बिना बुझे चूने की जल के साथ अभिक्रिया

18. जब हम एक बीकर में लिए गए कॉपर ऑक्साइड की थोड़ी मात्रा में धीरे-धीरे तथा विलोडन के साथ तनु हाइड्रोक्लोरिक अम्ल मिलाते हैं, तो विलयन के रंग में परिवर्तन निम्नलिखित में से किसके बनने के कारण होता है ? *1*

(A) कॉपर(II) ऑक्साइड, जिसका रंग काला है।
(B) कॉपर(I) क्लोराइड, जिसका रंग नीला है।
(C) कॉपर(II) क्लोराइड, जिसका रंग नीला-हरा है।
(D) कॉपर(I) ऑक्साइड, जिसका रंग काला है।

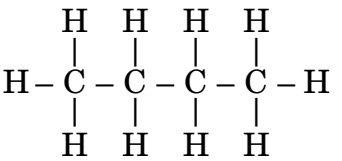
19. निम्नलिखित समीकरण

$$x\ KI + H_2O_2 \longrightarrow I_2 + y\ KOH$$

में x तथा y क्रमश: हैं : *1*

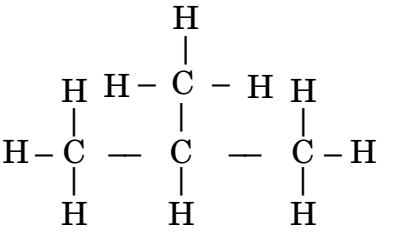
(A) 2, 2 (B) 1, 2
(C) 2, 1 (D) 1, 1

20. नीचे दी गई संरचनाओं 'X' तथा 'Y' पर विचार कीजिए :



'X'

तथा



'Y'

निम्नलिखित कथनों में से कौन-से सही हैं ? *1*

(i) 'X' तथा 'Y' समजातीय हैं।
(ii) 'X' तथा 'Y' के संरचनात्मक सूत्र समान हैं, परन्तु आण्विक सूत्र भिन्न हैं।
(iii) 'X' तथा 'Y' के आण्विक सूत्र समान हैं, परन्तु संरचनात्मक सूत्र भिन्न हैं।
(iv) 'X' तथा 'Y' संरचनात्मक समावयव हैं।

(A) (i) तथा (iii) (B) (i) तथा (iv)
(C) (ii) तथा (iv) (D) (iii) तथा (iv)

SECTION B

CHEMISTRY

17. Which of the following is an example of a displacement reaction ? *1*

(A) The combustion of natural gas
(B) The reaction of a reactive metal with dilute acid
(C) The electrolysis of water
(D) The reaction of quick lime with water

18. To a small amount of copper oxide in a beaker, when we add dilute hydrochloric acid slowly with stirring, the change in the colour of the solution is due to the formation of : *1*

(A) Copper(II) oxide, which is black in colour.
(B) Copper(I) chloride, which is blue in colour.
(C) Copper(II) chloride, which is blue-green in colour.
(D) Copper(I) oxide, which is black in colour.

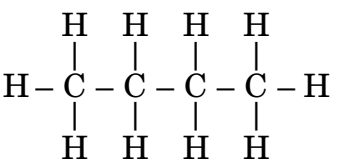
19. In the following equation

$$x\ KI + H_2O_2 \longrightarrow I_2 + y\ KOH$$

x and y respectively are : *1*

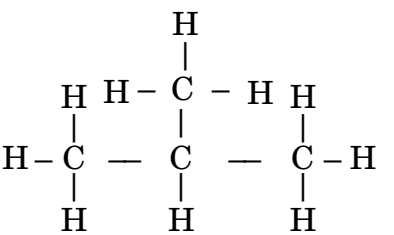
(A) 2, 2 (B) 1, 2
(C) 2, 1 (D) 1, 1

20. Consider the structures 'X' and 'Y' given below :



'X'

and



'Y'

Which of the following statements are correct ? *1*

(i) 'X' and 'Y' are homologues.
(ii) 'X' and 'Y' have the same structural formula, but different molecular formula.
(iii) 'X' and 'Y' have the same molecular formula, but different structural formula.
(iv) 'X' and 'Y' are structural isomers.

(A) (i) and (iii) (B) (i) and (iv)
(C) (ii) and (iv) (D) (iii) and (iv)

[]

21. कैल्शियम की ठंडे जल के साथ अभिक्रिया होती है : *1*

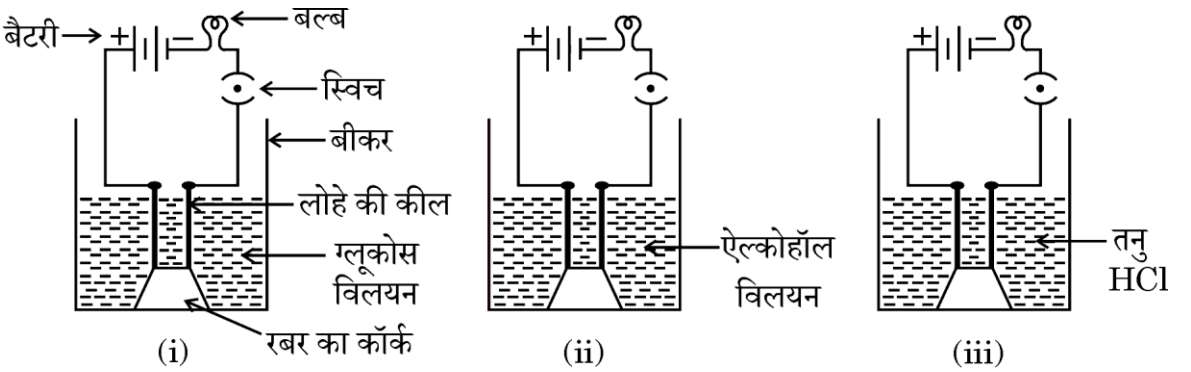
(A) कम तीव्र, लेकिन उत्सर्जित ऊष्मा हाइड्रोजन के प्रज्वलित होने के लिए पर्याप्त होती है।

(B) अति तीव्र और ऊष्माक्षेपी तथा हाइड्रोजन प्रज्वलित हो जाती है।

(C) ऊष्माक्षेपी, लेकिन उत्सर्जित ऊष्मा हाइड्रोजन के प्रज्वलित होने के लिए पर्याप्त नहीं होती है।

(D) मंद तथा ऊष्माशोषी।

22.



किस स्थिति/स्थितियों में बल्ब जलेगा यह मानते हुए कि विद्युत परिपथ के अन्य सभी संयोजन पूर्ण एवं कार्यरत हैं ? *1*

(A) केवल स्थिति (i) (B) केवल स्थिति (ii)

(C) स्थिति (ii) और (iii) (D) केवल स्थिति (iii)

23. जब ज़िंक NaOH के साथ अभिक्रिया करता है, तो निर्मित उत्पाद है : *1*

(A) Na_2O (B) ZnO

(C) Na_2ZnO_2 (D) $Zn(OH)_2$

प्रश्न संख्या 24 के लिए, दो कथन दिए गए हैं – जिनमें एक को अभिकथन (A) तथा दूसरे को कारण (R) के रूप में अंकित किया गया है। इस प्रश्न के सही उत्तर नीचे दिए गए कोडों (A), (B), (C) और (D) में से चुनकर दीजिए।

(A) अभिकथन (A) और कारण (R) दोनों सही हैं और कारण (R), अभिकथन (A) की सही व्याख्या करता है।

(B) अभिकथन (A) और कारण (R) दोनों सही हैं, परन्तु कारण (R), अभिकथन (A) की सही व्याख्या ***नहीं*** करता है।

(C) अभिकथन (A) सही है, परन्तु कारण (R) ग़लत है।

(D) अभिकथन (A) ग़लत है, परन्तु कारण (R) सही है।

21. The reaction of calcium with cold water is : *1*

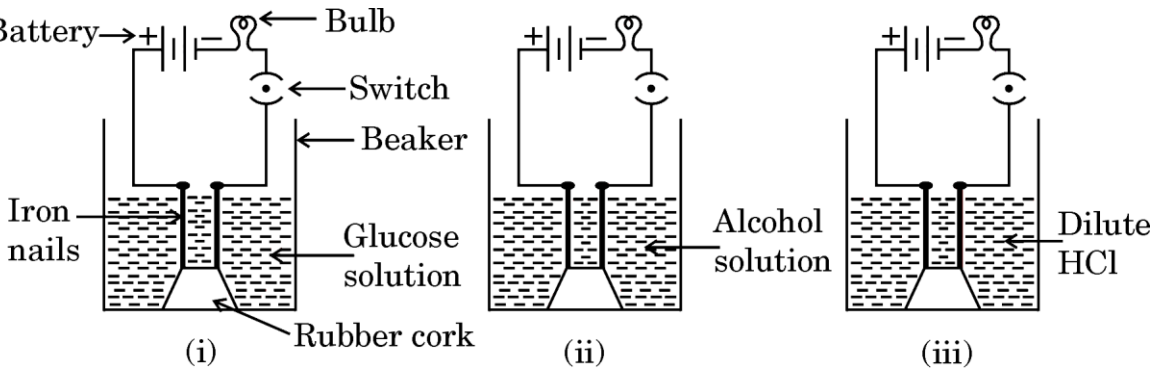
(A) Less violent, but the heat evolved is sufficient for the hydrogen to catch fire.

(B) Very violent and exothermic and hydrogen catches fire.

(C) Exothermic, but the heat evolved is not sufficient for the hydrogen to catch fire.

(D) Slow and endothermic.

22.



In which case/cases will the bulb glow considering that all other connections of electric circuit are complete and working ? *1*

(A) Case (i) only (B) Case (ii) only

(C) Cases (ii) and (iii) (D) Case (iii) only

23. When zinc reacts with NaOH, the product formed is : *1*

(A) Na_2O (B) ZnO

(C) Na_2ZnO_2 (D) $Zn(OH)_2$

For Question number 24, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to this question from the codes (A), (B), (C) and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

[]

24. *अभिकथन (A) :* कार्बन के यौगिक बड़ी संख्या में हैं, जिनमें बहुत से कार्बन परमाणु आपस में एक-दूसरे से जुड़े होते हैं।

कारण (R) : कार्बन-कार्बन आबंध अत्यधिक प्रबल एवं स्थायी होता है। *1*

25. संयोजी परमाणुओं के मध्य इलेक्ट्रॉनों के स्थानांतरण द्वारा निम्नलिखित आयनिक यौगिकों के बनने को दर्शाइए : *1+1=2*

(i) सोडियम ऑक्साइड (Na_2O)

(ii) मैग्नीशियम क्लोराइड ($MgCl_2$)

[दिया गया है : परमाणु क्रमांक : Na = 11, Mg = 12, O = 8, Cl = 17]

26. एक शुष्क क्वथन नली में 2 g हरे रंग के फेरस सल्फेट क्रिस्टलों को गरम किया गया। होने वाली रासायनिक अभिक्रिया के प्रकार का नाम लिखिए। अभिक्रिया के लिए संतुलित रासायनिक समीकरण लिखिए। क्या यह एक ऊष्माक्षेपी अथवा एक ऊष्माशोषी अभिक्रिया है ? *3*

27. (क) अथवा (ख) में से किसी एक का उत्तर दीजिए :

(क) कारण दीजिए : *3×1=3*

(i) अम्ल के तनुकरण के लिए, जल में अम्ल मिलाया जाता है, न कि अम्ल में जल।

(ii) शुष्क HCl गैस नीले लिटमस को लाल में परिवर्तित नहीं करती है जबकि तनु हाइड्रोक्लोरिक अम्ल करता है।

(iii) गरम करने पर कॉपर(II) सल्फेट क्रिस्टलों का नीला रंग, सफेद में परिवर्तित हो जाता है।

अथवा

(ख) निम्नलिखित यौगिकों का विरचन संतुलित रासायनिक समीकरण सहित लिखिए : *3×1=3*

(i) NaOH का क्लोर-क्षार प्रक्रिया द्वारा

(ii) बेकिंग सोडा

(iii) प्लास्टर ऑफ पेरिस

28. निम्नलिखित परिच्छेद को पढ़िए तथा उसके नीचे दिए गए प्रश्नों के उत्तर दीजिए :

धातुओं के परिष्करण में एक वैद्युत-रासायनिक प्रक्रम प्रयुक्त किया जाता है जिसमें विद्युत-अपघटन द्वारा चुनिंदा धातुओं को घोलकर उन्हें निक्षेपित किया जाता है। विद्युत-अपघटनी परिष्करण कॉपर, ज़िंक, टिन, निकैल, सिल्वर तथा स्वर्ण जैसे धातुओं के लिए प्रयुक्त किया जाता है।

(क) ऐनोड पंक की परिभाषा दीजिए। *1*

24. *Assertion (A) :* There are large number of compounds with many carbon atoms linked to each other.

Reason (R) : Carbon-Carbon bond is very strong and stable. *1*

25. Show the formation of the following ionic compounds by transfer of electrons between the combining atoms : *1+1=2*

(i) Sodium oxide (Na_2O)

(ii) Magnesium chloride ($MgCl_2$)

(Given : Atomic number : Na = 11, Mg = 12, O = 8, Cl = 17)

26. 2 g of green coloured crystals of ferrous sulphate are heated in a dry boiling tube. Name the type of chemical reaction taking place. Write the balanced chemical equation for the reaction. Is this an exothermic or an endothermic reaction ? *3*

27. Attempt either (a) or (b) :

(a) Give reasons : *3×1=3*

(i) For dilution of an acid, acid is added into water and not water into acid.

(ii) Dry HCl gas does not turn blue litmus red whereas dilute hydrochloric acid does.

(iii) Blue colour of Copper(II) sulphate crystals turns white on heating.

OR

(b) Write the preparation of the following compounds with balanced chemical equation : *3×1=3*

(i) NaOH by chlor-alkali process

(ii) Baking Soda

(iii) Plaster of Paris

28. Read the following passage and answer the questions that follow :

An electrochemical process is used for refining metals by selectively dissolving and depositing them through electrolysis. Electrolytic refining is used for metals like Copper, Zinc, Tin, Nickel, Silver and Gold.

(a) Define anode mud. *1*

(ख) कॉपर के विद्युत-अपघटनी परिष्करण में, ऐनोड तथा कैथोड के नाम बताइए। *1*

(ग) (i) रासायनिक समीकरण की सहायता से, कॉपर का इसके अयस्क Cu_2S से निष्कर्षण को दर्शाइए। *2*

अथवा

(ग) (ii) कॉपर के विद्युत-अपघटनी परिष्करण को दर्शाने के लिए एक स्वच्छ एवं नामांकित आरेख बनाइए। *2*

29. (क) अथवा (ख) में से किसी एक का उत्तर दीजिए :

(क) (i) समजातीय श्रेणी क्या है ? निम्नलिखित कार्बनिक यौगिकों में से कौन-से दो एक ही समजातीय श्रेणी के सदस्य हैं ?

C_2H_4, C_4H_{10}, C_3H_4, C_4H_8

(ii) निम्नलिखित अभिक्रियाओं में उत्पाद/उत्पादों को लिखिए :

(I) $CH_3 - CH_2 - OH + CH_3COOH \xrightarrow{\text{अम्ल}}$

(II) $C_2H_5OH + O_2 \xrightarrow{\text{दहन}}$

(iii) जब साबुन को जल में मिलाया जाता है, तो मिसेल निर्माण क्यों होता है ? *2+2+1=5*

अथवा

(ख) (i) निम्नलिखित यौगिकों के नाम लिखिए :

(I) $CH_3 - \underset{\underset{O}{\|}}{C} - CH_3$

(II) $H - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - C \equiv C - H$

(ii) वनस्पति तेल को घी में परिवर्तित करने के लिए सामान्यत: काम में आने वाली अभिक्रिया का नाम दीजिए।

(iii) C_4H_{10} का गलनांक C_3H_8 से उच्चतर क्यों होता है ?

(iv) क्या होता है जब सोडियम का एक टुकड़ा एथेनॉल में डाला जाता है ?

(v) निम्नलिखित अभिक्रिया में उत्पाद लिखिए : *5×1=5*

$CH_3COOC_2H_5 + NaOH \longrightarrow$

(b) In electrolytic refining of copper, name the anode and the cathode. *1*

(c) (i) With the help of chemical equations, show the extraction of copper from its ore Cu_2S. *2*

OR

(c) (ii) Draw a neat and labelled diagram showing electrolytic refining of copper. *2*

29. Attempt either (a) or (b) :

(a) (i) What is homologous series ? Which two of the following organic compounds belong to the same homologous series ?
C_2H_4, C_4H_{10}, C_3H_4, C_4H_8

(ii) Write the product(s) in the following reactions :

(I) $CH_3 - CH_2 - OH + CH_3COOH \xrightarrow{\text{Acid}}$

(II) $C_2H_5OH + O_2 \xrightarrow{\text{Burning}}$

(iii) Why does micelle formation take place when soap is added to water ? *2+2+1=5*

OR

(b) (i) Name the following compounds :

(I) $CH_3 - \underset{\underset{O}{\|}}{C} - CH_3$

(II) $H - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - C \equiv C - H$

(ii) Name the reaction which is commonly used in the conversion of vegetable oils to fats.

(iii) Why is the melting point of C_4H_{10} higher than C_3H_8 ?

(iv) What happens when a piece of sodium is dropped into ethanol ?

(v) Write the products in the following reaction : *5×1=5*

$CH_3COOC_2H_5 + NaOH \longrightarrow$

खण्ड ग

भौतिक विज्ञान

30. विद्युत परिपथ में ऐमीटर और वोल्टमीटर को संयोजित करने की सही व्यवस्था है : *1*

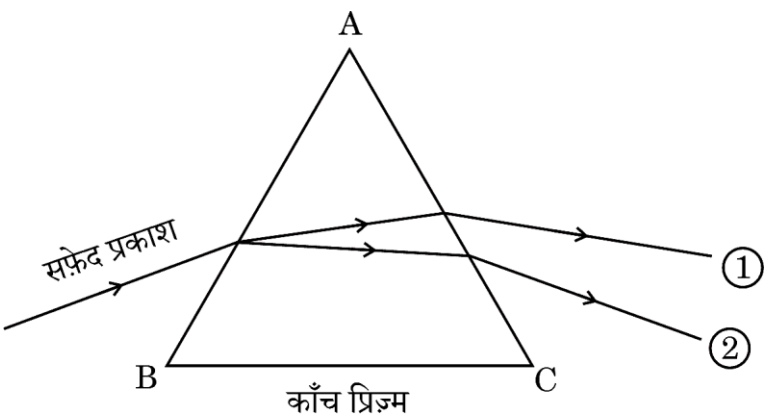
(A) ऐमीटर पार्श्वक्रम में और वोल्टमीटर श्रेणीक्रम में

(B) ऐमीटर एवं वोल्टमीटर दोनों पार्श्वक्रम में

(C) ऐमीटर श्रेणीक्रम में और वोल्टमीटर पार्श्वक्रम में

(D) ऐमीटर एवं वोल्टमीटर दोनों श्रेणीक्रम में

31. प्रिज़्म से अपवर्तन दर्शाते हुए दिए गए किरण आरेख का प्रेक्षण कीजिए और किरण 1 तथा 2 के रंग के लिए सही विकल्प का चयन कीजिए : *1*



	किरण 1 का रंग	*किरण 2 का रंग*
(A)	नीला	लाल
(B)	हरा	पीला
(C)	लाल	बैंगनी
(D)	बैंगनी	लाल

प्रश्न संख्या 32 के लिए, दो कथन दिए गए हैं – जिनमें एक को अभिकथन (A) तथा दूसरे को कारण (R) के रूप में अंकित किया गया है। इस प्रश्न के सही उत्तर नीचे दिए गए कोडों (A), (B), (C) और (D) में से चुनकर दीजिए।

(A) अभिकथन (A) और कारण (R) दोनों सही हैं और कारण (R), अभिकथन (A) की सही व्याख्या करता है।

(B) अभिकथन (A) और कारण (R) दोनों सही हैं, परन्तु कारण (R), अभिकथन (A) की सही व्याख्या ***नहीं*** करता है।

(C) अभिकथन (A) सही है, परन्तु कारण (R) ग़लत है।

(D) अभिकथन (A) ग़लत है, परन्तु कारण (R) सही है।

SECTION C

PHYSICS

30. The correct way to connect an ammeter and a voltmeter in an electric circuit is : *1*

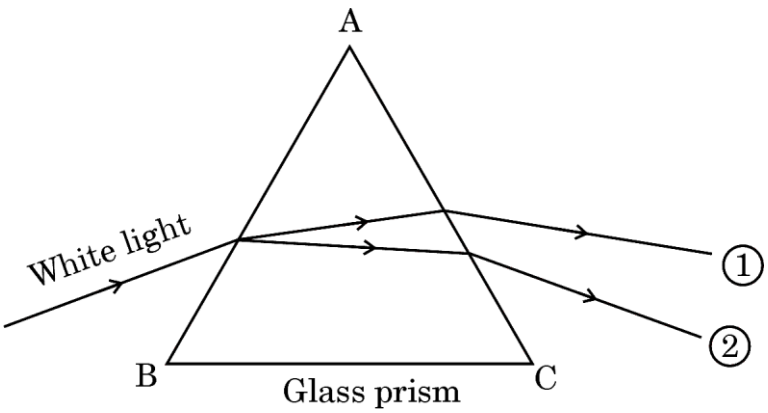
(A) Ammeter in parallel and voltmeter in series

(B) Ammeter and voltmeter both in parallel

(C) Ammeter in series and voltmeter in parallel

(D) Ammeter and voltmeter both in series

31. Observe the given ray diagram showing refraction through a prism and choose the correct option for colour of rays 1 and 2 : *1*



	Colour of ray 1	*Colour of ray 2*
(A)	Blue	Red
(B)	Green	Yellow
(C)	Red	Violet
(D)	Violet	Red

For Question number 32, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to this question from the codes (A), (B), (C) and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

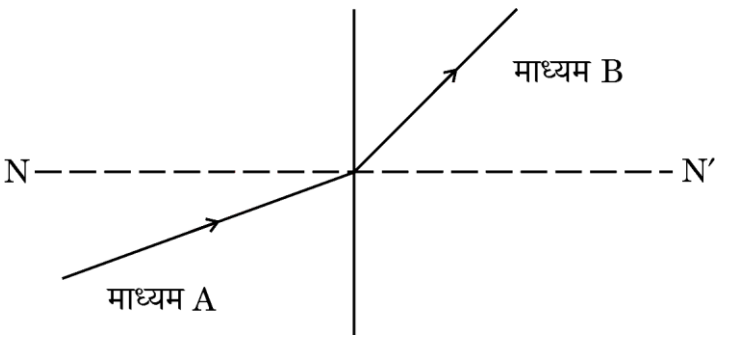
(D) Assertion (A) is false, but Reason (R) is true.

[]

32. *अभिकथन (A) :* बाह्य चुम्बकीय क्षेत्र में रखने पर एक दिक्सूचक की सुई सदैव पृथ्वी की उत्तर-दक्षिण दिशा में संरेखित होती है।

कारण (R) : दिक्सूचक की सुई का व्यवहार मुक्त रूप से लटकाए गए छड़ चुम्बक के व्यवहार की भाँति होता है। *1*

33.



दिए गए चित्र में दर्शाए अनुसार एक प्रकाश की किरण माध्यम A से माध्यम B में प्रवेश करती है :

(क) इनमें से कौन-सा माध्यम दूसरे माध्यम की तुलना में प्रकाशिकत: अधिक सघन है ? अपने उत्तर की पुष्टि कीजिए।

(ख) यदि प्रकाश की चाल माध्यम A में V_A तथा माध्यम B में V_B है, तो माध्यम A के सापेक्ष माध्यम B का अपवर्तनांक क्या होगा ? *2*

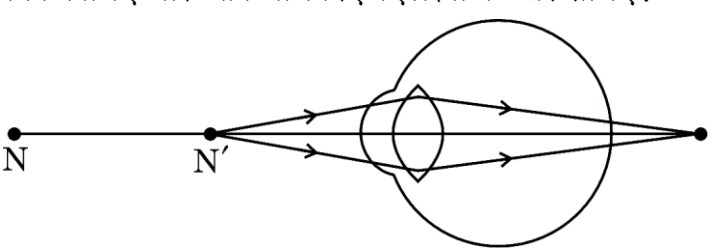
34. (क) अथवा (ख) में से किसी एक का उत्तर दीजिए :

(क) क्या होता है जब प्रकाश, माध्यम के (i) बहुत छोटे कणों से तथा (ii) बहुत बड़े आकार के कणों से प्रकीर्णित होता है ? प्रत्येक स्थिति में अपने उत्तर के समर्थन में तर्क दीजिए। *2*

अथवा

(ख) किरण आरेख की सहायता से, प्रकृति में स्पेक्ट्रम बनने की किसी परिघटना की व्याख्या कीजिए। *2*

35. दिए गए चित्र का अध्ययन कीजिए और उसके नीचे दिए गए प्रश्नों के उत्तर दीजिए :

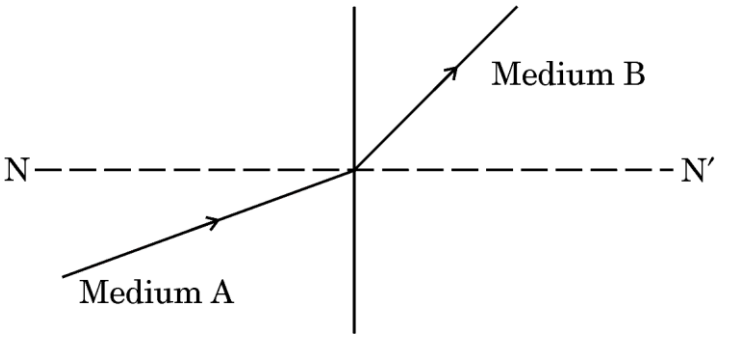


(क) चित्र में दर्शाए दृष्टि दोष का नाम लिखिए। इस दृष्टि दोष में प्रतिबिंब नेत्र के दृष्टिपटल (रेटिना) के सापेक्ष कहाँ बनता है ?

32. *Assertion (A) :* The needle of a compass, kept in an external magnetic field, always aligns itself in the North-South direction of the Earth.

Reason (R) : The behaviour of the needle of the compass is similar to the behaviour of a freely suspended bar magnet. *1*

33.



A ray of light enters into medium B from medium A as shown in the given figure :

(a) Which one of these two media is optically denser than the other medium ? Justify your answer.

(b) If the speed of light in medium A is V_A and in medium B is V_B, then what is the refractive index of medium B with respect to medium A ? *2*

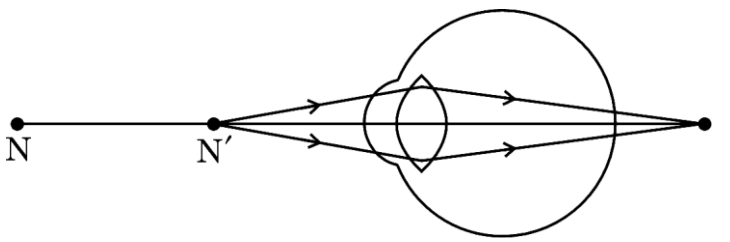
34. Attempt either (a) or (b) :

(a) What happens when light is scattered from (i) very fine particles and (ii) very large size particles of medium ? Justify your answer in each case. *2*

OR

(b) With the help of a ray diagram, explain any phenomenon of formation of spectrum in nature. *2*

35. Study the given diagram and answer the questions that follow :



(a) Write the name of the eye defect shown in the diagram. Where is the image formed in this eye defect with respect to the retina of the eye ?

(ख) इस दृष्टि दोष के दो कारणों को सूचीबद्ध कीजिए।

(ग) चित्र की सहायता से, दर्शाइए कि इस दृष्टिदोष को किस प्रकार से संशोधित करते हैं। *3*

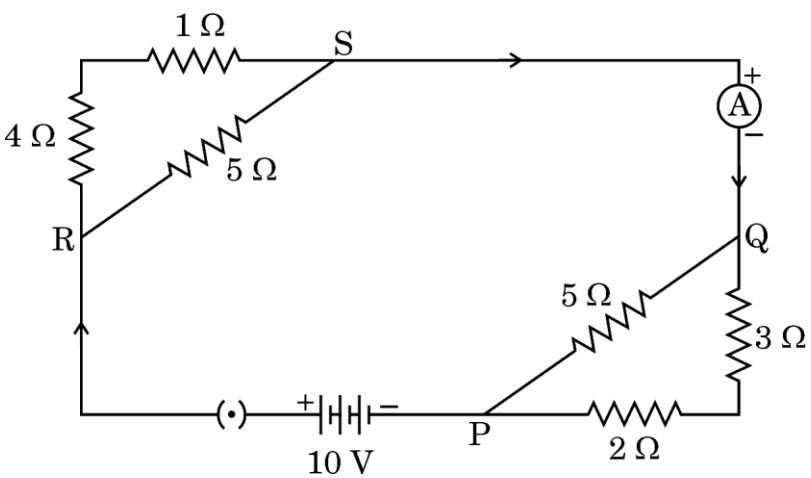
36. (क) उस एक युक्ति का नाम लिखिए जिसका उपयोग :

(i) परिपथ में नियत विभवान्तर बनाए रखने के लिए होता है।

(ii) विद्युत परिपथ में विद्युत धारा का मान परिवर्तित करने के लिए किया जाता है।

(ख) जब किसी विद्युत हीटर के सिरों के बीच विभवान्तर 110 V है, तो इसमें 5 A की विद्युत धारा प्रवाहित होती है। जब विभवान्तर बढ़ाकर 220 V किया जाता है, तो इसमें प्रवाहित विद्युत धारा का मान कितना होगा ? *3*

37. दिए गए विद्युत परिपथ पर विचार कीजिए :



निम्नलिखित का परिकलन कीजिए : *3*

(क) परिपथ का कुल प्रतिरोध

(ख) बैटरी से ली गई विद्युत धारा

(ग) बिन्दु P और Q के बीच विभवान्तर

(b) List two causes of this eye defect.

(c) With the help of a diagram, show how this eye defect of vision is corrected. *3*

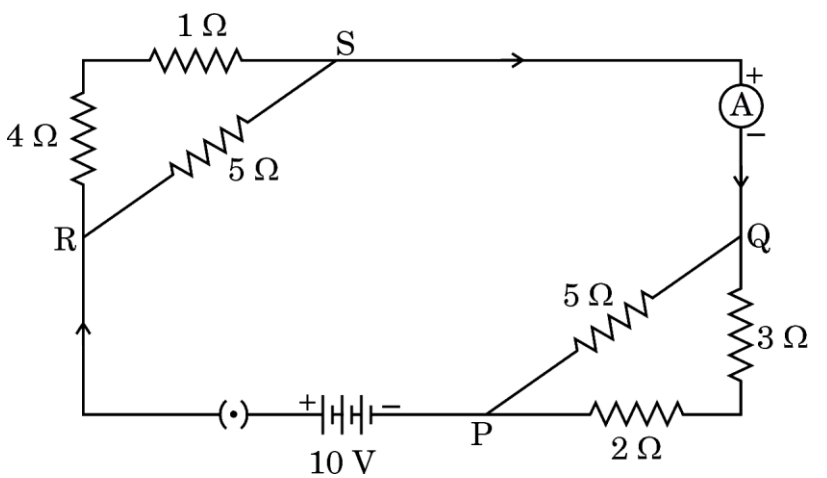
36. (a) Name a device which is used to :

(i) Maintain a constant potential difference in a circuit.

(ii) Change the electric current in an electric circuit.

(b) When the potential difference between the terminals of an electric heater is 110 V, a current of 5 A flows through it. What will be the value of current flowing through it when the potential difference is increased to 220 V ? *3*

37. Consider the given electric circuit :



Calculate the following : *3*

(a) Total resistance of the circuit

(b) The electric current drawn from the battery

(c) Potential difference between points P and Q

[]

38. किसी उत्तल लेंस के लिए बिंब की दूरी (u) के साथ, प्रतिबिंब की दूरी (v) में परिवर्तन निम्न प्रेक्षण सारणी में दिया गया है। इसका विश्लेषण कीजिए और नीचे दिए गए प्रश्नों के उत्तर दीजिए :

क्रम संख्या	बिंब की दूरी (u) cm	प्रतिबिंब की दूरी (v) cm
1	– 150	+ 30
2	– 75	+ 37·5
3	– 50	+ 50
4	– 37·5	+ 75
5	– 30	+ 150
6	– 15	+ 37·5

(क) बिना किसी परिकलन, दिए गए उत्तल लेंस की फोकस दूरी ज्ञात कीजिए। अपने उत्तर के समर्थन में तर्क दीजिए। *1*

(ख) सारणी में दिया गया कौन-सा प्रेक्षण सही नहीं है और क्यों ? *1*

(ग) (i) $u = -30$ cm के लिए आवर्धन का मान ज्ञात कीजिए। बनने वाले प्रतिबिंब की प्रकृति लिखिए। अपने उत्तर के लिए कारण दीजिए। *2*

अथवा

(ग) (ii) ऊपर दी गई सारणी के प्रेक्षणों का विश्लेषण कीजिए और $u = -30$ cm एवं $v = 150$ cm के लिए नामांकित किरण आरेख बनाइए। *2*

39. (क) अथवा (ख) में से किसी एक का उत्तर दीजिए :

(क) (i) परिनालिका क्या होती है ? एक धारावाही परिनालिका के अंदर और बाहर उत्पन्न चुम्बकीय क्षेत्र का पैटर्न दर्शाता हुआ आरेख बनाइए।

(ii) किन्हीं दो कारकों के नाम लिखिए जिन पर धारावाही परिनालिका के कारण चुम्बकीय क्षेत्र का परिमाण निर्भर करता है।

38. The variation of image distance (v) with the object distance (u) for a convex lens is given in the following observation table. Analyse it and answer the questions given below :

S.No.	Object distance (u) cm	Image distance (v) cm
1	– 150	+ 30
2	– 75	+ 37·5
3	– 50	+ 50
4	– 37·5	+ 75
5	– 30	+ 150
6	– 15	+ 37·5

(a) Without calculation, find out the focal length of the given convex lens. Justify your answer. *1*

(b) Which one of the observations given in the table is not correct and why ? *1*

(c) (i) Find out the value of magnification for $u = -30$ cm. Write the nature of the image formed. Give reason for your answer. *2*

OR

(c) (ii) Analyse the data given in the table above and draw the labelled ray diagram for $u = -30$ cm and $v = 150$ cm. *2*

39. Attempt either (a) or (b) :

(a) (i) What is a solenoid ? Draw a diagram showing the magnetic field pattern due to a current-carrying solenoid (inside and outside).

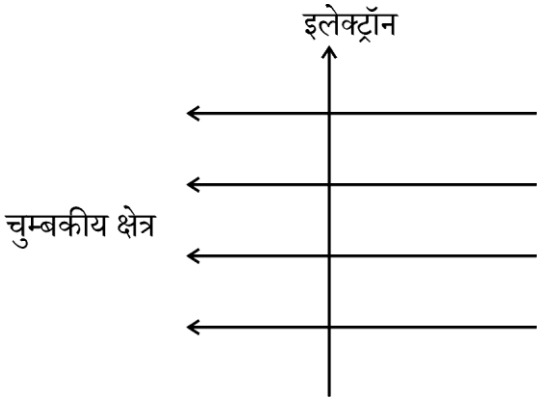
(ii) Name any two factors on which the magnitude of the magnetic field due to a current-carrying solenoid depends.

(iii) किसी धारावाही परिनालिका को खींचकर एक सीधे धारावाही चालक तार के रूप में परिवर्तित कर दिया जाता है। अब इस तार के परित: चुम्बकीय क्षेत्र का पैटर्न दर्शाता हुआ आरेख बनाइए और इस पर चुम्बकीय क्षेत्र की दिशा अंकित कीजिए। *5*

अथवा

(ख) (i) चित्र की सहायता से, दर्शाइए कि बाह्य चुम्बकीय क्षेत्र में रखा हुआ कोई धारावाही चालक, बल का अनुभव करता है। क्षेत्र, धारा एवं बल की दिशा स्पष्ट रूप से दर्शाइए।

(ii) नीचे दिए गए आरेख में किसी एकसमान चुम्बकीय क्षेत्र में गमन करता हुआ इलेक्ट्रॉन दर्शाया गया है :



(I) इलेक्ट्रॉन पर लगने वाले बल की दिशा क्या होगी ?

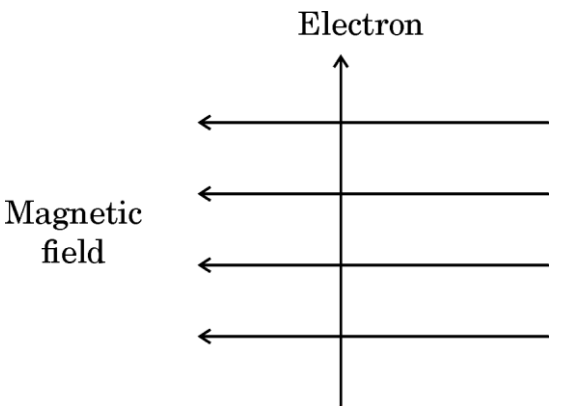
(II) इलेक्ट्रॉन पर लगने वाले बल की दिशा पर क्या प्रभाव पड़ेगा, यदि चुम्बकीय क्षेत्र की दिशा के साथ-साथ इलेक्ट्रॉन की गति की दिशा, दोनों को उत्क्रमित (विपरीत) कर दिया जाए ? *5*

(iii) A current-carrying solenoid is stretched and converted into a straight wire carrying current. Draw a diagram showing the magnetic field pattern around it and mark the direction of the magnetic field. *5*

OR

(b) (i) With the help of a diagram, show that a current-carrying conductor placed in an external magnetic field, experiences a force. Indicate the direction of the field, current and force clearly.

(ii) The diagram given below shows an electron moving in a uniform magnetic field.



(I) What will be the direction of the force acting on the electron ?

(II) What will happen to the direction of the force acting on the electron, if the direction of the magnetic field as well as the direction of motion of the electron, both are reversed ? *5*

Marking Scheme **Strictly Confidential** **(For Internal and Restricted use only)** **Secondary School Examination, 2026 (Xth)** **SUBJECT NAME SCIENCE (Q.P. CODE /Set No 31/3/1)**	
General Instructions: -	
1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	**"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC."**
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In Class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.**
4	The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark (√) wherever answer is correct. For wrong answer CROSS 'X' be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.

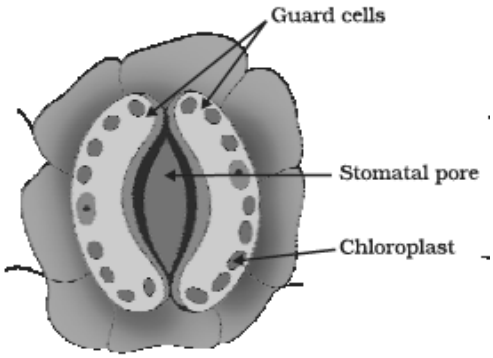
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
13	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- ● Leaving answer or part thereof unassessed in an answer book. ● Giving more marks for an answer than assigned to it. ● Wrong totalling of marks awarded on an answer. ● Wrong transfer of marks from the inside pages of the answer book to the title page. ● Wrong question wise totalling on the title page. ● Wrong totalling of marks of the two columns on the title page. ● Wrong grand total. ● Marks in words and figures not tallying/not same. ● Wrong transfer of marks from the answer book to online award list. ● Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for Spot Evaluation**" before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME

SCIENCE (Subject Code-086)

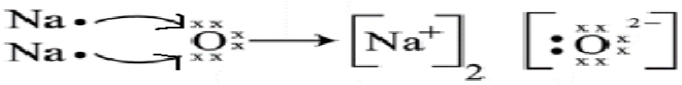
(PAPER CODE: 31/3/1) (10-03-86K)

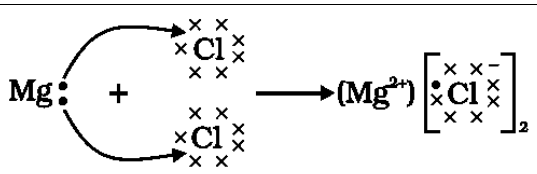
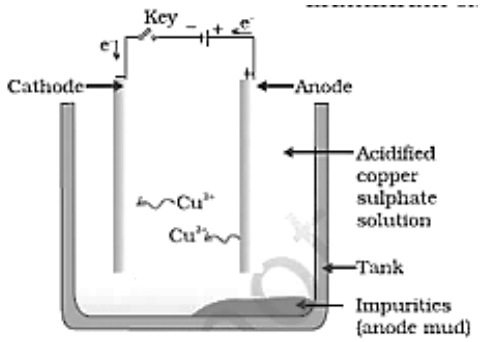
S.No.	EXPECTED OUTCOMES/VALUE POINTS	Marks	Total marks
	SECTION – A **(Biology)**		
1.	(B)/ (i) and (iii)	**1**	**1**
2.	(B)/ Both plants are covered with separate wooden bell-jars	**1**	**1**
3.	(C)/ Hind Brain-Cerebellum	**1**	**1**
4.	(D)/ Axonal end of one neuron to dendritic end of another neuron	**1**	**1**
5.	(A)/ Food Web	**1**	**1**
6.	(B)/ Human Beings	**1**	**1**
7.	(D)/ Rapid cell division in tendril cells that are away from the support	**1**	**1**
8.	(A)/ Both A and R are true, and R is the correct explanation of A	**1**	**1**
9.	(B)/ Both A and R are true but R is not the correct explanation of A	**1**	**1**
10	(i) To freeze the CFC production at 1986 levels. (ii) Ozone shields the earth's surface from harmful UV radiations.	**1** **1**	**2**
11	• Aerobic Respiration • Complete breakdown of glucose takes place in presence of oxygen releasing more energy.	**1** **1**	**2**
12	I. (i) 2-chambered (ii) Amphibians/Reptiles (iii) Double circulation II. Double circulation	**½x3** **½**	**2**
13.	• Root pressure: Cells in the contact of the soil actively take up ions and creates a difference in concentration between roots and soil, water moves from soil to root to eliminate this difference. • Transpirational pull: Water lost through transpiration from aerial parts of plants, creates a suction which pulls water column from xylem cells of roots.	**½+1** **½+1**	**3**
14.	Parents: TT x tt (Tall) (short)	**½**	

	Gametes: (T), (T) (t), (t) F1 Tt All Tall plants Observations: • No medium or short height plants were observed in F1 generation. • All progeny resembles one of the parents. • All plants were tall. (any two observations)	½ 1 ½ ½	3
15.	(a) (i) Opening of stomata during the day is minimised to prevent loss of water by evaporation. / Transpiration (loss of water in the form of water vapour) is minimised. (ii) Stomata **OR** (b) (i) • Absorption of light energy by Chlorophyll. • Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen • Reduction of Carbon Dioxide into Carbohydrates (ii) At night. (iii) Diagram of Open stomatal pore.  Diagram - 1 Mark Labelling - 1 Mark	**2** **2** **1** **1** **2**	**4**
16	(a) (i) • Structure: *Bryophyllum* leaf • Type: Vegetative propagation / Asexual reproduction (ii) • Advantage: Genetically identical plants, maintaining desirable traits of the parents. / Bear flowers and fruits	½ ½ **1**	

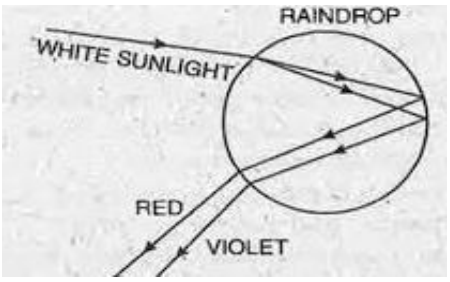
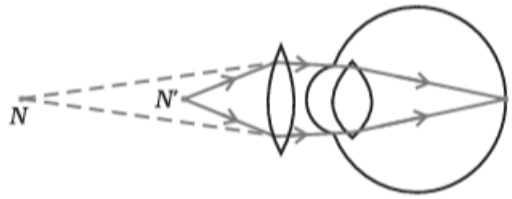
	earlier than those plants which are grown from seeds / Used for the plants that have lost their capacity to produce seeds. (any one) • Disadvantage: No genetic variation.	**1**	
	(iii) As DNA of single parent is involved without gamete fusion. / Offsprings are produced by mitosis hence similar genetic makeup thus, no variation.	**1**	
	(iv) It creates genetic variation, enhances chances of survival in changing environment and drives evolution.	**1**	
	OR		
	(b) (i) Name: Multiple Fission Type: Asexual reproduction	**½** **½**	
	(ii) In stage P, many daughter cells are produced by multiple fission / Repeated nuclear divisions followed by cytoplasmic divisions.	**1**	
	(iii) *Plasmodium* (any other)	**½**	
	(iv) • Vegetative propagation	**½**	
	Advantages – • All the plants produced are genetically similar to the parent plant • Such plants can bear flowers and fruits earlier than those produced from seeds. (any other advantage)	**1** **1**	**5**

SECTION – B
(Chemistry)

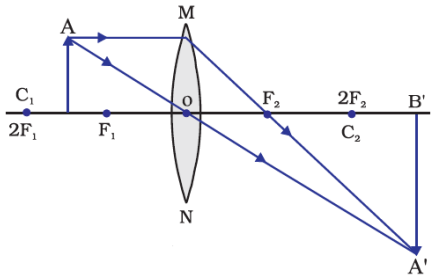
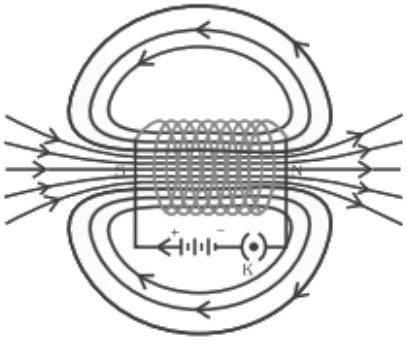
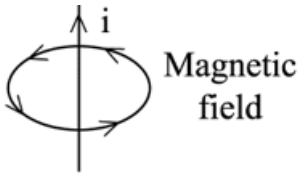
17.	(B)/ The reaction of a reactive metal with dilute acid.	**1**	**1**
18.	(C)/ Copper (II) chloride, which is blue-green in colour.	**1**	**1**
19.	(A)/ 2,2	**1**	**1**
20.	(D)/ (iii) and (iv)	**1**	**1**
21.	(C)/ Exothermic, but the heat evolved is not sufficient for the hydrogen to catch fire.	**1**	**1**
22.	(D)/ Case (iii) only	**1**	**1**
23.	(C)/ Na_2ZnO_2	**1**	**1**
24.	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	**1**	**1**
25.	(i)  (ii)	**1**	

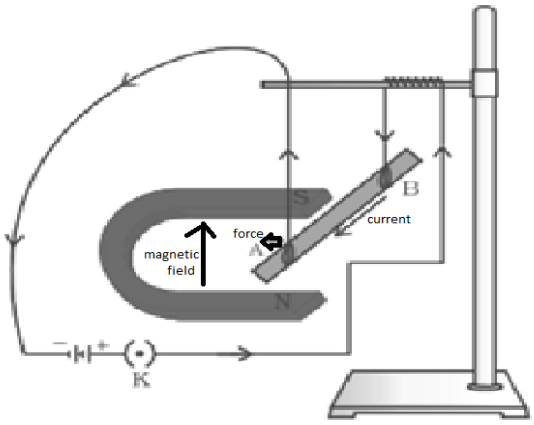
		1	2
26.	• Thermal decomposition reaction • $2FeSO_4(s) \xrightarrow{heat} Fe_2O_3(s) + SO_2(g) + SO_3(g)$ (deduct ½ mark if no / incorrect balancing) • Endothermic reaction	1 1 1	3
27.	(a) (i) When acid is added to water, it does not cause excessive local heating/ does not splash out and cause burns. (ii) Because dry HCl does not ionize/produce H^+ ions whereas in dilute HCl, H^+ ions are present. (iii) Because of loss of 5 molecules of water of crystallisation. **OR** (b) (i) $2NaCl(aq) + 2H_2O(l) \xrightarrow{electricity} 2NaOH(aq) + H_2(g) + Cl_2(g)$ (ii) $NaCl + H_2O + NH_3 + CO_2 \longrightarrow NaHCO_3 + NH_4Cl$ (iii) $CaSO_4.2H_2O \xrightarrow{373K} CaSO_4.\frac{1}{2}H_2O + 1\frac{1}{2}H_2O$ (Deduct ½ mark if no/ incorrect balancing in each case)	1 1 1 1 1 1	3
28.	(a) During electrolytic refining of a metal, the insoluble impurities which settle down at the bottom of the anode is called anode mud. (b) Anode: Impure copper rod Cathode: Pure copper strip (c) (i) $2Cu_2S + 3O_2(g) \xrightarrow{heat} 2Cu_2O(s) + 2SO_2(g)$ $2Cu_2O + Cu_2S \xrightarrow{heat} 6Cu(s) + SO_2(g)$ **OR** (c) (ii)  (Diagram- 1 mark, Labelling-1 mark)	1 ½ ½ 1 1 2	4

29.	(a) (i) • A series of compounds in which the same functional group substitutes for hydrogen in a carbon chain. / Can be represented by a single general formula and successive members differ by -CH_2 unit or 14u. • C_2H_4 and C_4H_8 belong to the same homologous series/ are alkenes. (ii) (I) $CH_3CH_2OH + CH_3COOH \xrightarrow{\text{Acid}} CH_3COOC_2H_5 + H_2O$ (II) $C_2H_5OH + 3O_2 \xrightarrow{\text{Burning}} 2CO_2 + 3H_2O$ (balancing may be ignored) (iii) The ionic end of soap interacts with water while the carbon chain interacts with oil/dirt. The soap molecules thus form a structure called micelle. **OR** (b) (i) (I) Propanone/acetone (II) Propyne (ii) Hydrogenation/addition reaction. (iii) C_4H_{10} will have higher melting point, as it has a higher molecular mass than C_3H_8 and melting point increases with the increase in molecular mass. (iv) Sodium ethoxide (C_2H_5ONa) is formed and hydrogen gas is evolved. / $2Na + 2CH_3CH_2OH \rightarrow 2CH_3CH_2O^-Na^+ + H_2$ (balancing may be ignored) (v) $CH_3COON\ C_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$	**1** **1** **1** **1** **1** ½ ½ **1** **1** **1** ½+ ½	**5**
	SECTION – C **(Physics)**		
30.	(C) /Ammeter in series and voltmeter in parallel.	**1**	**1**
31.	(C) /Colour of ray 1- Red; Colour of ray 2 - Violet	**1**	**1**
32.	(D)/Assertion (A) is false, but Reason (R) is true.	**1**	**1**
33.	(a) Medium A is optically denser than B because light ray is going away from the normal NN'. (b) $n_{BA} = \frac{V_A}{V_B}$	**1** **1**	**2**
34.	(a) (i) Mainly blue coloured light is scattered because very fine particles scatter shorter wavelength. (ii) Scattered light may appear white because very large size particles scatter light of all wavelengths.	**1** **1**	

	OR (b)  A natural spectrum like rainbow is formed when sunlight passes through tiny water droplets present in the atmosphere. The water droplets disperse the incident light ray, then reflect it internally and finally refract it again when it comes out of the raindrop. (any other phenomenon of spectrum in nature)	**1** **1**	**2**
35.	(a) • Hypermetropia/ Far -Sightedness • Behind the retina. (b) • Focal length of the eye lens is too long. • The eye ball has become too small. (c)  	½ ½ ½ ½ **1**	**3**
36.	(a) (i) Battery / Electric cell (ii) Rheostat / Variable resistance (b) Resistance of the heater, $R = \frac{V}{I}$ $R = \frac{110}{5}$ $R = 22\ \Omega$ Current through the heater, $I' = \frac{V'}{R}$ $= \frac{220}{22}$ $= 10\ A$ / **Alternate answer for (b)**: • According to Ohm's law, potential difference is directly proportional to current. • When the potential difference is doubled, current will also be doubled. So, value of current will be 10A.	½ ½ ½ ½ **1** **1** **1**	**3**
37.	(a) 4 Ω and 1 Ω are in series, $R_s = 4\Omega + 1\ \Omega = 5\ \Omega$		

	Resistance across R and S, $\frac{1}{R_1} = \frac{1}{5} + \frac{1}{5}$ $R_1 = \frac{5}{2}\Omega$ 2 Ω and 3 Ω are in series, R_{s1} = 2Ω + 3 Ω = 5 Ω Resistance across P and Q, $\frac{1}{R_2} = \frac{1}{5} + \frac{1}{5}$ $R_2 = \frac{5}{2}\Omega$ Total resistance: $R = R_1 + R_2$ $= \frac{5}{2} + \frac{5}{2}$ = 5 Ω	**1**	
	(b) $I = \frac{V}{R}$ $I = \frac{10}{5}$ I = 2 A	**1**	
	(c) V = I R $V = 2 \times \frac{5}{2}$ V = 5 V	**1**	**3**
38.	(a) In observation no.3. The object distance is equal to image distance, which is only possible when the object is at 2F (C) =50 cm. Therefore, the focal length is 25 cm.	**1**	
	(b) • Observation no. 6 • Because when object is kept between F and O, image formed by lens will be on same side of object. Hence, image distance(v) should be negative.	½ ½	
	(c) (i) $m = \frac{v}{u}$ $= \frac{150}{-30}$ m = – 5	½ ½	
	• Nature of image: Image will be real and inverted • Reason: because the value of m is negative.	½ ½	

	. **OR** (c) (ii)  (deduct ½ mark for no or incorrect direction of rays)	**2**	**4**
39.	(a) (i) Solenoid – A coil of many circular turns of insulated copper wire, wrapped closely in the shape of cylinder.  (ii) • Current flowing through the solenoid • No. of turns of the coil (iii)  Note: Award marks if a different direction of current is shown with the correct corresponding direction of magnetic field. **OR** (b) (i) When current is passed through the conductor, it experiences a force and gets displaced.	**1** **2** ½ ½ **1**	

	 diagram direction of current direction of magnetic field direction of force (ii) (I) Into the plane of paper (II) The direction of force will remain same.	**1½** **½** **½** **½** **1** **1**	**5**

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2026 (X^{th})
SUBJECT NAME SCIENCE (Q.P. CODE /Set No 31/3/2)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
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6	Evaluators will mark (√) wherever answer is correct. For wrong answer CROSS 'X' be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written in the left-hand margin and encircled. This may be followed strictly.
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9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
13	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- ● Leaving answer or part thereof unassessed in an answer book. ● Giving more marks for an answer than assigned to it. ● Wrong totalling of marks awarded on an answer. ● Wrong transfer of marks from the inside pages of the answer book to the title page. ● Wrong question wise totalling on the title page. ● Wrong totalling of marks of the two columns on the title page. ● Wrong grand total. ● Marks in words and figures not tallying/not same. ● Wrong transfer of marks from the answer book to online award list. ● Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
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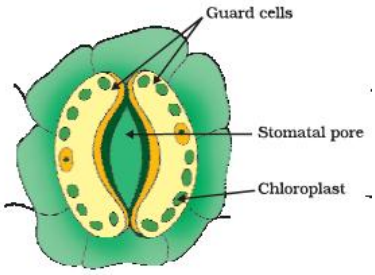
MARKING SCHEME
SCIENCE (Subject Code-086)
(PAPER CODE: 31/3/2) (10-03-86K)

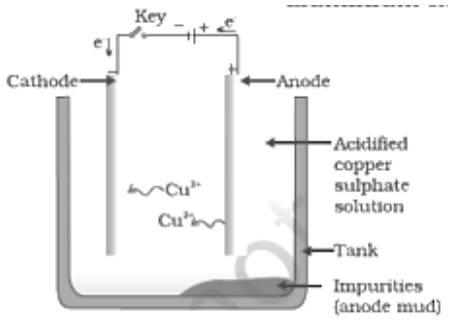
Q.No.	EXPECTED OUTCOMES/VALUE POINTS	Marks	Total Marks
	SECTION – A (Biology)		
1.	(B)/ Both plants are covered with separate wooden bell-jars	**1**	**1**
2.	(A)/ Food Web	**1**	**1**
3.	(D)/ Axonal end of one neuron to dendritic end of another neuron	**1**	**1**
4.	(D)/ Rapid cell division in tendril cells that are away from the support	**1**	**1**
5.	(B)/ Human Beings	**1**	**1**
6.	(A) Promote cell division	**1**	**1**
7.	(D) halving of chromosomes at the time of gamete formation.	**1**	**1**
8.	(B)/ Both A and R are true but R is not the correct explanation of A	**1**	**1**
9.	(B)Both A and R are true but R is not the correct explanation of A.	**1**	**1**
10.	• Aerobic Respiration • Complete breakdown of glucose takes place in presence of oxygen releasing more energy.	**1** **1**	**2**
11.	I. (i) 2-chambered (ii) Amphibians/Reptiles (iii) Double circulation II. Double circulation	**½x3** **½**	**2**
12.	Plant → Goat → Man According to 10 % Law, only 10 % of energy from a trophic level is transferred to the next trophic level. So, if Man has 5 J energy then Goat has 5 × 10 = 50 J And plants (producers) have 50 × 10 = 500 Joule	**1** **1**	**2**
13.	(a) All Blue flowers (b) Parents : BB × bb Gametes Ⓑ Ⓑ ⓑ ⓑ F_1 Bb (Blue) Self Pollination Bb × Bb Gametes Ⓑ ⓑ, Ⓑ, ⓑ B b B BB Bb b Bb bb	**1** **1**	

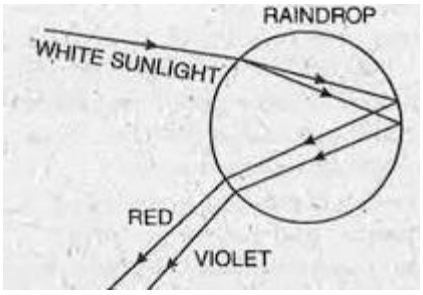
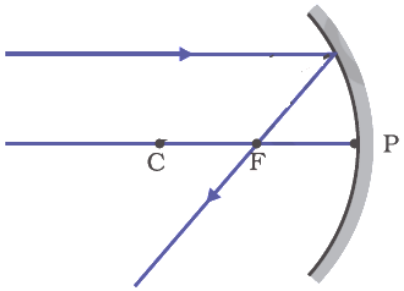
	/ 25% flowers are white (Blue: White= 3:1, ¼ x 100 = 25) (c) BB: bb :: 1: 1	 **1**	 **3**
14.	• Root pressure: Cells in the contact of the soil actively take up ions and creates a difference in concentration between roots and soil, water moves from soil to root to eliminate this difference. • Transpirational pull: Water lost through transpiration from aerial parts of plants, creates a suction which pulls water column from xylem cells of roots.	**½+1** **½+1**	 **3**
15.	(a) (i) Opening of stomata during the day is minimised to prevent loss of water by evaporation. / Transpiration (loss of water in the form of water vapour) is minimised. (ii) Stomata **OR** (b) (i) • Absorption of light energy by Chlorophyll. • Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen. • Reduction of carbon dioxide into carbohydrates. (ii) At night. (iii) Diagram of Open stomatal pore.  Diagram - 1 mark Labelling - 1 Mark	**2** **2** **1** **1** **2**	 **4**
16.	(a) (i) Name: Multiple Fission Type: Asexual reproduction (ii) In stage P, many daughter cells are produced by multiple fission / Repeated nuclear divisions followed by cytoplasmic divisions. (iii) *Plasmodium* (any other) (iv) Vegetative propagation <u>Advantages</u> – • All the plants produced are genetically similar to the parent plant	**½** **½** **1** **½** **½** **1**	

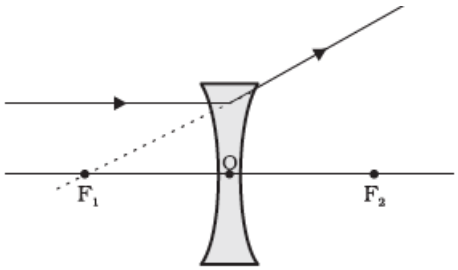
	• Such plants can bear flowers and fruits earlier than those produced from seeds. (any other advantage) **OR** (b) (i) Structure: *Bryophyllum* leaf Type: Asexual reproduction/ vegetative propagation (ii) • Advantage: Genetically identical plants, maintaining desirable traits of the parents. / Bear flowers and fruits earlier than those plants which are grown from seeds / Used for the plants that have lost their capacity to produce seeds. (Any one) • Disadvantage: No genetic variation (iii) As DNA of single parent is involved without gamete fusion. /Offsprings are produced by mitosis hence similar genetic makeup thus no variation. (iv) It creates genetic variation, enhances chances of survival in changing environment and drives evolution.	**1** **½** **½** **1** **1** **1** **1**	**5**

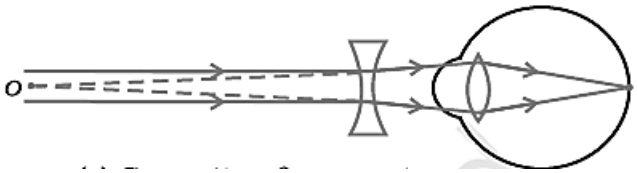
SECTION – B
(Chemistry)

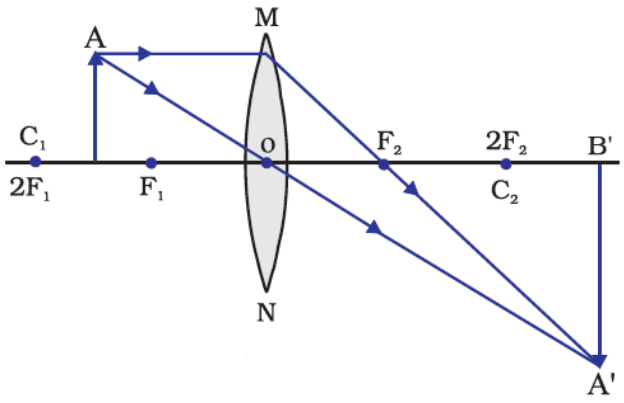
17.	(C)/ Na_2ZnO_2	**1**	**1**
18.	(D)/ Case (iii) only	**1**	**1**
19.	(C)/ Exothermic, but the heat evolved is not sufficient for the hydrogen to catch fire.	**1**	**1**
20.	(B)/ C_4H_8	**1**	**1**
21.	(A)/ 2,2	**1**	**1**
22.	(C)/ Copper (II) chloride, which is blue-green in colour.	**1**	**1**
23.	(B)/ The reaction of a reactive metal with dilute acid.	**1**	**1**
24.	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	**1**	**1**
25.	(i) Hard and brittle solid because of strong force of attraction between positive and negative ions. (ii) High melting and boiling point because a considerable amount of energy is required to break the strong inter-ionic attraction.	**1** **1**	**2**
26.	(i) To prevent the chips from getting oxidised/rancid. (ii) During respiration, glucose combines with oxygen in the cells of our body and gives energy. (iii) To prevent the decomposition of silver chloride into silver and chlorine by sunlight.	**1** **1** **1**	**3**
27.	(a) (i) When acid is added to water, it does not cause excessive local heating/ does not splash out and cause burns. (ii) Because dry HCl does not ionize/produce H^+ ions whereas in dilute HCl, H^+ ions are present. (iii) Because of loss of 5 molecules of water of crystallisation. **OR** (b) (i) $2NaCl(aq) + 2H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g) + Cl_2(g)$	**1** **1** **1** **1**	

	(ii) $NaCl + H_2O + NH_3 + CO_2 \longrightarrow NaHCO_3 + NH_4Cl$ (iii) $CaSO_4.2H_2O \xrightarrow{373K} CaSO_4.\frac{1}{2}H_2O + 1\frac{1}{2}H_2O$ (Deduct ½ mark if no/ incorrect balancing in each case)	1 1	3
28.	(a) During electrolytic refining of a metal, the insoluble impurities which settle down at the bottom of the anode is called anode mud. (b) Anode: Impure copper rod Cathode: Pure copper strip (c) (i) $2Cu_2S + 3O_2(g) \xrightarrow{heat} 2Cu_2O(s) + 2SO_2(g)$ $2Cu_2O + Cu_2S \xrightarrow{heat} 6Cu(s) + SO_2(g)$ **OR** (c) (ii)  (Diagram- 1 mark, Labelling-1 mark)	1 ½ ½ 1 1 2	4
29.	(a) (i) • A series of compounds in which the same functional group substitutes for hydrogen in a carbon chain./ Can be represented by a single general formula and successive members differ by -CH_2 unit or 14u. • C_2H_4 and C_4H_8 belong to the same homologous series/ are alkenes. (ii) (I) $CH_3CH_2OH + CH_3COOH \xrightarrow{Acid} CH_3COOC_2H_5 + H_2O$ (II) $C_2H_5OH + 3O_2 \xrightarrow{Burning} 2CO_2 + 3H_2O$ (balancing may be ignored) (iii) The ionic end of soap interacts with water while the carbon chain interacts with oil/dirt. The soap molecules thus form a structure called micelle. **OR** (b) (i) (I) Propanone/acetone (II) Propyne (ii) Hydrogenation/addition reaction. (iii) C_4H_{10} will have higher melting point, as it has a higher molecular mass than C_3H_8 and melting point increases with the increase in molecular mass.	1 1 1 1 1 ½ ½ 1 1	

	(iv) Sodium ethoxide (C_2H_5ONa) is formed and hydrogen gas is evolved / $2Na + 2CH_3CH_2OH \rightarrow 2CH_3CH_2O^-Na^+ + H_2$ (balancing may be ignored) (v) $CH_3COON\ C_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$	1 ½+ ½	5
	SECTION – C **(Physics)**		
30.	(C) /Colour of ray 1- Red; Colour of ray 2 - Violet	**1**	**1**
31.	(B)/ current becomes $\frac{I}{4}$ and potential difference remains V.	**1**	**1**
32.	(D)/Assertion (A) is false, but Reason (R) is true.	**1**	**1**
33.	(a) (i) Mainly blue coloured light is scattered because very fine particles scatter shorter wavelength. (ii) Scattered light may appear white because very large size particles scatter light of all wavelengths. **OR** (b)  A natural spectrum like rainbow is formed when light ray passes through tiny water droplets. The water droplets disperse the incident sunlight, then reflect it internally and finally refract it again when it comes out of the raindrop. (any other phenomenon of spectrum in nature)	1 1 1 1	**2**
34.	(i)  	**1**	

	(ii)  	**1**	**2**
35.	(a) (i) Battery / Electric cell (ii) Rheostat / Variable resistance (b) Resistance of the heater, $R = \frac{V}{I}$ $R = \frac{110}{5}$ $R = 22\ \Omega$ Current through the heater, $I' = \frac{V'}{R}$ $= \frac{220}{22}$ $= 10$ A / **Alternate answer for (b)**: • According to Ohm's law, potential difference is directly proportional to current. • When the potential difference is doubled, current will also be doubled. So, value of current will be 10A.	½ ½ ½ ½ **1** **1** **1**	**3**
36.	(a) 4 Ω and 1 Ω are in series, $R_s = 4\Omega + 1\ \Omega = 5\ \Omega$ Resistance across R and S, $\frac{1}{R_1} = \frac{1}{5} + \frac{1}{5}$ $R_1 = \frac{5}{2}\Omega$ 2 Ω and 3 Ω are in series, $R_{s1} = 2\Omega + 3\ \Omega = 5\ \Omega$ Resistance across P and Q, $\frac{1}{R_2} = \frac{1}{5} + \frac{1}{5}$ $R_2 = \frac{5}{2}\Omega$ Total resistance: $R = R_1 + R_2$ $= \frac{5}{2} + \frac{5}{2}$ $= 5\ \Omega$	**1**	

	(b) $I = \frac{V}{R}$ $I = \frac{10}{5}$ $I = 2\ A$ (c) $V = I\,R$ $V = 2 \times \frac{5}{2}$ $V = 5\ V$	 **1** **1**	**3**
37.	(a) • Myopia • The image is formed in front of the retina. (b) • Excessive curvature of the eye lens. • Elongation of the eye ball. (c) 	½ ½ ½ ½ **1**	**3**
38.	(a) In observation no.3. The object distance is equal to image distance, which is only possible when the object is at 2F (C) =50 cm. So, focal length is 25 cm. (b) • Observation no. 6 • When object is kept between F and O, image formed by lens will be on same side of object. Hence, image distance(v) should be negative. (c) $m = \frac{v}{u}$ $= \frac{150}{-30}$ $m = -5$ Nature of image: Image will be real and inverted Reason: because the value of m is negative. **OR** (c)	**1** ½ ½ ½ ½ ½ ½	



(deduct ½ mark for no or incorrect direction of rays)

2

4

39. (a) (i) (I)

- Fleming's left hand rule. ½
- Stretch the thumb, fore finger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and second finger in the direction of current then thumb will point the direction of force acting on the conductor. 1

(II)

- Right hand thumb rule. ½
- Imagine that you are holding a current carrying conductor in your right hand such that thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of field lines of magnetic field. 1

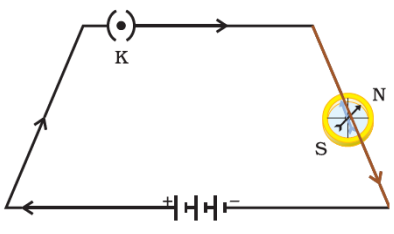
(ii)

Magnetic field due to bar magnet	**Magnetic field due to current-carrying solenoid**
Strength of magnetic field is constant.	Strength of magnetic field can be changed by changing the magnitude of current.
Direction of magnetic field cannot be changed without changing the orientation of magnet.	Direction of magnetic field can be changed by changing the direction of current.

(any one difference) 2

OR

(b)(i)



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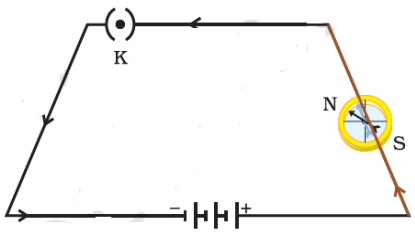
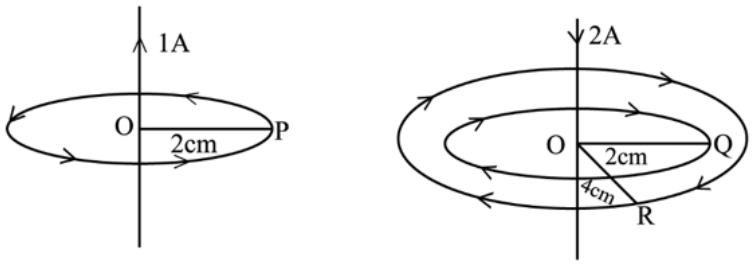


1

When current passes through a straight conductor, the compass needle placed near it shows deflection.

	(ii) (I)  (A) (B) (II) (1) magnetic field strength at Q is more than P. (2) magnetic field strength at Q is more than R.	**1** **½ + ½** **1** **1**	**5**

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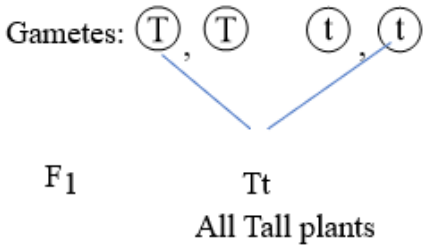
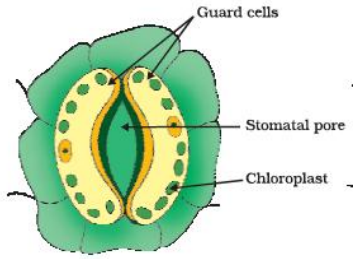
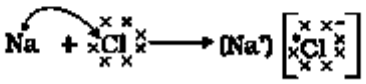
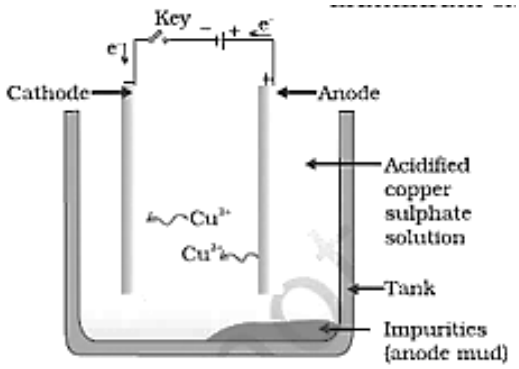
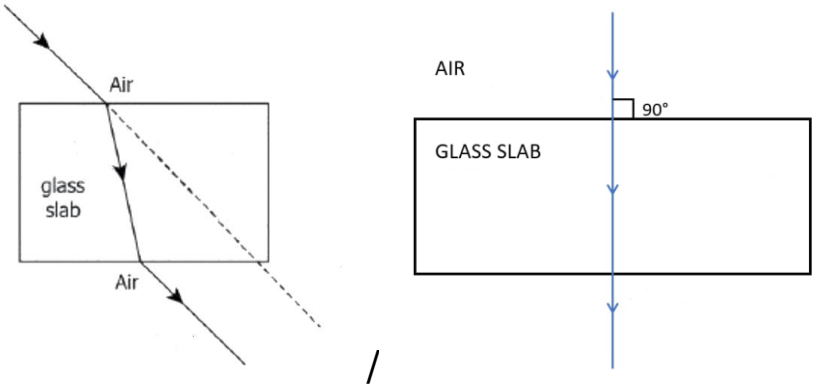
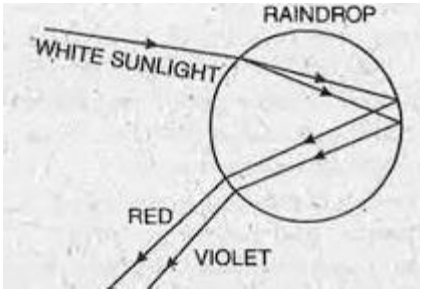
	SECTION – A **(Biology)**		

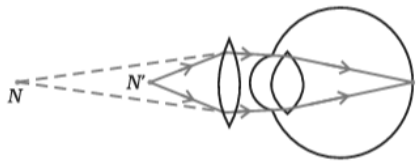
1.	(D)/ Rapid cell division in tendril cells that are away from the support	**1**	**1**
2.	(B)/ (i) and (iii)	**1**	**1**
3.	(A) / Food Web	**1**	**1**
4.	(B) / Both plants are covered with separate wooden bell-jars	**1**	**1**
5.	(B) / Human Beings	**1**	**1**
6.	(D) / Pollination, Fertilisation, embryo, seed.	**1**	**1**
7.	(C) / Gonorrhoea	**1**	**1**
8.	(D) / A is false, R is true.	**1**	**1**
9.	(A) / Both assertion (A) and reason (R) are true and Reason (R) is the correct explanation of Assertion (A)	**1**	**1**
10.	Hormones are chemical messengers produced by endocrine glands that travel through blood stream to regulate various functions of the body. (i) Regulates blood-sugar level. (ii) Prepares body for dealing with stress.	**1** **½** **½**	**2**
11.	(i) To freeze the CFC production at 1986 levels. (ii) Ozone shields the earth's surface from harmful UV radiations.	**1** **1**	**2**
12.	• Aerobic Respiration • Complete breakdown of glucose takes place in presence of oxygen releasing more energy.	**1** **1**	**2**
13.	Parents: TT x tt (Tall) (short)  F_1 Tt All Tall plants Observations: (i) No medium or short height plants were observed in F1 generation. (ii) All progeny resembles one of the parents. (iii) All plants were tall. (any two observations)	**½** **½** **1** **½** **½**	**3**

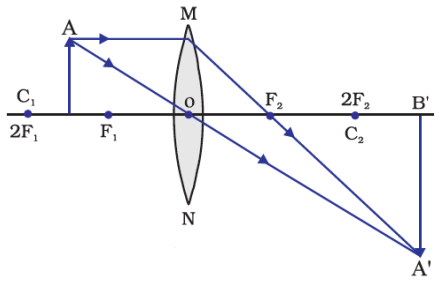
14.	(a) Herbivores eat grass, need a longer small intestine to allow the cellulose to be digested. (b) The finger like projections on the inner lining of small intestine, the villi, increase the surface area for absorption of digested food. (c) Dissolved oxygen in water is much lower as compared to oxygen in air.	**1** **1** **1**	**3**
15.	(a) (i) Opening of stomata during the day is minimised to prevent loss of water by evaporation. / Transpiration (loss of water in the form of water vapour) is minimised. (ii) Stomata **OR** (b) (i) • Absorption of light energy by Chlorophyll. • Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen • Reduction of Carbon Dioxide into Carbohydrates (ii) At night. (iii) Diagram of Open stomatal pore.  Diagram - 1 Mark Labelling - 1 Mark	**2** **2** **½** **½** **½** **½** **2**	**4**
16.	(a) (i) Structure: *Bryophyllum* leaf Type: Vegetative propagation / Asexual reproduction (ii) • Advantage: Genetically identical plants, maintaining desirable traits of the parents. / Bear flowers and fruits earlier than those plants which are grown from seeds / Used for the plants that have lost their capacity to produce seeds. (Any one) • Disadvantage: No genetic variation (iii) As DNA of single parent is involved without gamete fusion. /Offsprings are produced by mitosis hence similar genetic makeup thus no variation. (iv) It creates genetic variation, enhances chances of survival in changing environment and drives evolution. **OR**	**½** **½** **1** **1** **1** **1**	

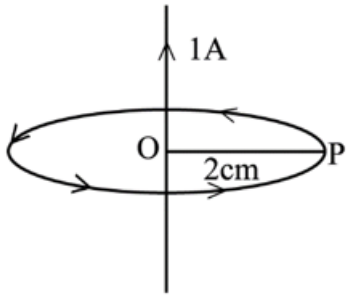
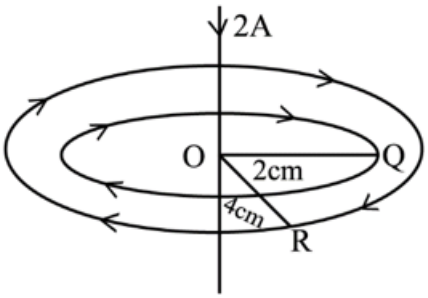
	(b) (i) Name: Multiple Fission Type: Asexual reproduction (ii) In stage P, many daughter cells are produced by multiple fission / Repeated nuclear divisions followed by cytoplasmic divisions. (iii) *Plasmodium* (or any other) (iv) Vegetative propagation Advantages – (1) All the plants produced are genetically similar to the parent plant (2) Such plants can bear flowers and fruits earlier than those produced from seeds. (or any other advantage)	½ ½ 1 ½ ½ 1 1	5
	SECTION – B **(Chemistry)**		
17.	(A)/ 2,2	**1**	**1**
18.	(B)/ The reaction of a reactive metal with dilute acid.	**1**	**1**
19.	(C)/ Copper (II) chloride, which is blue-green in colour.	**1**	**1**
20.	(D)/ C_3H_8	**1**	**1**
21.	(C)/ Na_2ZnO_2	**1**	**1**
22.	(C)/ Exothermic, but the heat evolved is not sufficient for the hydrogen to catch fire.	**1**	**1**
23.	(D)/ Case (iii) only	**1**	**1**
24.	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	**1**	**1**
25.	$Na \rightarrow Na^+ + e^-$ 2,8,1 2,8 (Sodium cation) $Cl + e^- \rightarrow Cl^-$ 2,8,7 2,8,8 (Chloride anion)  • Because the movement of ions in solid NaCl is not possible due to its rigid structure.	**1** **1**	**2**
26.	(i) The process in which a metal is attacked by substances around it such as moisture, acids etc. (ii) Oxidation of fats and oils present in food resulting in change of its smell and taste. (iii) Reaction in which heat/energy is released along with the formation of products.	**1** **1** **1**	**3**
27.	(a) (i) When acid is added to water, it does not cause excessive local heating/ does not splash out and cause burns. (ii) Because dry HCl does not ionize/produce H^+ ions whereas in dilute HCl, H^+ ions are present. (iii) Because of loss of 5 molecules of water of crystallisation. **OR**	**1** **1** **1** **1**	

	(b) (i) $2NaCl(aq) + 2H_2O(l) \xrightarrow{\text{Electricity}} 2NaOH(aq) + H_2(g) + Cl_2(g)$ (ii) $NaCl + H_2O + NH_3 + CO_2 \longrightarrow NaHCO_3 + NH_4Cl$ (iii) $CaSO_4.2H_2O \xrightarrow{373K} CaSO_4.\frac{1}{2}H_2O + 1\frac{1}{2}H_2O$ (balancing may be ignored)	1 1	3
28.	(a) During electrolytic refining of a metal, the insoluble impurities which settle down at the bottom of the anode is called anode mud. (b) Anode: Impure copper rod Cathode: Pure copper strip (c) (i) $2Cu_2S + 3O_2(g) \xrightarrow{\text{heat}} 2Cu_2O(s) + 2SO_2(g)$ $2Cu_2O + Cu_2S \xrightarrow{\text{heat}} 6Cu(s) + SO_2(g)$ **OR** (c) (ii)  (Diagram- 1 mark, Labelling-1 mark)	1 ½ ½ 1 1 2	4
29.	(a) (i) • A series of compounds in which the same functional group substitutes for hydrogen in a carbon chain. / Can be represented by a single general formula and successive members differ by $-CH_2$ unit or 14u. • C_2H_4 and C_4H_8 belong to the same homologous series/ are alkenes. (ii) (I) $CH_3CH_2OH + CH_3COOH \xrightarrow{\text{Acid}} CH_3COOC_2H_5 + H_2O$ (II) $C_2H_5OH + 3O_2 \xrightarrow{\text{Burning}} 2CO_2 + 3H_2O$ (balancing may be ignored) (iii) The ionic end of soap interacts with water while the carbon chain interacts with oil/dirt. The soap molecules thus form a structure called micelle. **OR** (b) (i) (I) Propanone/acetone (II) Propyne (ii) Hydrogenation/addition reaction.	1 1 1 1 1 ½ ½ 1	

	(iii) C_4H_{10} will have higher melting point, as it has a higher molecular mass than C_3H_8 and Melting point increases with the increase in molecular mass. (iv) Sodium ethoxide (C_2H_5ONa) is formed and hydrogen gas is evolved / $2Na + 2CH_3CH_2OH \rightarrow 2CH_3CH_2O^-Na^+ + H_2$ (balancing may be ignored) (v) $CH_3COON\ C_2H_5 + NaOH \longrightarrow CH_3COONa + C_2H_5OH$	**1** **1** **½+ ½**	**5**
	SECTION – C **(Physics)**		
30.	(C)/ Ammeter in series and voltmeter in parallel.	**1**	**1**
31.	(C)/ Presbyopia and hypermetropia.	**1**	**1**
32.	(D)/Assertion (A) is false , but Reason (R) is true.	**1**	**1**
33.	 / • $Refractive\ index = \frac{sini}{sinr}$	**1** **1**	**2**
34.	(a) (i) Mainly blue coloured light is scattered because very fine particles scatter shorter wavelength. (ii) Scattered light may appear white because very large size particles scatter light of all wavelengths. **OR** (b)  A natural spectrum like rainbow is formed when light ray passes through tiny water droplets. The water droplets disperse the incident sunlight, then reflect it internally and finally refract it again when it comes out of the raindrop. (Any other phenomenon of spectrum in nature)	**1** **1** **1** **1**	**2**

35.	(a) (a) 4 Ω and 1 Ω are in series, $R_s = 4\Omega + 1\ \Omega = 5\ \Omega$ Resistance across R and S, $\frac{1}{R_1} = \frac{1}{5} + \frac{1}{5}$ $R_1 = \frac{5}{2}\Omega$ 2 Ω and 3 Ω are in series, $R_{s1} = 2\Omega + 3\ \Omega = 5\ \Omega$ Resistance across P and Q, $\frac{1}{R_2} = \frac{1}{5} + \frac{1}{5}$ $R_2 = \frac{5}{2}\Omega$ Total resistance: $R = R_1 + R_2$ $= \frac{5}{2} + \frac{5}{2}$ $= 5\ \Omega$	**1**	
	(b) $I = \frac{V}{R}$ $I = \frac{10}{5}$ I = 2 A	**1**	
	(c) V = I R $V = 2 \times \frac{5}{2}$ V = 5 V	**1**	**3**
36.	(a) • Hypermetropia/ Far -Sightedness • Behind the retina.	½ ½	
	(b) • Focal length of the eye lens is too long. • The eye ball has become too small.	½ ½	
	(c)  	**1**	**3**
37.	(a) • Ohm's law – The potential difference 'V' across the ends of given metallic wire in an electric circuit is directly proportional to the current flowing through it, provided its temperature remains same. • $V\ \alpha\ I$ $\frac{V}{I} = Constant$ for all corresponding values of V and I.	**1**	

	/ The same value of $\frac{V}{I}$ is obtained from the graph for all corresponding points of V and I. (b) Wire B. The slope of B is higher, so it has higher resistance/ resistivity.	1 ½ ½	3
38.	(a) In observation no.3. The object distance is equal to image distance, which is only possible when the object is at 2F (C) =50 cm. Therefore, the focal length is 25 cm. (b) • Observation no. 6 • When object is kept between F and O, image formed by lens will be on same side of object. Hence, image distance(v) should be negative. (c) $m = \frac{v}{u}$ $= \frac{150}{-30}$ $m = -5$ Nature of image: Image will be real and inverted Reason: because the value of m is negative. **OR** (c)  (deduct ½ mark for no or incorrect direction of rays)	1 ½ ½ ½ ½ ½ 2	4
39.	(a) (i) Live wire - Red Neutral wire – Black Earth wire - Green (ii) 220V (iii) (I) Earth wire provides a low resistance conducting path for current and thus, protect us from electric shock due to leakage of electric current to metallic body of electrical appliances. (II) Fuse is a safety device which melts and breaks the electric circuit when unduly high electric current flows due to overloading and prevents damage to appliances and circuit. **OR**	2 1 1 1	

	(b) (i) (I) • Fleming's left-hand rule. • Stretch the thumb, fore finger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and second finger in the direction of current then thumb will point the direction of force acting on the conductor. (II) • Right hand thumb rule. • Imagine that you are holding a current carrying conductor in your right hand such that thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of field lines of magnetic field. (ii) (I)  (A)  (B) (II) (1) magnetic field strength at Q is more than P. (2) magnetic field strength at Q is more than R.	½ 1 ½ 1 ½ + ½ ½ ½	5

Series : 1GEFH **SET~1**

प्रश्न-पत्र कोड
Q.P. Code **31/1/1**

रोल नं.
Roll No.

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें।
Candidates must write the Q.P. Code on the title page of the answer-book.

	नोट		NOTE
(I)	कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **27** हैं।	(I)	Please check that this question paper contains **27** printed pages.
(II)	प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।	(II)	Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
(III)	कृपया जाँच कर लें कि इस प्रश्न-पत्र में **39** प्रश्न हैं।	(III)	Please check that this question paper contains **39** questions.
(IV)	**कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें।**	(IV)	**Please write down the Serial Number of the question in the answer-book at the given place before attempting it.**
(V)	इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक परीक्षार्थी केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे। #	(V)	15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

विज्ञान
SCIENCE

*निर्धारित समय : **3** घण्टे*
*Time allowed : **3** hours*

*अधिकतम अंक : **80***
*Maximum Marks : **80***

सामान्य निर्देश :

निम्नलिखित निर्देशों को बहुत सावधानी से पढ़िए और उनका सख़्ती से पालन कीजिए :

(i) *इस प्रश्न-पत्र में कुल **39** प्रश्न हैं। **सभी** प्रश्न **अनिवार्य** हैं।*

(ii) *यह प्रश्न-पत्र **पाँच** खण्डों में विभाजित किया गया है – **क, ख, ग, घ** एवं **ङ**।*

(iii) ***खण्ड क** – प्रश्न संख्या **1** से **20** तक बहुविकल्पीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **1** अंक का है।*

(iv) ***खण्ड ख** – प्रश्न संख्या **21** से **26** तक अति लघु-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **2** अंकों का है। इन प्रश्नों के उत्तर **30** से **50** शब्दों में दिए जाने चाहिए।*

(v) ***खण्ड ग** – प्रश्न संख्या **27** से **33** तक लघु-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **3** अंकों का है। इन प्रश्नों के उत्तर **50** से **80** शब्दों में दिए जाने चाहिए।*

(vi) ***खण्ड घ** – प्रश्न संख्या **34** से **36** तक दीर्घ-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **5** अंकों का है। इन प्रश्नों के उत्तर **80** से **120** शब्दों में दिए जाने चाहिए।*

(vii) ***खण्ड ङ** – प्रश्न संख्या **37** से **39** तक **3** स्रोत-आधारित/प्रकरण-आधारित इकाइयों के मूल्यांकन के **4** अंकों के प्रश्न (उप-प्रश्नों सहित) हैं।*

(viii) *प्रश्न-पत्र में समग्र विकल्प नहीं दिया गया है। यद्यपि, कुछ खण्डों में आंतरिक विकल्प दिए गए हैं। इस प्रकार के प्रश्नों में केवल एक ही विकल्प का उत्तर दीजिए।*

खण्ड क

*प्रश्न संख्या **1** से **20** तक के प्रत्येक प्रश्न में दिए गए चार विकल्पों में से सबसे उचित विकल्प चुनिए और लिखिए। ग़लत उत्तर के लिए कोई ऋणात्मक अंकन नहीं है।* *20×1=20*

1. जल का विद्युत-अपघटन एक वियोजन (अपघटन) अभिक्रिया है। जल के विद्युत-अपघटन के समय इलेक्ट्रोडों पर मुक्त गैसों – हाइड्रोजन और ऑक्सीजन के द्रव्यमानों का अनुपात ($M_H : M_O$) होता है :

(A) 8 : 1 (B) 2 : 1

(C) 1 : 2 (D) 1 : 8

2. वायु की उपस्थिति में ऐलुमिनियम और मैग्नीशियम के दहन होने पर बनने वाले उत्पाद क्रमश: हैं :

(A) Al_3O_4 और MgO_2 (B) Al_2O_3 और MgO

(C) Al_3O_4 और MgO (D) Al_2O_3 और MgO_2

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper comprises **39** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** sections – **A**, **B**, **C**, **D** and **E**.*

(iii) ***Section A** – Questions No. **1** to **20** are Multiple Choice Questions. Each question carries **1** mark.*

(iv) ***Section B** – Questions No. **21** to **26** are Very Short Answer type questions. Each question carries **2** marks. Answer to these questions should be in the range of **30** to **50** words.*

(v) ***Section C** – Questions No. **27** to **33** are Short Answer type questions. Each question carries **3** marks. Answer to these questions should in the range of **50** to **80** words.*

(vi) ***Section D** – Questions No. **34** to **36** are Long Answer type questions. Each question carries **5** marks. Answer to these questions should be in the range of **80** to **120** words.*

(vii) ***Section E** – Questions No. **37** to **39** are of **3** source-based/case-based units of assessment carrying **4** marks each with sub-parts.*

(viii) *There is no overall choice. However, an internal choice has been provided in some sections. Only one of the alternatives has to be attempted in such questions.*

SECTION A

*Select and write the most appropriate option out of the four options given for each of the questions no. **1** to **20**. There is no negative marking for incorrect response.* *20×1=20*

1. Electrolysis of water is a decomposition reaction. The mass ratio (M_H : M_O) of hydrogen and oxygen gases liberated at the electrodes during electrolysis of water is :

(A) 8 : 1 (B) 2 : 1

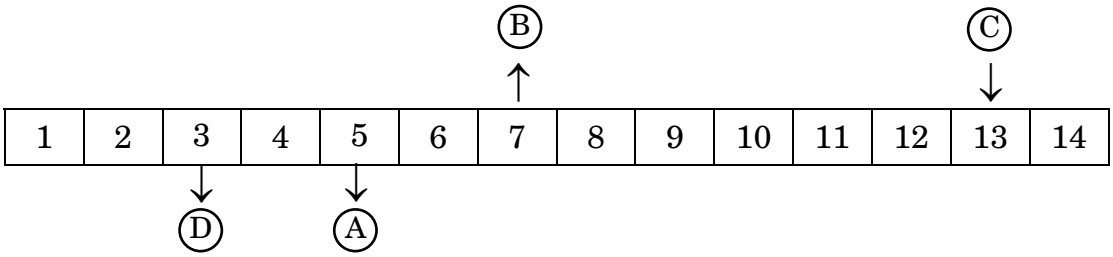
(C) 1 : 2 (D) 1 : 8

2. The products formed when Aluminium and Magnesium are burnt in the presence of air respectively are :

(A) Al_3O_4 and MgO_2 (B) Al_2O_3 and MgO

(C) Al_3O_4 and MgO (D) Al_2O_3 and MgO_2

3. निम्नलिखित तालिका में pH स्केल पर चार विलयनों A, B, C और D के pH मान दर्शाए गए हैं :



ये चारों विलयन A, B, C और D क्रमश: हैं

(A) प्रबल अम्ल, दुर्बल अम्ल, उदासीन, प्रबल क्षारक

(B) दुर्बल अम्ल, उदासीन, दुर्बल क्षारक, प्रबल क्षारक

(C) दुर्बल अम्ल, उदासीन, प्रबल क्षारक, दुर्बल क्षारक

(D) दुर्बल अम्ल, उदासीन, प्रबल क्षारक, प्रबल अम्ल

4. निम्नलिखित अभिक्रियाओं पर विचार कीजिए :

(i) तनु हाइड्रोक्लोरिक अम्ल, सोडियम हाइड्रॉक्साइड से अभिक्रिया करता है।

(ii) मैग्नीशियम ऑक्साइड, तनु हाइड्रोक्लोरिक अम्ल से अभिक्रिया करता है।

(iii) कार्बन डाइऑक्साइड, सोडियम हाइड्रॉक्साइड से अभिक्रिया करती है।

यह पाया जाता है कि प्रत्येक प्रकरण में :

(A) लवण और जल बनता है।

(B) उदासीन लवण बनते हैं।

(C) हाइड्रोजन गैस बनती है।

(D) अम्लीय लवण बनते हैं।

5. दो तत्त्वों A और B के बीच अभिक्रिया से कोई यौगिक C बनता है। A इलेक्ट्रॉन खोता है तथा B इलेक्ट्रॉन ग्रहण करता है। यौगिक C निम्नलिखित में से कौन-सा एक गुण ***नहीं*** दर्शाएगा ?

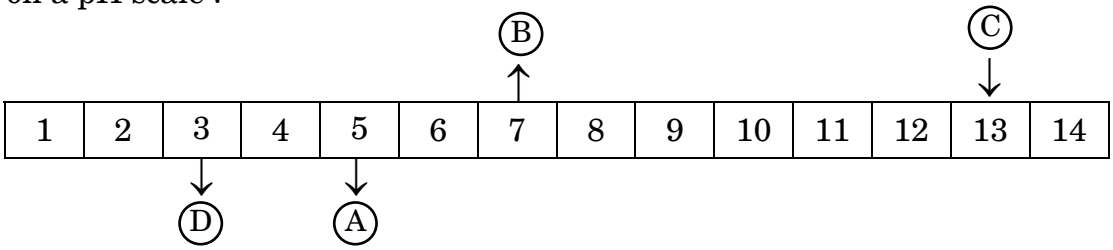
(A) इसका गलनांक उच्च है।

(B) यह जल में अत्यधिक विलेय है।

(C) इसके विजातीय (विपरीत आवेशित) आयनों के बीच दुर्बल स्थिर-वैद्युत आकर्षण बल है।

(D) यह अपनी गलित अवस्था अथवा जलीय विलयन में विद्युत चालन करता है।

3. The following table shows the pH values of four solutions A, B, C and D on a pH scale :



The solutions A, B, C and D respectively are of a

(A) Strong acid, weak acid, neutral, strong base

(B) Weak acid, neutral, weak base, strong base

(C) Weak acid, neutral, strong base, weak base

(D) Weak acid, neutral, strong base, strong acid

4. Consider the following reactions :

(i) Dilute hydrochloric acid reacts with sodium hydroxide.

(ii) Magnesium oxide reacts with dilute hydrochloric acid.

(iii) Carbon dioxide reacts with sodium hydroxide.

It is found that in each case :

(A) Salt and water is formed.

(B) Neutral salts are formed.

(C) Hydrogen gas is formed.

(D) Acidic salts are formed.

5. Reaction between two elements A and B, forms a compound C. A loses electrons and B gains electrons. Which one of the following properties will ***not*** be shown by compound C ?

(A) It has high melting point.

(B) It is highly soluble in water.

(C) It has weak electrostatic forces of attraction between its oppositely charged ions.

(D) It conducts electricity in its molten state or aqueous solution.

6. विद्युत-अपघटनी अपचयन प्रक्रिया द्वारा गलित क्लोराइडों से प्राप्त होने वाली धातुएँ हैं :

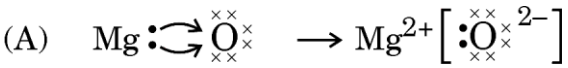
(A) गोल्ड और सिल्वर

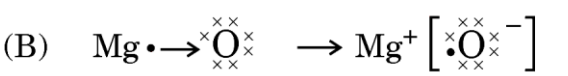
(B) कैल्शियम और मैग्नीशियम

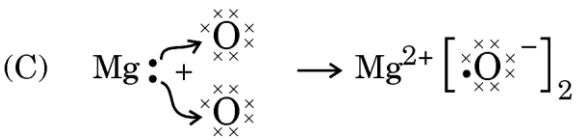
(C) ऐलुमिनियम और सिल्वर

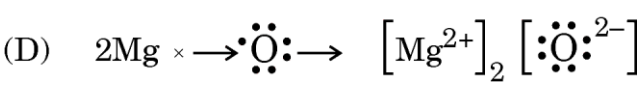
(D) सोडियम और आयरन

7. नीचे दिए गए किस विकल्प में मैग्नीशियम ऑक्साइड बनना सही दिखाया गया है ?

(A) 

(B) 

(C) 

(D) 

8. मुँह में लार का कम मात्रा में स्रावित होना किस परिवर्तन को प्रभावित करता है ?

(A) प्रोटीनों से ऐमीनो अम्ल

(B) वसा से वसीय अम्ल और ग्लिसरॉल

(C) स्टार्च से सरल शर्करा

(D) शर्करा से ऐल्कोहॉल

9. वह कौन-सा पादप हॉर्मोन है जिसकी सांद्रता, प्ररोह के प्रकाश से दूर वाले भाग की कोशिकाओं को लम्बाई में वृद्धि के लिए उद्दीपित करती है ?

(A) साइटोकाइनिन

(B) जिब्बेरेलिन

(C) ऐड्रिनलीन

(D) ऑक्सिन

6. The metals obtained from their molten chlorides by the process of electrolytic reduction are :

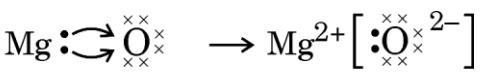
(A) Gold and silver

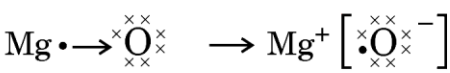
(B) Calcium and magnesium

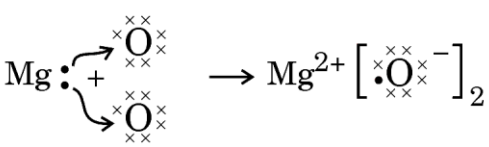
(C) Aluminium and silver

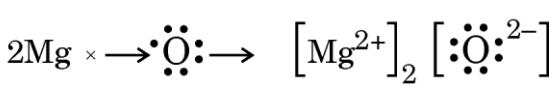
(D) Sodium and iron

7. The formation of magnesium oxide is correctly shown in option :

(A) 

(B) 

(C) 

(D) 

8. Secretion of less saliva in mouth will effect the conversion of :

(A) proteins into amino acids

(B) fats into fatty acids and glycerol

(C) starch into simple sugars

(D) sugars into alcohol

9. The plant hormone whose concentration stimulates the cells to grow longer on the side of the shoot which is away from light is :

(A) Cytokinins

(B) Gibberellins

(C) Adrenaline

(D) Auxins

10. उभयलिंगी पुष्प के विषय में सही कथन है/हैं :

(i) इनमें पुंकेसर और स्त्रीकेसर दोनों होते हैं।

(ii) इनमें या तो पुंकेसर होता है अथवा स्त्रीकेसर होता है।

(iii) ये या तो स्वपरागण दर्शाते हैं अथवा परपरागण दर्शाते हैं।

(iv) ये अपने आप फल उत्पन्न नहीं कर सकते हैं।

(A) केवल (i) (B) केवल (iv)

(C) (i) और (iii) (D) (i) और (iv)

11. गोल और हरे (RRyy) बीजों वाले मटर के पौधों का झुर्रीदार और पीले (rrYY) बीजों वाले मटर के पौधों के साथ संकरण कराया गया। F_1 संतति के पौधों द्वारा विकसित बीज होंगे :

(A) 50% गोल और हरे (B) 75% झुर्रीदार और हरे

(C) 100% गोल और पीले (D) 75% झुर्रीदार और पीले

12. निम्नलिखित ग्लूकोज़ के विखण्डन का पथ दर्शाया गया है :

ग्लूकोज़ $\xrightarrow{(a)}$ पायरुवेट + ऊर्जा $\xrightarrow{(b)}$ लैक्टिक अम्ल + ऊर्जा

स्थल 'a' और 'b' क्रमश: हैं :

(A) माइटोकॉन्ड्रिया और ऑक्सीजन के अभाव वाली पेशीय कोशिकाएँ

(B) कोशिकाद्रव्य और ऑक्सीजन प्रचुर पेशीय कोशिकाएँ

(C) कोशिकाद्रव्य और यीस्ट कोशिकाएँ

(D) कोशिकाद्रव्य और ऑक्सीजन के अभाव वाली पेशीय कोशिकाएँ

13. दर्पण 'X' सूर्य के प्रकाश को सौर भट्टी में सांद्रित करता है तथा दर्पण 'Y' वाहनों के पार्श्व में ड्राइवरों को पीछे के ट्रैफिक को देखने के लिए लगाया जाता है। इन दो दर्पणों के विषय में निम्नलिखित में से कौन-से कथन सही हैं ?

(i) दर्पण 'X' द्वारा बना प्रतिबिम्ब वास्तविक, छोटा और इसके फोकस पर होता है।

(ii) दर्पण 'Y' द्वारा बना प्रतिबिम्ब आभासी, छोटा और सीधा होता है।

(iii) दर्पण 'X' द्वारा बना प्रतिबिम्ब आभासी, छोटा और सीधा होता है।

(iv) दर्पण 'Y' द्वारा बना प्रतिबिम्ब वास्तविक, छोटा और इसके फोकस पर होता है।

(A) (i) और (ii) (B) (ii) और (iii)

(C) (iii) और (iv) (D) (i) और (iv)

10. The correct/true statement(s) for a bisexual flower is/are :

(i) They possess both stamen and pistil.

(ii) They possess either stamen or pistil.

(iii) They exhibit either self-pollination or cross-pollination.

(iv) They cannot produce fruits on their own.

(A) (i) only (B) (iv) only

(C) (i) and (iii) (D) (i) and (iv)

11. If pea plants with round and green seeds (RRyy) are crossed with pea plants having wrinkled and yellow seeds (rrYY), the seeds developed by the plants of F_1 generation will be :

(A) 50% round and green (B) 75% wrinkled and green

(C) 100% round and yellow (D) 75% wrinkled and yellow

12. The breakdown of glucose has taken the following pathway :

Glucose $\xrightarrow{(a)}$ Pyruvate + Energy $\xrightarrow{(b)}$ Lactic acid + Energy

The sites 'a' and 'b' respectively are :

(A) Mitochondria and Oxygen deficient muscle cells

(B) Cytoplasm and Oxygen rich muscle cells

(C) Cytoplasm and Yeast cells

(D) Cytoplasm and Oxygen deficient muscle cells

13. Mirror 'X' is used to concentrate sunlight in solar furnace and Mirror 'Y' is fitted on the side of the vehicle to see the traffic behind the driver. Which of the following statements are true for the two mirrors ?

(i) The image formed by mirror 'X' is real, diminished and at its focus.

(ii) The image formed by mirror 'Y' is virtual, diminished and erect.

(iii) The image formed by mirror 'X' is virtual, diminished and erect.

(iv) The image formed by mirror 'Y' is real, diminished and at its focus.

(A) (i) and (ii) (B) (ii) and (iii)

(C) (iii) and (iv) (D) (i) and (iv)

14. कोई वृद्ध व्यक्ति पक्ष्माभी पेशियों की दुर्बलता तथा अभिनेत्र लेंस के लचीलेपन में कमी होने के कारण दृष्टिदोष से पीड़ित है। यदि यह दृष्टिदोष 'a' है जिसका संशोधन लेंस 'b' द्वारा किया जा सकता है, तो 'a' और 'b' क्रमश: हैं :

(A) दीर्घ दृष्टि दोष और उत्तल लेंस
(B) जरा दूरदृष्टिता और द्विफोकसी लेंस
(C) निकट दृष्टि दोष और अवतल लेंस
(D) निकट दृष्टि दोष और द्विफोकसी लेंस

15. निम्नलिखित में से कौन-कौन से समूह कोई आहार श्रृंखला ***नहीं*** बनाते हैं ?

(i) भेड़िया, खरगोश, घास, शेर
(ii) प्लवक, मानव, टिड्डा, मछली
(iii) बाज़, घास, सर्प, टिड्डा, मेंढक
(iv) घास, सर्प, भेड़िया, बाघ

(A) (i) और (iv) (B) (i) और (iii)
(C) (ii) और (iii) (D) (ii) और (iv)

16. किसी स्थलीय पारितंत्र में हरे पादपों की पत्तियों द्वारा प्राप्त सौर ऊर्जा का लगभग कितने प्रतिशत भाग खाद्य ऊर्जा में परिवर्तित ***नहीं*** होता है ?

(A) 1% (B) 10%
(C) 90% (D) 99%

प्रश्न संख्या 17 से 20 के लिए, दो कथन दिए गए हैं – जिनमें एक को अभिकथन (A) तथा दूसरे को कारण (R) द्वारा अंकित किया गया है। इन प्रश्नों के सही उत्तर नीचे दिए गए कोडों (A), (B), (C) और (D) में से चुनकर दीजिए।

(A) अभिकथन (A) और कारण (R) दोनों सही हैं और कारण (R), अभिकथन (A) की सही व्याख्या करता है।
(B) अभिकथन (A) और कारण (R) दोनों सही हैं, परन्तु कारण (R), अभिकथन (A) की सही व्याख्या ***नहीं*** करता है।
(C) अभिकथन (A) सही है, परन्तु कारण (R) ग़लत है।
(D) अभिकथन (A) ग़लत है, परन्तु कारण (R) सही है।

17. *अभिकथन (A) :* अपघटन अभिक्रियाएँ सामान्यतः ऊष्माशोषी अभिक्रियाएँ होती हैं।

कारण (R) : कार्बनिक पदार्थ का कम्पोस्ट में अपघटन ऊष्माक्षेपी प्रक्रिया/अभिक्रिया है।

14. An old person is suffering from an eye defect caused by weakening of ciliary muscles and diminishing flexibility of the eye lens. If the defect of vision is 'a' which can be corrected by lens 'b', then 'a' and 'b' respectively are :

(A) hypermetropia and convex lens

(B) presbyopia and bifocal lens

(C) myopia and concave lens

(D) myopia and bifocal lens

15. Which of the following groups do ***not*** constitute a food chain ?

(i) Wolf, rabbit, grass, lion

(ii) Plankton, man, grasshopper, fish

(iii) Hawk, grass, snake, grasshopper, frog

(iv) Grass, snake, wolf, tiger

(A) (i) and (iv) (B) (i) and (iii)

(C) (ii) and (iii) (D) (ii) and (iv)

16. The percentage of solar energy which is ***not*** converted into food energy by the leaves of green plants in a terrestrial ecosystem is about :

(A) 1% (B) 10%

(C) 90% (D) 99%

For Questions number 17 to 20, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

17. *Assertion (A) :* Decomposition reactions are generally endothermic reactions.

Reason (R) : Decomposition of organic matter into compost is an exothermic process.

18. *अभिकथन (A) :* मानव संतान में मानवों के सभी आधारभूत लक्षण होते हैं।

कारण (R) : मानव संतान बहुत कम विभिन्नताएँ दर्शाते हुए तथ्यत: अपने माता-पिता जैसी ही दिखाई देती है।

19. *अभिकथन (A) :* दो चुम्बकीय क्षेत्र रेखाएँ परस्पर एक-दूसरे का प्रतिच्छेदन नहीं करती हैं।

कारण (R) : दिक्सूचक सुई दो चुम्बकीय क्षेत्र रेखाओं के प्रतिच्छेदन बिन्दु पर दो दिशाओं की ओर संकेत नहीं कर सकती है।

20. *अभिकथन (A) :* 1980 से वायुमंडल में ओज़ोन की मात्रा में तीव्रता से गिरावट आने लगी।

कारण (R) : ऑक्सीजन के परमाणु, ऑक्सीजन के अणुओं से संयुक्त होकर ओज़ोन बनाते हैं।

खण्ड ख

*प्रश्न संख्या **21** से **26** अति लघु-उत्तरीय प्रकार के प्रश्न हैं।*

21. कोई छात्र अपने विद्यालय की प्रयोगशाला में निम्नलिखित प्रयोग करता है।



ऐसे दो प्रेक्षणों की सूची बनाइए जो यह पुष्टि करते हैं कि इस प्रयोग में कोई रासायनिक परिवर्तन हुआ है। *2*

22. नामांकित आरेख खींचकर *हाइड्रा* में मुकुलन के विभिन्न चरण दर्शाइए। *2*

23. (क) रुधिर की हानि कम-से-कम होने के अतिरिक्त किसी वाहिनी से रक्तस्राव को अवरुद्ध करना (रोकना) क्यों अनिवार्य है ? रुधिर के उस संघटक का नाम लिखिए जो इस प्रक्रिया में सहायता करता है तथा उल्लेख कीजिए कि इस संघटक द्वारा इस कार्य का सम्पादन किस प्रकार किया जाता है। *2*

अथवा

(ख) (i) पादपों की वहन तंत्र प्रणाली जन्तुओं की अपेक्षा धीमी होती है। कारण दीजिए।

(ii) पादपों में पदार्थों के स्थानान्तरण/परिवहन में फ़्लोएम की भूमिका का उल्लेख कीजिए। *2*

18. *Assertion (A) :* A human child bears all the basic features of human beings.

Reason (R) : It looks exactly like its parents, showing very little variations.

19. *Assertion (A) :* No two magnetic field lines are found to cross each other.

Reason (R) : The compass needle cannot point towards two directions at the point of intersection of two magnetic field lines.

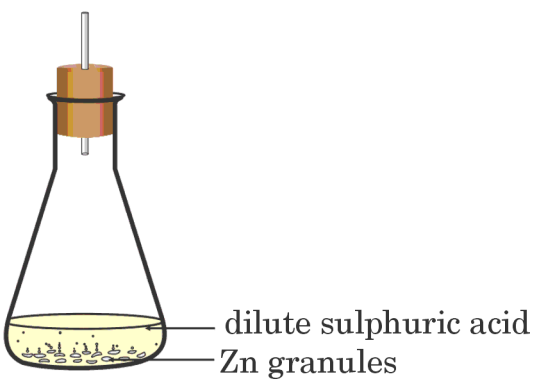
20. *Assertion (A) :* The amount of ozone in the atmosphere began to drop sharply in the 1980s.

Reason (R) : The oxygen atoms combine with molecular oxygen to form ozone.

SECTION B

Questions no. ***21*** *to* ***26*** *are Very Short Answer Type questions.*

21. A student performs the following experiment in his school laboratory.



List two observations to justify that in this experiment a chemical change has taken place. *2*

22. Draw labelled diagrams to show different stages of budding in *Hydra*. *2*

23. (a) Besides minimising the loss of blood, why is it essential to plug any leak in a blood vessel ? Name the component of blood which helps in this process and state how this component perform this function. *2*

OR

(b) (i) The transport system in plants is relatively slower than in animals. Give reasons.

(ii) State the role of phloem in the transport of materials in plants. *2*

24. कोई बिम्ब 30 cm फोकस दूरी के किसी अवतल लेंस से 60 cm दूरी पर स्थित है। लेंस सूत्र का उपयोग करके इस प्रकरण में प्रतिबिम्ब की स्थिति ज्ञात कीजिए। *2*

25. (क) प्रतिरोध R के किसी तार को तीन बराबर भागों में काटा गया है। यदि इन तीनों भागों को पार्श्वक्रम में संयोजित किया गया है, तो इस संयोजन का कुल प्रतिरोध परिकलित कीजिए। *2*

अथवा

(ख) विद्युत शक्ति की परिभाषा लिखिए। हम यह कब कहते हैं कि किसी विद्युत परिपथ में उपभुक्त शक्ति 1 वाट है ? *2*

26. ''कृषि में रसायनों और पीड़कनाशियों का अत्यधिक उपयोग पर्यावरण पर दुष्प्रभाव डालता है।'' इस कथन की पुष्टि कीजिए। *2*

खण्ड ग

*प्रश्न संख्या **27** से **33** लघु-उत्तरीय प्रकार के प्रश्न हैं।*

27. (क) ''सक्रियता श्रेणी में मध्य की धातुओं के निष्कर्षण में भी विस्थापन अभिक्रियाओं की मुख्य भूमिका होती है।'' दो उदाहरण देकर इस कथन की पुष्टि कीजिए।

(ख) सक्रियता श्रेणी में सबसे ऊपर स्थित धातुओं को उनके ऑक्साइडों को कार्बन द्वारा अपचयित करके प्राप्त क्यों नहीं किया जा सकता है ? *3*

28. (क) किसी क्रियाकलाप की सहायता से उन परिस्थितियों की व्याख्या कीजिए जिनमें लोहे (आयरन) की वस्तुओं पर जंग लगती है। *3*

अथवा

(ख) (i) उन दो धातुओं के नाम लिखिए जो ठंडे जल के साथ तीक्ष्णता से अभिक्रिया करती हैं। उन तीन प्रेक्षणों की सूची बनाइए जिन्हें कोई छात्र इन धातुओं को जल से भरे बीकर में डालने पर नोट करेगा।

(ii) इन धातुओं की जल के साथ अभिक्रिया में निकलने वाली गैस (यदि कोई है) की पहचान के लिए कोई परीक्षण लिखिए। *3*

24. An object is placed at a distance of 60 cm from a concave lens of focal length 30 cm. Use lens formula to find the position of the image formed in this case. *2*

25. (a) A wire of resistance R is cut into three equal parts. If these three parts are then joined in parallel, calculate the total resistance of the combination so formed. *2*

OR

(b) Define electric power. When do we say that the power consumed in an electric circuit is 1 watt ? *2*

26. "Excessive use of chemicals and pesticides in agriculture adversely effect the environment." Justify this statement. *2*

SECTION C

Questions no. ***27*** *to* ***33*** *are Short Answer Type questions.*

27. (a) "Displacement reactions also play a key role in extracting metals in the middle of the reactivity series." Justify this statement with two examples.

(b) Why can metals high up in the reactivity series not be obtained by reduction of their oxides by carbon ? *3*

28. (a) With the help of an activity, explain the conditions under which iron articles get rusted. *3*

OR

(b) (i) Name two metals which react violently with cold water. List any three observations which a student notes when these metal are dropped in a beaker containing water.

(ii) Write a test to identify the gas evolved (if any) during the reaction of these metals with water. *3*

29. पादपों में न तो तंत्रिका तंत्र होता है और न ही पेशियाँ होती हैं फिर भी वे उद्दीपन से अनुक्रिया करते हैं। उदाहरण के लिए छुई-मुई के पौधे की पत्तियाँ स्पर्श किए जाने पर मुड़कर मुरझा जाती हैं।

(क) "छुई-मुई" के पौधों में सूचना का संचरण किस प्रकार होता है ?

(ख) पादप कोशिकाओं को दर्शनीय अनुक्रिया करने योग्य कौन बनाता है ?

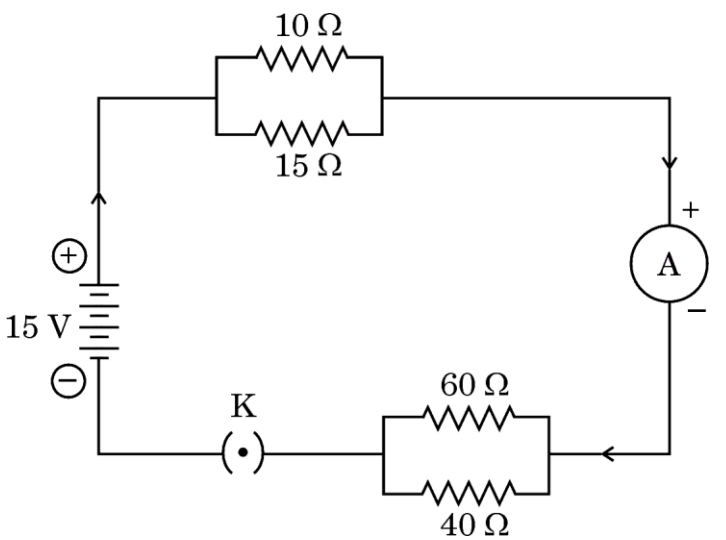
(ग) उपर्युक्त उल्लिखित गति और मटर के पौधे के प्रतानों की गति के बीच अन्तर स्पष्ट कीजिए। *3*

30. (क) गुणसूत्र क्या होते हैं ?

(ख) व्याख्या कीजिए कि लैंगिक जनन करने वाले जीवों की स्पीशीज़ में DNA की मात्रा का स्थायित्व किस प्रकार सुनिश्चित होता है। *3*

31. किसी उत्तल दर्पण द्वारा बनने वाले प्रतिबिम्ब की प्रकृति, स्थिति और सापेक्ष साइज़ को दर्शाने के लिए उस प्रकरण में किरण आरेख खींचिए जिसमें बिम्ब (i) अनन्त पर स्थित है तथा (ii) दर्पण के ध्रुव P और अनन्त के बीच स्थित है। *3*

32. निम्नलिखित विद्युत परिपथ पर विचार कीजिए :



निम्नलिखित के मान परिकलित कीजिए : *3*

(क) परिपथ का कुल प्रतिरोध

(ख) विद्युत स्रोत से ली गई कुल धारा

(ग) 10 Ω और 15 Ω प्रतिरोधकों के पार्श्वक्रम संयोजन के सिरों पर विभवान्तर

29. Plants have neither a nervous system nor muscles, even then they respond to stimuli. For example, the leaves of *chhui-mui* (touch-me-not) plant when touched begin to fold up and droop.

(a) How is the information communicated in "touch-me-not" plants ?

(b) What enables the plant cells to bring out the observable response ?

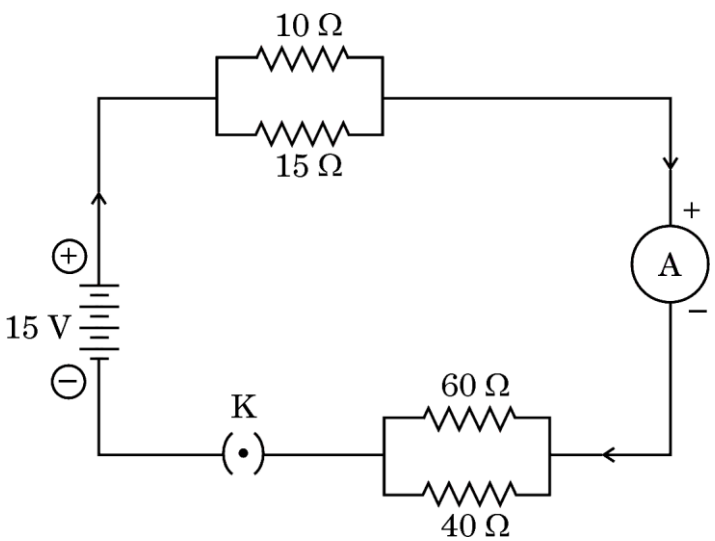
(c) Differentiate the movement mentioned above from the movement of tendrils in a pea plant. *3*

30. (a) What are chromosomes ?

(b) Explain in brief how stability of DNA content of a species is ensured in sexually reproducing organisms ? *3*

31. Draw ray diagrams to show the nature, position and relative size of the image formed by a convex mirror when the object is placed (i) at infinity and (ii) between infinity and pole P of the mirror. *3*

32. Consider the following electric circuit :



Calculate the values of the following : *3*

(a) The total resistance of the circuit

(b) The total current drawn from the source

(c) Potential difference across the parallel combination of 10 Ω and 15 Ω resistors

33. (क) लम्बाई l और अनुप्रस्थ-काट क्षेत्रफल A के किसी बेलनाकार चालक के प्रतिरोध और उसकी प्रतिरोधकता के बीच संबंध लिखिए। इस संबंध का उपयोग करके प्रतिरोधकता का SI मात्रक व्युत्पन्न कीजिए।

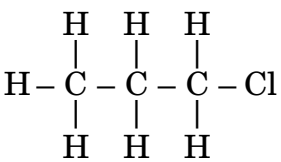
(ख) विद्युत तापन युक्तियों में मिश्रातुओं का उपयोग क्यों किया जाता है ? *3*

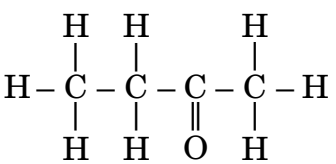
खण्ड घ

*प्रश्न संख्या **34** से **36** दीर्घ-उत्तरीय प्रकार के प्रश्न हैं।*

34. (क) (i) ब्यूटीन (C_4H_8) की दो समावयवी संरचनाएँ खींचिए।

(ii) निम्नलिखित यौगिकों के नाम लिखिए :

(I)


(II)


(iii) निम्नलिखित अभिक्रियाओं के रासायनिक समीकरण लिखिए तथा प्रत्येक प्रकरण में अभिक्रिया होने के लिए आवश्यक एक शर्त/परिस्थिति का उल्लेख भी कीजिए।

(I) एथेनॉल का पूर्ण ऑक्सीकरण

(II) प्रोपीन का हाइड्रोजनीकरण

(III) एथेनॉइक अम्ल की एथेनॉल से अभिक्रिया *5*

अथवा

(ख) (i) कोई कार्बन यौगिक X अच्छा विलायक है। सोडियम से अभिक्रिया करके, X दो उत्पाद Y और Z बनाता है। Z का उपयोग वनस्पति तेल को वनस्पति घी में परिवर्तित करने में किया जाता है। X, Y और Z को पहचानिए और इनके नाम लिखिए। अपने उत्तर की पुष्टि के लिए X की सोडियम से अभिक्रिया का समीकरण भी लिखिए।

33. (a) Write the relationship between resistivity and resistance of a cylindrical conductor of length l and area of cross-section A. Hence derive the SI unit of resistivity.

(b) Why are alloys used in electrical heating devices ? *3*

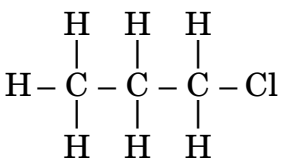
SECTION D

Questions no. ***34*** *to* ***36*** *are Long Answer Type questions.*

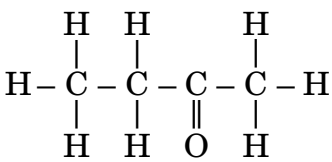
34. (a) (i) Draw two isomeric structures of Butene (C_4H_8).

(ii) Name the following compounds :

(I)



(II)



(iii) Write the chemical equations for the following reactions. Mention one essential condition each for these reactions to take place.

(I) Ethanol undergoes complete oxidation

(II) Propene undergoes hydrogenation

(III) Ethanoic acid reacts with ethanol *5*

OR

(b) (i) A carbon compound X is a good solvent. On reaction with sodium, X forms two products Y and Z. Z is used to convert vegetable oil into vegetable ghee. Identify and name X, Y and Z. Also write the equation of reaction of X with sodium to justify your answer.

(ii) यह दर्शाने के लिए रासायनिक समीकरण लिखिए कि क्या होता है जब :

(I) एथेनॉल का ऑक्सीजन/वायु में दहन होता है।

(II) एथेनॉल को 443 K पर आधिक्य सांद्र H_2SO_4 के साथ गर्म किया जाता है।

(III) एथेनॉल अम्लीकृत पोटैशियम डाइक्रोमेट के साथ अभिक्रिया करता है। *5*

35. (क) (i) मानव मादा जनन तंत्र के निम्नलिखित भागों के कार्य लिखिए :

(I) अण्डाशय

(II) अंडवाहिका (फेलोपियन ट्यूब)

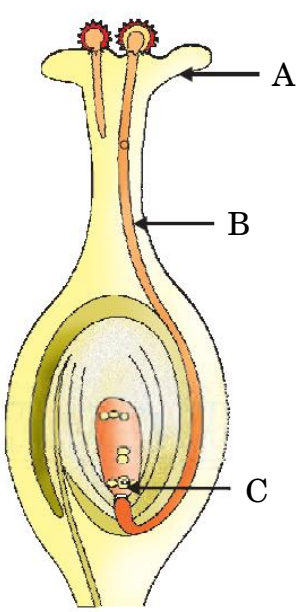
(III) गर्भाशय

(ii) पुरुषों (मानव नरों) द्वारा उपयोग की जाने वाली दो गर्भनिरोधक विधियों का संक्षेप में उल्लेख कीजिए। *5*

अथवा

(ख) (i) स्वपरागण और परपरागण के बीच विभेदन कीजिए।

(ii) नीचे दिए गए आरेख में A, B और C की पहचान कीजिए और प्रत्येक भाग का एक कार्य लिखिए। *5*



(ii) Write chemical equation to show what happens when ethanol :

(I) burns in oxygen/air.

(II) is heated at 443 K in excess conc. H_2SO_4.

(III) reacts with acidified potassium dichromate. *5*

35. (a) (i) Write the functions of the following parts of human female reproductive system :

(I) Ovary

(II) Fallopian tube

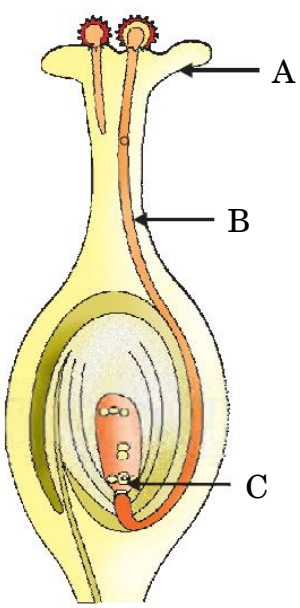
(III) Uterus

(ii) State briefly two contraceptive methods used by human males. *5*

OR

(b) (i) Differentiate between self-pollination and cross-pollination.

(ii) Identify A, B and C in the diagram given below and write one function of each. *5*



36. (क) (i) किसी लेंस 'X' की क्षमता – 2·5 D है । इस लेंस का नाम लिखिए और इसकी फोकस दूरी cm में निर्धारित कीजिए । नेत्र चिकित्सक किस दृष्टि दोष के संशोधन के लिए इस प्रकार के लेंस को संशोधक लेंस के रूप में निर्धारित करते हैं ?

(ii) "किसी लेंस के लिए आवर्धन 'm' का मान – 2 है ।" नई कार्तीय चिह्न परिपाटी का उपयोग करते हुए और यह मानते हुए कि कोई बिम्ब इस लेंस के प्रकाशिक केन्द्र से 20 cm की दूरी पर है, निम्नलिखित का उल्लेख कीजिए :

(I) बनने वाले प्रतिबिम्ब की प्रकृति;

(II) बिम्ब के साइज़ की तुलना में प्रतिबिम्ब का साइज़;

(III) प्रतिबिम्ब की स्थिति, तथा

(IV) प्रतिबिम्ब की ऊँचाई का चिह्न ।

(iii) दो लेंसों A और B की फोकस दूरी के संख्यात्मक मान क्रमश: 10 cm और 20 cm हैं । इन दोनों में से कौन-सा लेंस अभिसारिता/अपसारिता की उच्चतर कोटि दर्शाएगा ? अपने उत्तर की कारण सहित पुष्टि कीजिए । *5*

अथवा

(ख) (i) किसी काँच के आयताकार स्लैब से प्रकाश की किसी किरण का अपवर्तित होना दर्शाने के लिए किरण आरेख खींचिए जबकि प्रकाश किरण वायु से काँच में तिर्यकत: आपतन कर रही है ।

(ii) प्रकाश के अपवर्तन का स्नेल का नियम लिखिए ।

(iii) (I) बिम्ब दूरी तथा (II) आवर्धन के आधार पर किसी उत्तल लेंस और किसी अवतल लेंस द्वारा बने आभासी प्रतिबिम्बों के बीच विभेदन कीजिए । *5*

36. (a) (i) The power of a lens 'X' is – 2·5 D. Name the lens and determine its focal length in cm. For which eye defect of vision will an optician prescribe this type of lens as a corrective lens ?

(ii) "The value of magnification 'm' for a lens is – 2." Using new Cartesian Sign Convention and considering that an object is placed at a distance of 20 cm from the optical centre of this lens, state :

(I) the nature of the image formed;

(II) size of the image compared to the size of the object;

(III) position of the image, and

(IV) sign of the height of the image.

(iii) The numerical values of the focal lengths of two lenses A and B are 10 cm and 20 cm respectively. Which one of the two will show higher degree of convergence/divergence ? Give reason to justify your answer. *5*

OR

(b) (i) Draw a ray diagram to show the refraction of a ray of light through a rectangular glass slab when it falls obliquely from air into glass.

(ii) State Snell's law of refraction of light.

(iii) Differentiate between the virtual images formed by a convex lens and a concave lens on the basis of :

(I) object distance, and

(II) magnification. *5*

खण्ड ङ

निम्नलिखित प्रश्न स्रोत-आधारित/केस-आधारित प्रश्न हैं। केस को सावधानीपूर्वक पढ़िए और दिए गए प्रश्नों के उत्तर दीजिए।

37. समुद्री जल में कई प्रकार के लवण घुले होते हैं। साधारण नमक को इन लवणों से पृथक किया जाता है। विश्व के कई भागों में भी ठोस लवण का निक्षेप होता है। बड़े आकार के यह किस्टल प्राय: अपद्रव्यों (अशुद्धियों) के कारण भूरे रंग के होते हैं। इसे खनिज नमक कहते हैं। इसका खनन भी कोयले की भाँति होता है। साधारण नमक दैनिक जीवन में उपयोग होने वाले रसायनों के लिए एक महत्त्वपूर्ण कच्ची सामग्री है।

(क) लवण-जल (ब्राइन) के विद्युत-अपघटन से उत्पन्न उत्पादों को दर्शाने के लिए संतुलित रासायनिक समीकरण लिखिए। *1*

(ख) लवण-जल (ब्राइन) के विद्युत-अपघटन से प्राप्त किसी भी एक उत्पाद के दो उपयोगों की सूची बनाइए। *1*

(ग) (i) किसी दुर्बल असंक्षारक क्षारीय लवण 'A' का उपयोग खाने को शीघ्रता से पकाने में किया जाता है। इसे गर्म करने पर कोई यौगिक 'B' बनता है जिसका उपयोग जल की स्थायी कठोरता को दूर करने में किया जाता है। A और B को पहचानिए तथा A को गर्म करने पर होने वाली अभिक्रिया का समीकरण भी लिखिए। *2*

अथवा

(ग) (ii) क्रिस्टलन के जल की परिभाषा लिखिए। उन दो लवणों का उदाहरण दीजिए जिनमें क्रिस्टलन का जल होता है। *2*

38. सभी जीवों का अनुरक्षण कार्य निरन्तर होना चाहिए। यह उस समय भी चलते रहना चाहिए जब वे कोई विशेष कार्य नहीं कर रहे होते हैं। जब हम सो रहे हों अथवा अपनी कक्षा में बैठे होते हैं, उस समय भी यह अनुरक्षण का कार्य चलता रहना चाहिए। कोशिकाओं और ऊतकों की क्षति और टूट-फूट को रोकने तथा अनुरक्षण प्रक्रियाओं के लिए ऊर्जा की आवश्यकता होती है। यह ऊर्जा एकल जीव के शरीर को स्वपोषियों, जिन्हें उत्पादक कहते हैं, से प्राप्त होती है।

(क) उस प्रक्रिया का नाम और परिभाषा लिखिए जिसके द्वारा हरे पादप भोजन निर्मित करते हैं। *1*

(ख) उपर्युक्त प्रक्रिया में होने वाली अभिक्रिया का रासायनिक समीकरण लिखिए। *1*

SECTION E

The following questions are Source-based / Case-based questions. Read the case carefully and answer the questions that follow.

37. Seawater contains many salts dissolved in it. Common salt is separated from these salts. Deposits of solid salt are also found in several parts of the world. These large crystals are often brown due to impurities. This is called rock salt and is mined like coal. The common salt is an important raw material for chemicals of daily use.

(a) Write balanced chemical equations to show the products formed during electrolysis of brine. *1*

(b) List two uses of any one product obtained during electrolysis of brine. *1*

(c) (i) A mild non-corrosive basic salt 'A', used for faster cooking, is strongly heated to produce a compound 'B', that is used for removing permanent hardness of water. Identify A and B and also write the equation for the reaction that occurs when A is heated. *2*

OR

(c) (ii) Define water of crystallisation. Give two examples of salts that have water of crystallisation. *2*

38. The maintenance functions of all living organisms must go on even when they are not doing anything particular. Even when we are just sitting in a class or even asleep, this maintenance job has to go on. These maintenance processes require energy to prevent damage and break-down of cells and tissues, which is obtained by the individual organism from the food prepared by the autotrophs, called producers.

(a) Name and define the process by which green plants prepare food. *1*

(b) Write chemical equation involved in the above process. *1*

(ग) (i) मरुद्भिद (मरुस्थली) पौधों द्वारा भोजन के संश्लेषण के समय होने वाली घटनाओं का उचित अनुक्रम में उल्लेख कीजिए। *2*

अथवा

(ग) (ii) कारण सहित व्याख्या कीजिए कि (I) घटा वाले (मेघाच्छन्न) मौसम में, तथा (II) धूल द्वारा रंध्रों को बंद कर दिए जाने पर हरे पादपों द्वारा भोजन निर्माण करने की दर पर क्या प्रभाव पड़ता है। *2*

39. हम अपने घरों में विद्युत शक्ति की आपूर्ति मुख्य तारों, जिसे मेन्स भी कहते हैं, से प्राप्त करते हैं। ये मुख्य तार या तो धरती पर लगे विद्युत खम्बों के सहारे अथवा भूमिगत केबलों द्वारा हमारे घरों तक पहुँचते हैं। हमारे देश में इस आपूर्ति के दो तारों (विद्युन्मय तार तथा उदासीन तार) के बीच 220 V का विभवान्तर होता है।

(क) हमारे घरों को आने वाली आपूर्ति जिन लाइन तारों द्वारा होती है उनके विद्युतरोधी आवरणों के रंग लिखिए। *1*

(ख) 220 V के किसी विद्युत परिपथ का धारा अनुमतांक क्या होना चाहिए कि उस परिपथ पर 1 kW शक्ति अनुमतांक की विद्युत इस्तरी का प्रचालन किया जा सके ? *1*

(ग) (i) भूसम्पर्क तार का क्या कार्य है ? विद्युत इस्तरी जैसे घरेलू विद्युत साधित्रों में भूसम्पर्क तार के महत्त्व का उल्लेख कीजिए। *2*

अथवा

(ग) (ii) विद्युत से होने वाली दुर्घटनाओं से बचाव के लिए ली जाने वाली दो सावधानियों की सूची बनाइए। उल्लेख कीजिए कि ये सावधानियाँ किस प्रकार परिपथ/साधित्र को संभावित क्षति से बचाती हैं। *2*

(c) (i) State in proper sequence the events that occur in synthesis of food by desert plants. *2*

OR

(c) (ii) Explain giving reasons what happens to the rate at which the green plants will prepare food *2*

(I) during cloudy weather, and

(II) when stomata get blocked due to dust.

39. In our homes, we receive the supply of electric power through a main supply also called mains, either supported through overhead electric poles or by underground cables. In our country the potential difference between the two wires (live wire and neutral wire) of this supply is 220 V.

(a) Write the colours of the insulation covers of the line wires through which supply comes to our homes. *1*

(b) What should be the current rating of the electric circuit (220 V) so that an electric iron of 1 kW power rating can be operated ? *1*

(c) (i) What is the function of the earth wire ? State the advantage of the earth wire in domestic electric appliances such as electric iron. *2*

OR

(c) (ii) List two precautions to be taken to avoid electrical accidents. State how these precautions prevent possible damage to the circuit/appliance. *2*

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2025
SUBJECT NAME : SCIENCE (Q.P. CODE 31/1/1)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	**"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC."**
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded**
4	The Marking Scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark(√) wherever answer is correct. For wrong answer CROSS 'X' be marked. Evaluators will not put right (✓)while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per

	day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.
13	• Ensure that you do not make the following common types of errors committed by the Examiner in the past:- • Leaving answer or part thereof unassessed in an answer book. • Giving more marks for an answer than assigned to it. • Wrong totaling of marks awarded on an answer. • Wrong transfer of marks from the inside pages of the answer book to the title page. • Wrong question wise totaling on the title page. • Wrong totaling of marks of the two columns on the title page. • Wrong grand total. • Marks in words and figures not tallying/not same. • Wrong transfer of marks from the answer book to online award list. • Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) • Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for Spot Evaluation**" before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18.	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

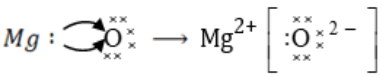
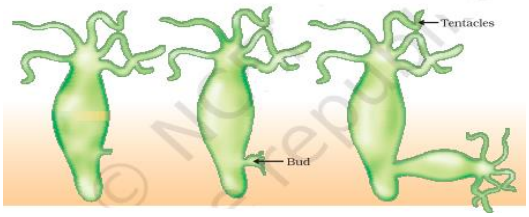
SECONDARY SCHOOL EXAMINATION, 2025

MARKING SCHEME

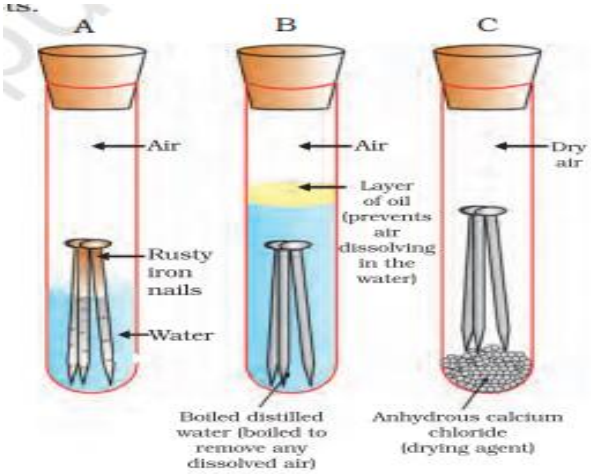
CLASS: X SCIENCE (Subject Code–086)

[Paper Code: 31/1/1]

Maximum Marks: 80

Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
	SECTION A		
1.	D /1: 8	1	1
2.	B / Al_2O_3 and MgO	1	1
3.	D / Weak acid, neutral, strong base, strong acid	1	1
4.	A / Salt and water is formed	1	1
5.	C / It has weak electrostatic forces of attraction between its oppositely charged ions.	1	1
6.	B / Calcium and Magnesium	1	1
7.	A / 	1	1
8.	C / starch into simple sugars	1	1
9.	D / Auxins	1	1
10.	C / (i) and (iii)	1	1
11.	C / 100% round and yellow	1	1
12.	D / Cytoplasm and Oxygen deficient muscle cells	1	1
13.	A / (i) and (ii)	1	1
14.	B / Presbyopia and bifocal lens	1	1
15.	D / (ii) and (iv)	1	1
16.	D / 99%	1	1
17.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
18.	C / Assertion (A) is true, but Reason (R) is false.	1	1
19.	A / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
20.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
	SECTION B		
21.	• Evolution of gas • Change / Rise in temperature	1 1	2
22.	 diagram labelling	1 1	2

23.	(a) • Plugging of the leak in blood vessels prevents lowering of the blood pressure / maintains the efficiency of the pumping system. • Platelets • Help to clot the blood at the site of injury. **OR** (b) (i) Plants have low energy needs because they have a large proportion of dead cells in many tissues / Plants have low energy needs as they do not move (ii) Translocation of soluble products of photosynthesis from leaves to other parts of the plant / It transports amino acids and other substances to storage organs of roots, fruits and seeds and to growing organs.	1 ½ ½ 1 1	2
24	u = - 60 cm f = -30 cm $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ $\frac{1}{-30\ cm} = \frac{1}{v} - \frac{1}{-60\ cm}$ $\frac{1}{v} = \frac{1}{-30} - \frac{1}{60}$ $\frac{-3}{60\ cm} = \frac{1}{v} \Rightarrow$ v = – 20 cm Position of image is 20 cm from a concave lens.	½ ½ 1	2
25.	(a) Resistance of each part = $\frac{R}{3}$ $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ $\frac{1}{R_p} = \frac{1}{R/3} + \frac{1}{R/3} + \frac{1}{R/3}$ $\frac{1}{R_p} = \frac{3}{R} + \frac{3}{R} + \frac{3}{R} = \frac{9}{R}$ $\Rightarrow R_p = \frac{R}{9}$ **OR** (b) • Electric power is the rate at which electrical energy is	½ ½ ½ ½ 1	

	consumed or dissipated in an electrical circuit. / Electric power is electrical energy consumed per unit time. • When 1A current at 1V potential difference flows in a circuit. / Power consumed is 1W when 1J electrical energy is consumed in 1 s.	1	2
26.	Chemicals/pesticides used by farmers get washed down into the soil or water bodies and affect biotic and abiotic components of the ecosystem. These chemicals are mostly non-biodegradable and get accumulated progressively at each trophic level (Biological magnification). Thus, the health of the organisms of all trophic levels is affected.	2	2
	SECTION C		
27.	(a) $3\,MnO_2(s) + 4\,Al(s) \longrightarrow 3\,Mn(l) + 2\,Al_2O_3(s) + heat$ $Fe_2O_3(s) + 2\,Al(s) \longrightarrow 2\,Fe(l) + Al_2O_3(s) + heat$ **(Award marks if explained through statement or any other reactions.)** (b) Metals towards the top of the reactivity series (Na, Mg, Ca) have more affinity for oxygen than carbon.	1 1 1	3
28.	(a) ➢ Take three test tubes and place clean iron nails in each of them. ➢ Label these test tubes A, B and C. ➢ Pour some water in test tube A and cork it. ➢ Pour boiled distilled water in test tube B, add about 1 mL of oil and cork it. The oil will float on water and prevent the air from dissolving in the water. ➢ Put some anhydrous calcium chloride in test tube C and cork it. Anhydrous calcium chloride will absorb the moisture, if any, from the air. Iron nails rust in test tube A, but they do not rust in test tubes B and C. Rusting of iron takes place when exposed to both air and water. /  	3	

<table>
<tr><td></td><td>Iron nails rust in test tube A, but they do not rust in test tubes B and C.
Rusting of iron takes place when exposed to both air and water.

(Note: if a student explains activity through description or through labelled diagram, award full marks.)

OR

(b) (i)
• Sodium, Potassium, Lithium
(any two)
• Observations:
➢ A violent reaction occurs.
➢ Large amount of heat is evolved.
➢ Evolved gas may catch fire.

(ii) The gas (bubbles) burns with a pop sound</td><td>½,½

1 ½

½</td><td>3</td></tr>
<tr><td>29.</td><td>(a) Plant cells use electrical– chemical means to convey information. /The information that touch has occurred must be communicated

(b) Plant cells change shape by changing the amount of water in them (swelling or shrinking).

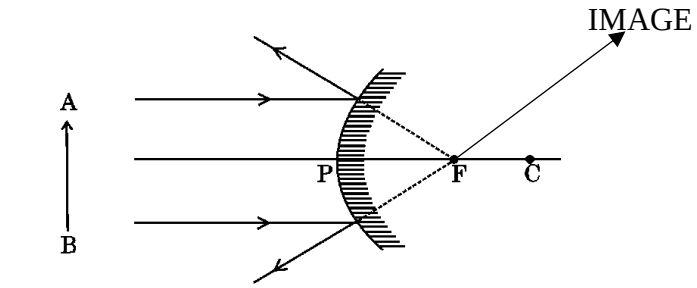
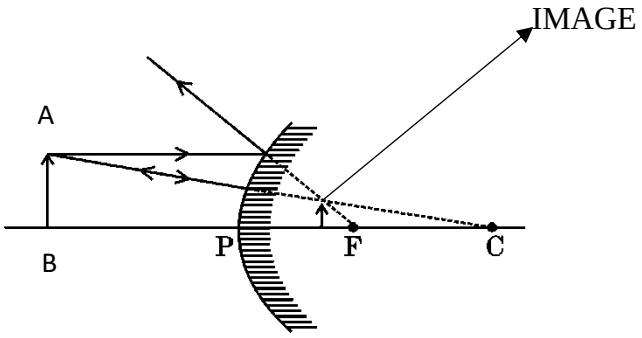
(c)
<table><tr><td>Movement in touch-me-not Plant</td><td>Movement of tendrils in pea plant</td></tr><tr><td>It is growth independent</td><td>It is growth dependent</td></tr><tr><td>It does not take place in the direction of stimulus</td><td>It takes place in the direction of stimulus</td></tr><tr><td>It is also called as nastic movement.</td><td>It is also called as tropic movement (any other)</td></tr></table>(Any one difference)</td><td>1

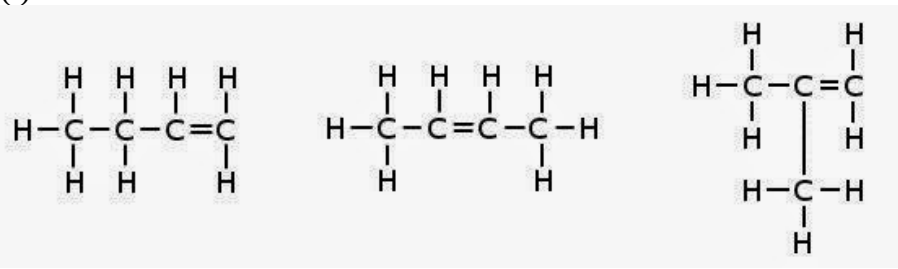
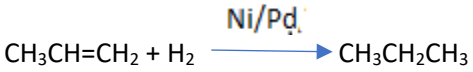
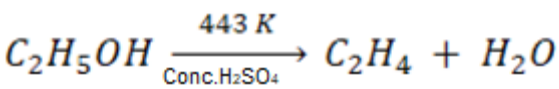
1

1</td><td>3</td></tr>
<tr><td>30.</td><td>(a)
Chromosomes carry genes which control the traits of an organism/chromosomes contain information for inheritance of features from parents to next generation in the form of DNA(Deoxy ribonucleic acid) molecule.
(b)
• Each cell has two copies of each chromosome, one from male and the other from female parents which get halved during the formation of germ cells/gametes.
• After fusion of the germ cells zygote is formed which restores the normal number of chromosomes and the same amount of DNA in the progeny.</td><td>1

1

1</td><td>3</td></tr>
</table>

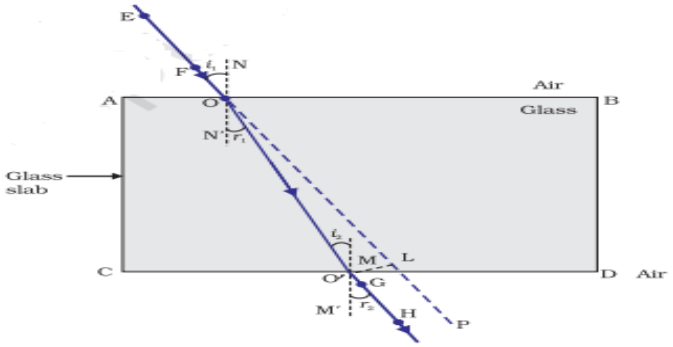
31.	(i)  OBJECT (ii)  OBJECT **(Note: Deduct ½ mark if arrows are not drawn.)**	1 ½ 1 ½	3
32.	(a) $\frac{1}{R_1} = \frac{1}{10\,\Omega} + \frac{1}{15\,\Omega} = \frac{1}{6\,\Omega} \Rightarrow R_1 = 6\ \Omega$ $\frac{1}{R_2} = \frac{1}{60\,\Omega} + \frac{1}{40\,\Omega} = \frac{100}{2400\,\Omega} \Rightarrow R_2 = 24\ \Omega$ $\because$ R_1 and R_2 are in series $\therefore$ $R_{total} = R_1 + R_2 = (6 + 24) = 30\ \Omega$ (b) V = IR $\Rightarrow$ $I = \frac{V}{R} = \frac{15\,V}{30\,\Omega} = 0{\cdot}5$ A (c) $V = IR_1 = 0{\cdot}5\ A \times 6\ \Omega = 3{\cdot}0$ V	1 1 1	3
33.	(a) • $R = \rho \frac{l}{A}$ $\rho = \frac{RA}{l}$ • SI unit of $\rho = \frac{ohm \times (metre)^2}{metre}$ = ohm meter	1 ½ ½	

	(b) Resistivity of alloy is higher than pure metals. / They do not oxidise (burn) readily at high temperatures.	1	3
	SECTION D		
34.	(a) (i) 	½, ½	
	(any two)		
	(ii) (I) Chloropropane	½	
	(II) Butanone/ Butan-2-one	½	
	(iii) (I) 	1	
	(II) 	1	
	(III) $CH_3COOH + C_2H_5OH \xrightarrow{Acid} CH_3COOC_2H_5 + H_2O$	1	
	OR		
	(b) (i) X = Ethanol/ Ethyl alcohol/ C_2H_5OH	½	
	Y = Sodium ethoxide/ C_2H_5ONa	½	
	Z = Hydrogen/H_2	½	
	$CH_3CH_2OH + Na \longrightarrow CH_3CH_2ONa + \frac{1}{2}H_2$ X Y Z	½	
	(ii) (I) 	1	
	(II) 	1	

	(III) $C_2H_5OH \xrightarrow{Acidified\ K_2Cr_2O_7} CH_3COOH$ **(No mark to be deducted if equations are not balanced.)**	1	5
35.	(a) (i) (I) Ovary: Produces female gamete (egg) and female hormones(oestrogen). (II) Fallopian tube: Site of Fertilization (III) Uterus: Site of Implantation and embryonic development. (ii) Methods of contraception used by males: • Mechanical barrier - Condoms • Surgical method – blocking the vas deferens in males (Vasectomy) **OR** (b) (i)	½,½ 1 1 1 1	
	Self-pollination: Pollen grains are transferred from stamen to the stigma of the same flower. Cross-pollination: Transfer of pollen grains from stamen of one flower to the stigma of another flower of same species.	1+1	
	(ii) A – Stigma: Receives pollen and provides suitable environment for its germination. B –Pollen tube: Carries males germ cells (gametes) to the female gamete situated in the ovary. C – Egg Cell (Female germ cell): Fuses with male gamete and forms zygote.	1 1 1	5
36.	(a) (i) • Concave lens • P = $\frac{1}{f(m)}$ $-2{\cdot}5 = \frac{1}{f}$ f = $\frac{10}{-2{\cdot}5}$ = – 0·4 m = – 40 cm • Myopia (ii) (I) Real and inverted (II) magnified image /size of image is double the size of object (III) beyond 2F/ on the other side as that of object (IV) Negative (iii) • The lens with focal length 10 cm • less focal length, more converging/diverging power	½ ½ ½ ½ ½×4 ½ ½	

OR

(b) (i)



(if arrows not marked , deduct half mark)

2

(ii) The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for a given pair of media.

1

$$\frac{\sin i}{\sin r} = constant$$

1

(iii)

Convex Lens	Concave Lens
(I) Object to be placed between O and F	Object can be placed anywhere in front of the lens
(II) Magnified image	Diminished image

1

5

SECTION E

37. (a) $2\,NaCl + 2\,H_2O \xrightarrow{electricity} 2\,NaOH + H_2 + Cl_2$

1

(b)

Uses of NaOH : Degreasing metals/ Soaps and Detergents/ paper making/ artificial fibres/ preparation of bleach

Uses of H_2: As fuel/ Margarine/ In preparation of ammonia for fertilizers/Preparation of HCl

Uses of Cl_2 : Disinfectant/ PVC/ water treatment/ in swimming pools/ CFC's/ preparation of bleach/ preparation of HCl/ pesticides

(Any two uses of anyone product)

½,½

(c) (i) A – $NaHCO_3$/ Sodium Hydrogen Carbonate/ Baking soda

½

B – Na_2CO_3 / Sodium Carbonate

½

$$\underset{A}{2\,NaHCO_3} \xrightarrow{heat} \underset{B}{Na_2CO_3} + H_2O + CO_2$$

1

OR

(c) (ii) • The fixed number of water molecules present in one formula unit of a salt.

1

- $CuSO_4.5H_2O$/Copper Sulphate pentahydrate/Blue vitrol
- $CaSO_4.2H_2O$/Gypsum/Calcium sulphate dihydrate
- $Na_2CO_3.10H_2O$/Washing Soda/Sodium carbonate decahydrate

	• $FeSO_4.7H_2O$/ Green Vitrol/Ferrous sulphate hepta hydrate • $CaSO_4$. ½ H_2O/ Calcium Sulphate hemihydrate /POP **(Any two examples)**	½,½	4
38.	(a) Photosynthesis A process by which green plants capture sunlight and convert it to chemical energy with the help of chlorophyll / Process by which carbon dioxide and water is converted into carbohydrates in the presence of sunlight chlorophyll and water. (b) $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$ (c) (i) • Absorption of light energy by chlorophyll • Conversion of light energy to chemical energy. • Reduction of carbon dioxide to carbohydrates. • Desert plants take up CO_2 at night and prepare intermediate, which is acted upon by the energy absorbed by the chlorophyll during the day. **OR** (c) (ii) (I) Decrease the rate of photosynthesis due to low amount of sunlight. (II) Decreases the rate of photosynthesis due to reduced gaseous exchange.	½ ½ 1 2 1 1	4
39.	(a) Live wire- Red Neutral wire- Black (b) Power, P = 1 kW = 1 × 1000 W = 1000 W Voltage, V = 220 V Current drawn I =? $P = V \times I$ $I = \frac{1000\ W}{220\ V} = 4{\cdot}54$ A Current rating should be of 5A. (c) (i) • The earth wire provides a low resistance conducting path for the current which ensures that any leakage of current to flow to the metallic body of the appliances, keeps its potential to that of the earth. • The user will not get an electric shock. **OR** (c) (ii) • Fuse wire • Earth wire • A fuse in a circuit prevents damage to the circuit due to overloading. • Earth wire prevents electric shock due to leakage of current.	½ ½ ½ ½ 1 1 ½ ½ ½ ½	4

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2025
SUBJECT NAME : SCIENCE (Q.P. CODE 31/1/2)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	**"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC."**
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded**
4	The Marking Scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark(√) wherever answer is correct. For wrong answer CROSS 'X' be marked. Evaluators will not put right (✓)while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.

13	• Ensure that you do not make the following common types of errors committed by the Examiner in the past:- • Leaving answer or part thereof unassessed in an answer book. • Giving more marks for an answer than assigned to it. • Wrong totaling of marks awarded on an answer. • Wrong transfer of marks from the inside pages of the answer book to the title page. • Wrong question wise totaling on the title page. • Wrong totaling of marks of the two columns on the title page. • Wrong grand total. • Marks in words and figures not tallying/not same. • Wrong transfer of marks from the answer book to online award list. • Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) • Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for Spot Evaluation**" before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18.	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

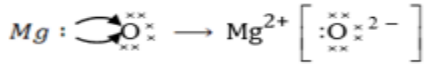
SECONDARY SCHOOL EXAMINATION, 2025

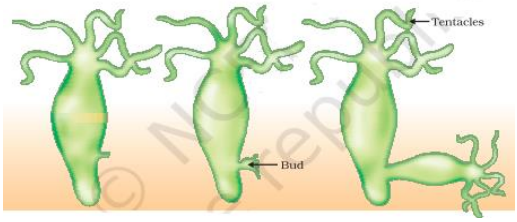
MARKING SCHEME

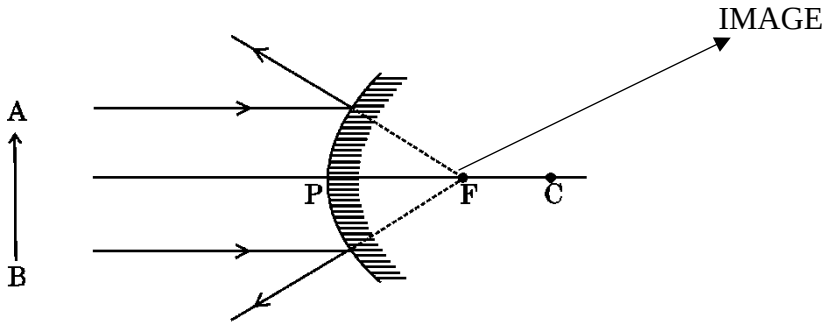
CLASS: X [SCIENCE (Subject Code–086)]

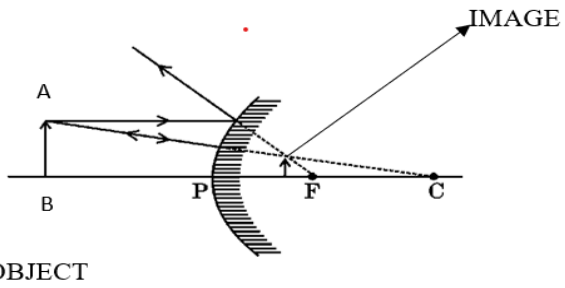
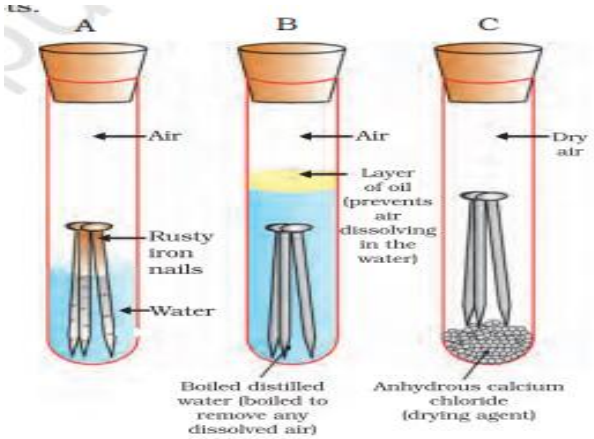
[Paper Code: 31/1/2]

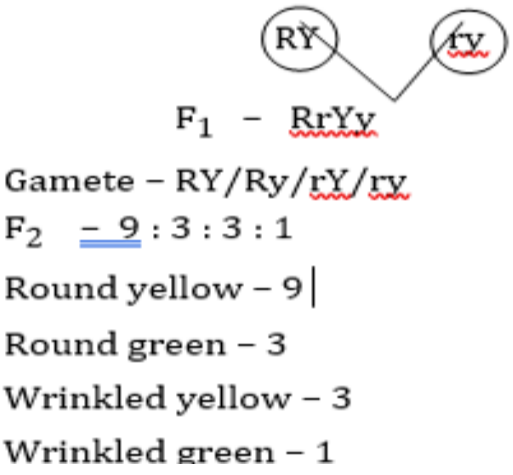
Maximum Marks: 80

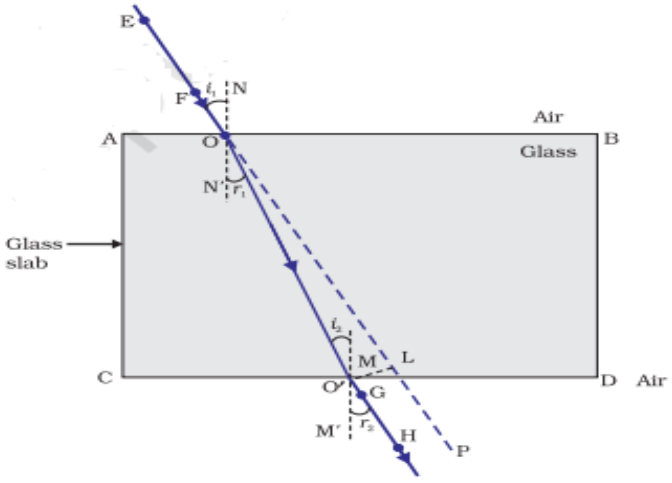
Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
	SECTION A		
1.	A/ 	1	1
2.	B / Calcium and Magnesium	1	1
3.	C/$FeSO_4$	1	1
4.	C / It has weak electrostatic forces of attraction between its oppositely charged ions.	1	1
5.	D / 1 : 8	1	1
6.	A / Salt and water is formed	1	1
7.	B / Al_2O_3 and MgO	1	1
8.	D / Auxins	1	1
9.	C / starch into simple sugars	1	1
10.	C / 100% round and yellow	1	1
11.	C / (i) and (iii)	1	1
12	D / Cytoplasm and Oxygen deficient muscle cells	1	1
13.	D/Green light deviates more than the orange light	1	1
14.	A / (i) and (ii)	1	1
15.	D / 99%	1	1
16.	D / (ii) and (iv)	1	1
17.	C / Assertion (A) is true, but Reason (R) is false.	1	1
18.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
19.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
20.	A / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
	SECTION B		
21.	Chemicals/pesticides used by farmers get washed down into the soil or water bodies and affect biotic and abiotic components of the ecosystem. These chemicals are mostly non-biodegradable and get accumulated progressively at each trophic level (Biological magnification). Thus, the health of the organisms of all trophic levels is affected.	2	2
22.	• (a) Power dissipated will be: • (I) minimum in circuit (ii) and • (II) maximum in circuit (iii) • • Justification : Power dissipated = $\frac{V^2}{R}$ • Since voltage is same in three cases, the power dissipation	½ ½	

	• will be inversely proportional to the resistance of the • circuit. • • (Award marks if explained through calculations) • • OR • (b) Voltage V = 220V • P=V x I • Power P_1 = 100 W P_2 = 60 W • ∴ $I_1 = \frac{P_1}{V} = \frac{100\ W}{220\ V}$ = 0·45 A • ∴ $I_2 = \frac{P_2}{V} = \frac{60\ W}{220\ V}$ = 0·27 A • ∴ Total current drawn $I = I_1 + I_2$ = 0·45 + 0·27 = 0·72 A	1 ½ ½ ½ ½	2
23.	f = – 20 cm ; u = – 30 cm $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{-20} - \frac{1}{-30}$ $\frac{1}{v} = \frac{1}{-20} + \frac{1}{30}$ v = -60 cm Position of image is 60 cm in front of the mirror.	½ ½ 1	2
24.	(a) • Plugging of the leak in blood vessels prevents lowering of the blood pressure / maintains the efficiency of the pumping system • Platelets • Help to clot the blood at the site of injury. **OR** (b) (i) Plants have low energy needs because have a large proportion of dead cells in many tissues / Plants have low energy needs as they do not move (ii) Translocation of soluble products of photosynthesis from leaves to other parts of the plant / It transports amino acids and other substances to storage organs of roots, fruits and seeds and to growing organs.	1 ½ ½ 1 1	2
25.	 diagram	1	

	labelling	1	2
26.	(a) $2\,Pb(NO_3)_2 \xrightarrow{heat} 2\,PbO + 4\,NO_2 + O_2$	1	
	(b) $CH_4 + 2\,O_2 \longrightarrow CO_2 + 2\,H_2O + Heat + light$	1	2
	SECTION C		
27.	(a) When 1 coulomb of charge flows through any cross section of a conductor in 1 second, then the electric current flowing through it is 1 ampere. / 1A = $\frac{1C}{1s}$	1	
	• (b) Radius of wire = 0·01 cm = $0{\cdot}01 \times 10^{-2}$ m		
	• $\rho = 44 \times 10^{-8}\ \Omega$ m		
	• R = 14 Ω	½	
	• $R = \rho \frac{l}{A}$	½	
	• $l = \frac{R \times A}{\rho} = \frac{14 \times 22 \times (0{\cdot}01 \times 10^{-2})^2}{7 \times 44 \times 10^{-8}}$		
	• $= \frac{10^{-8}}{10^{-8}}$ = 1·0 m	1	3
28.	(a) $\frac{1}{R_1} = \frac{1}{10\,\Omega} + \frac{1}{15\,\Omega} = \frac{1}{6\,\Omega} \Rightarrow R_1 = 6\ \Omega$		
	$\frac{1}{R_2} = \frac{1}{60\,\Omega} + \frac{1}{40\,\Omega} = \frac{100}{2400\,\Omega} \Rightarrow R_2 = 24\ \Omega$		
	∵ R_1 and R_2 are in series		
	∴ $R_{total} = R_1 + R_2 = (6 + 24) = 30\ \Omega$	1	
	(b) V = IR ⇒ $I = \frac{V}{R} = \frac{15\,V}{30\,\Omega}$ = 0·5 A	1	
	(c) V = IR = 0·5 A × 6 Ω = 3·0 V	1	3
29.	(i)  OBJECT	1 ½	

	(ii)  OBJECT (**Note: Deduct ½ mark if arrows are not drawn.)**	1 ½	3
30.	(a) ➢ Take three test tubes and place clean iron nails in each of them. ➢ Label these test tubes A, B and C. ➢ Pour some water in test tube A and cork it. ➢ Pour boiled distilled water in test tube B, add about 1 mL of oil and cork it. The oil will float on water and prevent the air from dissolving in the water. ➢ Put some anhydrous calcium chloride in test tube C and cork it. Anhydrous calcium chloride will absorb the moisture, if any, from the air. Iron nails rust in test tube A, but they do not rust in test tubes B and C. Rusting of iron takes place when exposed to both air and water. /  Iron nails rust in test tube A, but they do not rust in test tubes B and C. Rusting of iron takes place when exposed to both air and water. **(Note: if a student explains activity through description or through labelled diagram, give full marks.)** **OR** (b) (i)	3	

	• Sodium, Potassium, Lithium **(any two)** • Observations: ➢ A violent reaction occurs. ➢ Large amount of heat is evolved. ➢ Evolved gas catches fire. (ii) The gas (bubbles) burns with a pop sound	½,½ 1 ½ ½	3
31.	(a) $3\,MnO_2(s) + 4\,Al(s) \longrightarrow 3\,Mn(l) + 2\,Al_2O_3(s) + heat$ $Fe_2O_3(s) + 2\,Al(s) \longrightarrow 2\,Fe(l) + Al_2O_3(s) + heat$ **(Award marks if explained through statement or any other reaction)** (b) Metals towards the top of the reactivity series (Na, Mg, Ca) have more affinity for oxygen than carbon.	1 1 1	3
32.	• Calculation of ratio of Seeds as per data given. • Round and yellow – $\frac{800}{90}$= 9, • Round and green – $\frac{275}{90}$= 3 • Wrinkled and yellow – $\frac{268}{90}$= 3 Wrinkled and green – $\frac{90}{90}$= 1 • • Parents – • Round and Yellow Wrinkled and Green • RRYY × rryy Gametes  **(Award marks if explained through Mendel's cross using two separate characters)** • Appearance of new combinations of characteristics show that traits for Round/Wrinkled and Yellow/Green seeds are independently inherited/ Independent inheritance of two separate traits.	1 1 1	3

33.	• (a) Gland that secretes • (i) Adrenal gland • (ii) Thyroid gland • (b) If the sugar level in blood rises it is detected by cells of pancreas which responds to produce more insulin to lower blood sugar level. • As the blood sugar level falls it is detected by cells of pancreas and insulin secretion is reduced.	½ ½ 2	3
	• SECTION D		
34.	(a) (i) • Concave lens • P = $\frac{1}{f(m)}$ $-2{\cdot}5 = \frac{1}{f}$ f = $\frac{10}{-2{\cdot}5}$ = – 0·4 m = – 40 cm • Myopia (ii) (I) Real and inverted (II) magnified image /size of image is double the size of object (III) beyond 2F/ on the other side as that of object (IV) Negative (iii) • The lens with focal length 10 cm • less focal length, more converging/diverging power **OR** (b) (i)  **(if arrows not marked, deduct half mark)** (ii) The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for a given pair of media. /	½ ½ ½ ½ ½×4 ½ ½ 2 1	

$\frac{\sin i}{\sin r} = constant$

Convex Lens	Concave Lens
(I) Object to be placed between O and F	Object can be placed anywhere in front of the lens
(II) Magnified image	Diminished/smaller image

1
1

5

35.

- (a) (i) A = Ethanol /Ethyl alcohol / C_2H_5OH
  B = Ethanoic acid /Acetic acid / CH_3COOH
  C = Ethene / C_2H_4/$CH_2=CH_2$

½
½
½

- (ii) Molecular mass of ethene (C_2H_4)
  $12 \times 2 + 1 \times 4 = 24 + 4 = 28$ u

1

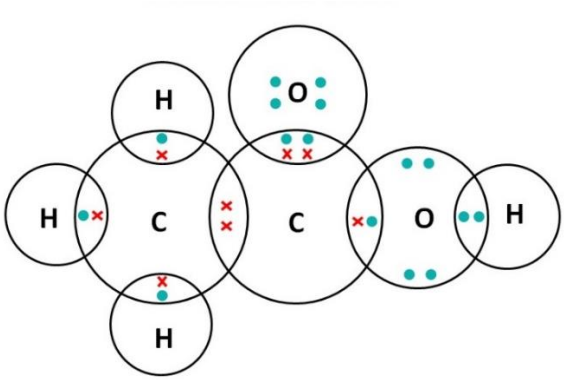
- (iii) Brisk effervescence is observed.

½

$$CH_3COOH + Na_2CO_3 \longrightarrow CH_3COONa + H_2O + CO_2$$

1

(iv) (Ethanoic acid)



1

OR

(b) (i)

- • Homologous series: A series of organic compounds in which the same functional groups or hetero-atom substitutes for hydrogen in a carbon chain/A sequence of a carbon compound with same general formula and similar chemical properties.

1

- $HCOOH$, CH_3COOH, C_2H_5COOH

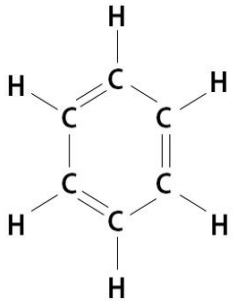
1

- Methanoic acid, Ethanoic acid, Propanoic acid
  (any other 3 successive members)

1

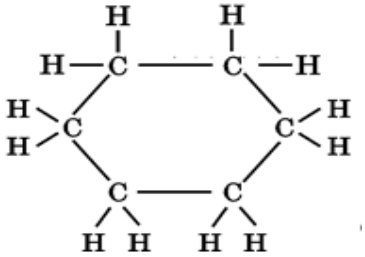
- (ii) (I) Benzene
  (II) Cyclohexane

½
½



Benzene

OR



Cyclohexane (any other example) — 1

5

36. a) (i)

(I) Ovary: Produces female gamete (egg) and female hormones(oestrogen). — ½,½

(II) Fallopian tube: Site of Fertilization — 1

(III) Uterus: Site of Implantation and embryonic development. — 1

(ii) Methods of contraception used by males:

- Mechanical barrier - Condoms — 1
- Surgical method – blocking the vas deferens in males (Vasectomy) — 1

OR

(b) (i)

Self-pollination	Cross-pollination
Pollen grains are transferred from stamen to the stigma of the same flower.	Transfer of pollen grains from stamen of one flower to the stigma of another flower of same species.

2

(ii)

A – Stigma: Receives pollen and provides suitable environment for its germination. — ½,½

B –Pollen tube: Carries males germ cells (gametes) to the female gamete situated in the ovary. — ½,½

C – Egg Cell: (Female germ cell): Fuses with male gamete and forms zygote. — ½,½

5

SECTION E

37. (a) Live wire- Red — ½

Neutral wire- Black — ½

	(b) Power, P = 1 kW = 1 × 1000 W = 1000 W Voltage, V = 220 V Current drawn I =? P = V × I $I = \frac{1000\ W}{220\ V} = 4{\cdot}54$ A Current rating should be of 5A. (c) (i) • The earth wire provides a low resistance conducting path for the current which ensures that any leakage of current to flow to the metallic body of the appliances, keeps its potential to that of the earth. • The user will not get an electric shock. **OR** (c) (ii) • Fuse wire • Earth wire • A fuse in a circuit prevents damage to the circuit due to overloading. • Earth wire prevents electric shock due to leakage of current.	½ ½ 1 1 ½ ½ ½ ½	4
38.	(a) Photosynthesis A process by which green plants capture sunlight and convert it to chemical energy with the help of chlorophyll / Process by which carbon dioxide and water is converted into carbohydrates in the presence of sunlight chlorophyll and water. (b) $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$ (c) (i) • Absorption of light energy by chlorophyll • Conversion of light energy to chemical energy. • Reduction of carbon dioxide to carbohydrates. • Desert plants take up CO_2 at night and prepare an intermediate, which is acted upon by the energy absorbed by the chlorophyll during the day. **OR** (c) (ii) (I) Decrease the rate of photosynthesis due to low amount of sunlight. (II) Decreases the rate of photosynthesis due to reduced gaseous exchange	½ ½ 1 2 1 1	4
39.	(a) $2\ NaCl + 2\ H_2O \xrightarrow{electricity} 2\ NaOH + H_2 + Cl_2$ (b) Uses of NaOH : Degreasing metals/ Soaps and Detergents/ paper making/ artificial fibres/ preparation of bleach	1 ½ ,½	

	Uses of H_2: As fuel/ Margarine/ Preparation of ammonia for fertilizers/preparation of HCl Uses of Cl_2 : Disinfectant/ PVC/ water treatment/ in swimming pools/ CFC's/ preparation of bleach/ preparation of HCl/ pesticides **(Any two uses of anyone product)**	½ ½	
	(c) (i) A – $NaHCO_3$/ Sodium Hydrogen Carbonate/Baking soda B – Na_2CO_3 / Sodium Carbonate $2\,NaHCO_3 \xrightarrow{heat} Na_2CO_3 + H_2O + CO_2$ A B	1 1	
	OR (c) (ii) • The fixed number of water molecules present in one formula unit of a salt. • $CuSO_4.5H_2O$/ Copper Sulphate pentahydrate/Blue vitriol • $CaSO_4.2H_2O$/Gypsum/Calcium sulphate dihydrate • $Na_2CO_3.10H_2O$/Washing Soda/Sodium carbonate decahydrate • $FeSO_4.7\,H_2O$ / Green Vitriol/Ferrous sulphate heptahydrate • $CaSO_4$. ½ H_2O /Calcium Sulphate hemihydrate/POP **(Any two examples)**	½,½	4

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2025
SUBJECT : SCIENCE (Q.P. CODE 31/1/3)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	**"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC."**
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded**
4	The Marking Scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark(√) wherever answer is correct. For wrong answer CROSS 'X' be marked. Evaluators will not put right (✓)while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per

	day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.
13	• Ensure that you do not make the following common types of errors committed by the Examiner in the past:- • Leaving answer or part thereof unassessed in an answer book. • Giving more marks for an answer than assigned to it. • Wrong totaling of marks awarded on an answer. • Wrong transfer of marks from the inside pages of the answer book to the title page. • Wrong question wise totaling on the title page. • Wrong totaling of marks of the two columns on the title page. • Wrong grand total. • Marks in words and figures not tallying/not same. • Wrong transfer of marks from the answer book to online award list. • Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) • Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for Spot Evaluation**" before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18.	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

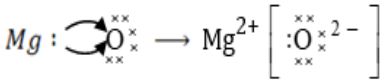
SECONDARY SCHOOL EXAMINATION, 2025

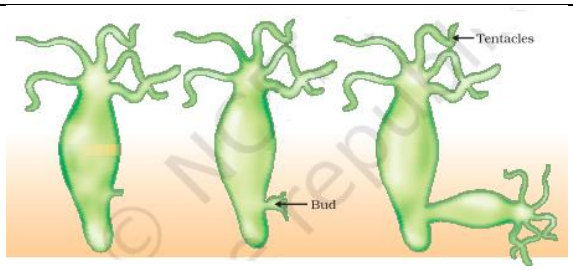
MARKING SCHEME

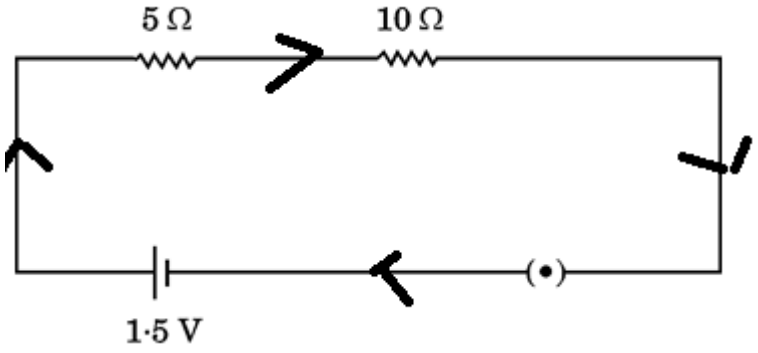
CLASS: X [SCIENCE (Subject Code–086)]

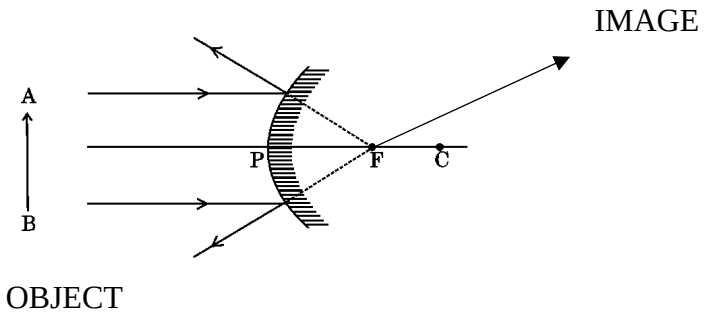
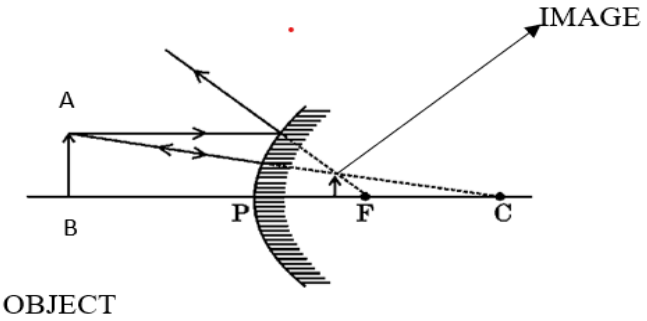
[Paper Code: 31/1/3]

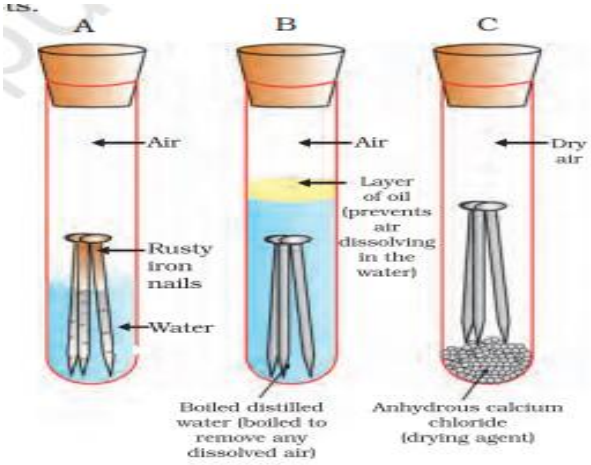
Maximum Marks: 80

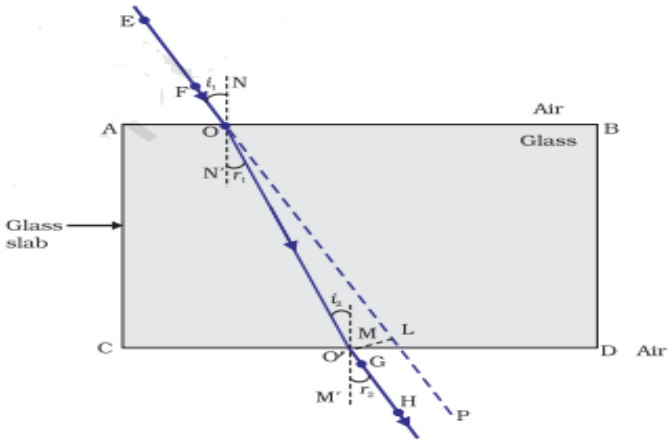
Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
	SECTION A	**1**	**1**
1.	B / Calcium and Magnesium	1	1
2.	A / 	1	1
3.	C / It has weak electrostatic forces of attraction between its oppositely charged ions.	1	1
4.	A / Salt and water is formed	1	1
5.	B /5	1	1
6.	B / Al_2O_3 and MgO	1	1
7.	D / 1 : 8	1	1
8.	D / Cytoplasm and Oxygen deficient muscle cells.	1	1
9.	C / 100% round and yellow	1	1
10.	C / (i) and (iii)	1	1
11.	D / Auxins	1	1
12.	C / starch into simple sugars	1	1
13.	D / 99%	1	1
14.	D / (ii) and (iv)	1	1
15.	A / Scattering of light	1	1
16.	A / (i) and (ii)	1	1
17.	B / Both Assertion (A) and Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
18.	A / Both Assertion (A) and Reason (R) is the correct explanation of Assertion (A).	1	1
19.	C / Assertion (A) is true, but Reason (R) is false.	1	1
20.	B / Both Assertion (A) and Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
	SECTION B		
21.	Here u = – 10 cm; f = – 15 cm ; $\frac{1}{f}=\frac{1}{v}+\frac{1}{u}$ $\frac{1}{-15}=\frac{1}{v}+\frac{1}{-10}$ $\frac{1}{v}=\frac{1}{-15}+\frac{1}{10}$ v =+30 cm Position of image is 30 cm from the mirror	½ ½ 1	2
22.	(a) $P=\frac{V^2}{R}$	½	

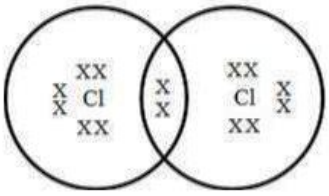
	$R=\frac{V^2}{P}$ $R_A=\frac{(220)^2}{50}$ $R_B=\frac{(220)^2}{25}$ $\frac{R_A}{R_B}=\frac{1}{2}$ / $P=\frac{V^2}{R}$ Since V is same means P is inversely proportional to R. Power of lamp A is double that of B hence Resistance of A is half that of B. $\frac{R_A}{R_B}=\frac{1}{2}$ **OR** (b) $H=\frac{V^2}{R}\times t$ $400=\frac{V^2}{4}\times 1$ $V^2=1600$ V=40V	½ 1 1 1 ½ ½ 1	2
23.	 diagram labelling	1 1	2
24.	(a) • Plugging of the leak in blood vessels prevents lowering of the blood pressure / maintains the efficiency of the pumping system. • Platelets • Help to clot the blood at the site of injury. **OR** (b) (i) Plants have low energy needs because they have a large proportion of dead cells in many tissues / Plants have low energy needs as they do not move (ii) Translocation of soluble products of photosynthesis from leaves to other parts of the plant / It transports amino acids and other substances to storage organs of roots, fruits and seeds and to growing organs.	1 ½ ½ 1 1	2

25.	• Evolution of gas • Change / Rise in temperature	1 1	2
26.	(a) $2\,HNO_3 + Ca(OH)_2 \longrightarrow Ca(NO_3)_2 + 2\,H_2O$ (b) $NaCl + AgNO_3 \longrightarrow AgCl + NaNO_3$ (**Deduct half mark if equation is not balance**d)	1 1	2
	SECTION C		
27.	(a) It is the amount of work done to bring one coulomb charge from one point to another in the field is 1 joule. / 1V=$\frac{1J}{1C}$ (b)  **Current** = $\frac{\textbf{Potential difference}}{\textbf{Resistance}} = \frac{\textbf{1·5 V}}{\textbf{(5 Ω + 10 Ω)}}$ $= \frac{1{\cdot}5\ V}{15\ \Omega} = 0{\cdot}1$ A	1 1 1	3
28.	(a) $\frac{1}{R_1} = \frac{1}{10\ \Omega} + \frac{1}{15\ \Omega} = \frac{1}{6\ \Omega} \Rightarrow R_1 = 6\ \Omega$ $\frac{1}{R_2} = \frac{1}{60\ \Omega} + \frac{1}{40\ \Omega} = \frac{100}{2400\ \Omega} \Rightarrow R_2 = 24\ \Omega$ ∵ R_1 and R_2 are in series ∴ $R_{total} = R_1 + R_2 = (6 + 24) = 30\ \Omega$ (b) $V = IR \quad \Rightarrow \quad I = \frac{V}{R} = \frac{15\ V}{30\ \Omega} = 0{\cdot}5$ A (c) $V = IR_1 = 0{\cdot}5\ A \times 6\ \Omega = 3{\cdot}0$ V	 1 1 1	 3

29.	(i)  OBJECT (ii)  OBJECT **(Note: Deduct ½ mark if arrows are not drawn.)**	1 ½ 1 ½	3
30.	(a) • 23 pairs or 46 chromosomes • 1 Pair or 2 chromosomes **(**b) In sexually reproducing organisms chromosomes occur in pairs. The members of the pair separate at the time of gamete formation. The two germ cells fuse and form zygote thus restore the same number of chromosomes as their parents**.** **(Award marks if explained by any other method.)**	½ ½ 2	3
31.	(a) Adrenaline Adrenal Gland **(b**) It acts on heart. Heart beats faster, resulting in more supply of oxygen to skeletal muscles. The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs. Breathing rate increases because of contraction of diaphragm and the rib muscles**.**	½ ½ 2	3
32.	(a) ➢ Take three test tubes and place clean iron nails in each of them. ➢ Label these test tubes A, B and C.		

	➢ Pour some water in test tube A and cork it. ➢ Pour boiled distilled water in test tube B, add about 1 mL of oil and cork it. The oil will float on water and prevent the air from dissolving in the water. ➢ Put some anhydrous calcium chloride in test tube C and cork it. Anhydrous calcium chloride will absorb the moisture, if any, from the air. Iron nails rust in test tube A, but they do not rust in test tubes B and C. Rusting of iron takes place when exposed to both air and water. /  Iron nails rust in test tube A, but they do not rust in test tubes B and C. Rusting of iron takes place when exposed to both air and water. **(Note: if a student explains activity through description or through labelled diagram, give full marks.)** **OR** (b) (i) • Sodium, Potassium, Lithium **(any two)** • Observations: ➢ A violent reaction occurs. ➢ Large amount of heat is evolved. ➢ Evolved gas catches fire. (ii) The gas (bubbles) burns with a pop sound	3 ½,½ 1 ½ ½	3
33.	(a) $3\ MnO_2(s)\ +\ 4\ Al(s)\ \longrightarrow\ 3\ Mn(l)\ +\ 2\ Al_2O_3(s)\ +\ heat$ $Fe_2O_3(s)\ +\ 2\ Al(s)\ \longrightarrow\ 2\ Fe(l)\ +\ Al_2O_3(s)\ +\ heat$ **(Award marks if explained through statement)** (b) Metals towards the top of the reactivity series (Na, Mg, Ca) have more affinity for oxygen than carbon.	1 1 1	3
	SECTION D		
34.	(a) (i) • Concave lens	½	

	• $P = \frac{1}{f(m)}$ $-2{\cdot}5 = \frac{1}{f}$ $f = \frac{10}{-2{\cdot}5} = -0{\cdot}4\ m = -40\ cm$ • Myopia	½ ½ ½	
	(ii) (I) Real and inverted (II) magnified image /size of image is double the size of object (III) beyond 2F/ on the other side as that of object (IV) Negative	½×4	
	(iii) • The lens with focal length 10 cm • less focal length, more converging/diverging power	½ ½	
	OR		
	(b) (i)  **(if arrows not marked , deduct half mark)**	2	
	(ii) The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for a given pair of media. / $\frac{\sin i}{\sin r} = constant$	1	
	(iii)		
	Convex Lens / Concave Lens (I) Object to be placed between O and F / Object can be placed anywhere in front of the lens (II) Magnified image / Diminished image	1 1	5
35.	(a) (i) (I) Ovary: Produces female gamete (egg) and female hormones(oestrogen). (II) Fallopian tube: Site of Fertilization (III) Uterus: Site of implantation and embryonic development.	½,½ 1 1	
	(ii) Methods of contraception used by males: • Mechanical barrier - Condoms	1	

	• Surgical method – blocking the vas deferens in males (Vasectomy) **OR** (b) (i) Self-pollination: Pollen grains are transferred from stamen to the stigma of the same flower. Cross-pollination: Transfer of pollen grains from stamen of one flower to the stigma of another flower of same species. (ii) A – Stigma : Receives pollen and provides suitable environment for its germination. B –Pollen tube : Carries males germ cells (gametes) to the female gamete situated in the ovary. C – Egg Cell (Female germ cell) : Fuses with male gamete and forms Zygote.	1 1+1 1 1 1	5
36.	**(a) (i)**  (ii) • $CH_4 + Cl_2 \xrightarrow{Sunlight} CH_3Cl + HCl$ / Chloromethane is formed; • substitution reaction **(iii)** Alkaline $KMnO_4$/ Acidified $KMnO_4$ /Acidified $K_2Cr_2O_7$ **(any two)** **(iv)** Covalent compounds: Low melting and boiling points; Poor conductors of electricity; Generally soft if solids; Generally soluble in oil or non-polar solvents Ionic Compounds: High melting and boiling points; Conduct electricity in aqueous solution and molten state.; Hard crystalline solids; Generally soluble in soluble in water/polar solvents **OR** **(b)** (i) Carbon could gain four electrons forming C^{4-} anion. But it would be difficult for the nucleus with six protons to hold on to ten electrons. Carbon could also	1 ½ ½ ½, ½ ½×4	

	lose four electrons forming C^{4+} cation. But it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus. $\therefore$ It shares four electrons of the outermost shell to form covalent bond/covalent compound.	2	
	(ii) There are weak forces of attraction between the molecules of covalent compound.	1	
	(iii) (I) Covalent compounds do not form ions hence are poor conductors.	1	
	(II) Carbon-carbon single bond is very strong and stable.	1	5
	SECTION E		
37.	(a) Live wire- Red Neutral wire- Black	½ ½	
	(b) Power, P = 1 kW = 1 × 1000 W = 1000 W Voltage, V = 220 V Current drawn I =? $P = V \times I$ $I = \frac{1000\ W}{220\ V} = 4{\cdot}54$ A Current rating should be of 5A.	½ ½	
	(c) (i) • The earth wire provides a low resistance conducting path for the current which ensures that any leakage of current to flow to the metallic body of the appliances, keeps its potential to that of the earth. • The user will not get an electric shock. **OR**	1 1	
	(c) (ii) • Fuse wire • Earth wire • A fuse in a circuit prevents damage to the circuit due to overloading. • Earth wire prevents electric shock due to leakage of current.	½ ½ ½ ½	4
38.	(a) $2\ NaCl + 2\ H_2O \xrightarrow{\text{electricity}} 2\ NaOH + H_2 + Cl_2$ (b) Uses of NaOH : Degreasing metals/ Soaps and Detergents/ paper making/ artificial fibres/ preparation of bleach Uses of H_2: As fuel/ Margarine/ In preparation of ammonia for fertilizers/preparation of HCl Uses of Cl_2 : Disinfectant/ PVC/ water treatment/ in swimming pools/ CFC's/ preparation of bleach/ preparation of HCl/ pesticides **(Any two uses of anyone product)**	1 ½,½	

	(c) (i) A – $NaHCO_3$/ Sodium Hydrogen Carbonate/Baking soda B – Na_2CO_3 / Sodium Carbonate $2\,NaHCO_3 \xrightarrow{heat} Na_2CO_3 + H_2O + CO_2$ **OR** (c) (ii) • The fixed number of water molecules present in one formula unit of a salt. • $CuSO_4.5H_2O$/Copper Sulphate pentahydrate/Blue vitriol • $CaSO_4.2H_2O$/Gypsum/Calcium sulphate dihydrate • $Na_2CO_3.10H_2O$/Washing Soda/Sodium carbonate decahydrate • $FeSO_4.7H_2O$/ Green Vitriol/Ferrous sulphate heptahydrate • $CaSO_4$. ½ H_2O /Calcium Sulphate hemihydrate/ POP **(Any other two examples)**	½ ½ 1 1 ½,½	4
39.	(a) Photosynthesis A process by which green plants capture sunlight and convert it to chemical energy with the help of chlorophyll / Process by which carbon dioxide and water is converted into carbohydrates in the presence of sunlight chlorophyll and water. (b) $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$ (c) (i) • Absorption of light energy by chlorophyll • Conversion of light energy to chemical energy. • Reduction of carbon dioxide to carbohydrates. • Desert plants take up CO_2 at night and prepare intermediate, which is acted upon by the energy absorbed by the chlorophyll during the day. **OR** (c) (ii) (I) Decrease the rate of photosynthesis due to low amount of sunlight. (II) Decreases the rate of photosynthesis due to reduced gaseous exchange. .	½ ½ 1 2 1 1	4

Series D4CBA/4

Set-1

प्रश्न-पत्र कोड
Q.P. Code **31/4/1**

रोल नं.
Roll No.

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।
Candidates must write the Q.P. Code on the title page of the answer-book.

विज्ञान
SCIENCE

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

	नोट		**NOTE**
(I)	कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **27** हैं ।	(I)	Please check that this question paper contains **27** printed pages.
(II)	कृपया जाँच कर लें कि इस प्रश्न-पत्र में **39** प्रश्न हैं ।	(II)	Please check that this question paper contains **39** questions.
(III)	प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।	(III)	Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
(IV)	**कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**	(IV)	**Please write down the serial number of the question in the answer-book before attempting it.**
(V)	इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।	(V)	15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

सामान्य निर्देश :

निम्नलिखित निर्देशों को बहुत सावधानी से पढ़िए और उनका सख़्ती से पालन कीजिए :

(i) *इस प्रश्न-पत्र में कुल **39** प्रश्न हैं । **सभी** प्रश्न अनिवार्य हैं ।*

(ii) *यह प्रश्न-पत्र **पाँच** खण्डों में विभाजित किया गया है – **क, ख, ग, घ** एवं **ङ** ।*

(iii) ***खण्ड क** – प्रश्न संख्या **1** से **20** तक बहुविकल्पीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **1** अंक का है ।*

(iv) ***खण्ड ख** – प्रश्न संख्या **21** से **26** तक अति लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **2** अंकों का है । इन प्रश्नों के उत्तर 30 से 50 शब्दों में दिए जाने चाहिए ।*

(v) ***खण्ड ग** – प्रश्न संख्या **27** से **33** तक लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **3** अंकों का है । इन प्रश्नों के उत्तर 50 से 80 शब्दों में दिए जाने चाहिए ।*

(vi) ***खण्ड घ** – प्रश्न संख्या **34** से **36** तक दीर्घ-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **5** अंकों का है । इन प्रश्नों के उत्तर 80 से 120 शब्दों में दिए जाने चाहिए ।*

(vii) ***खण्ड ङ** – प्रश्न संख्या **37** से **39** तक 3 स्रोत-आधारित/प्रकरण-आधारित इकाइयों के मूल्यांकन के **4** अंकों के प्रश्न (उप-प्रश्नों सहित) हैं ।*

(viii) *प्रश्न-पत्र में समग्र विकल्प नहीं दिया गया है । यद्यपि, कुछ खण्डों में आंतरिक विकल्प दिए गए हैं । इस प्रकार के प्रश्नों में केवल एक ही विकल्प का उत्तर दीजिए ।*

खण्ड क

*प्रश्न संख्या **1** से **20** तक के प्रत्येक प्रश्न में दिए गए चार विकल्पों में से सबसे उचित विकल्प चुनिए और लिखिए । ग़लत उत्तर के लिए कोई ऋणात्मक अंकन नहीं है ।* *20×1=20*

1. $Zn + 2CH_3COOH \longrightarrow (CH_3COO)_2 Zn + H_2$

उपर्युक्त अभिक्रिया है :

(A) वियोजन (अपघटन) अभिक्रिया (B) विस्थापन अभिक्रिया

(C) द्विविस्थापन अभिक्रिया (D) संयोजन अभिक्रिया

2. किसी लवण का जलीय विलयन नीले लिटमस को लाल कर देता है । इस लवण को निम्नलिखित में से किसके बीच अभिक्रिया से प्राप्त किया जा सकता है ?

(A) HNO_3 और NaOH (B) H_2SO_4 और KOH

(C) CH_3COOH और NaOH (D) HCl और NH_4OH

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper comprises **39** questions. **All** questions are compulsory.*

(ii) *This question paper is divided into **five** sections – **A**, **B**, **C**, **D** and **E**.*

(iii) ***Section A** – Questions No. **1** to **20** are Multiple Choice Questions. Each question carries **1** mark.*

(iv) ***Section B** – Questions No. **21** to **26** are Very Short Answer type questions. Each question carries **2** marks. Answer to these questions should be in the range of 30 to 50 words.*

(v) ***Section C** – Questions No. **27** to **33** are Short Answer type questions. Each question carries **3** marks. Answer to these questions should in the range of 50 to 80 words.*

(vi) ***Section D** – Questions No. **34** to **36** are Long Answer type questions. Each question carries **5** marks. Answer to these questions should be in the range of 80 to 120 words.*

(vii) ***Section E** – Questions No. **37** to **39** are of 3 source-based/case-based units of assessment carrying **4** marks each with sub-parts.*

(viii) *There is no overall choice. However, an internal choice has been provided in some sections. Only one of the alternatives has to be attempted in such questions.*

SECTION A

*Select and write the most appropriate option out of the four options given for each of the questions no. **1** to **20**. There is no negative marking for incorrect response.* *20×1=20*

1. $Zn + 2CH_3COOH \longrightarrow (CH_3COO)_2 Zn + H_2$

The above reaction is a :

(A) Decomposition reaction (B) Displacement reaction

(C) Double displacement reaction (D) Combination reaction

2. An aqueous solution of a salt turns blue litmus to red. The salt could be the one obtained by the reaction of :

(A) HNO_3 and NaOH (B) H_2SO_4 and KOH

(C) CH_3COOH and NaOH (D) HCl and NH_4OH

3. चार अलग-अलग बीकरों में भरे चार विलयनों – ग्लूकोस, ऐल्कोहॉल, हाइड्रोक्लोरिक अम्ल और सल्फ्यूरिक अम्ल, को एक-एक करके किसी विद्युत परिपथ से संयोजित किया गया है जिसमें एक बल्ब भी जुड़ा है । विद्युत धारा प्रवाहित करने पर जिनमें बल्ब जलेगा वह विलयन हैं :

(A) ग्लूकोस और ऐल्कोहॉल

(B) ऐल्कोहॉल और हाइड्रोक्लोरिक अम्ल

(C) ग्लूकोस और सल्फ्यूरिक अम्ल

(D) हाइड्रोक्लोरिक अम्ल और सल्फ्यूरिक अम्ल

4. स्वतंत्र अवस्था और संयुक्त अवस्था दोनों में पाई जाने वाली धातुएँ हैं :

(A) गोल्ड और प्लेटिनम (B) प्लेटिनम और सिल्वर

(C) कॉपर और सिल्वर (D) गोल्ड और सिल्वर

5. बेन्ज़ीन (C_6H_6) के अणु में उपस्थित एकल आबन्ध और द्विआबन्ध की संख्या क्रमश: है :

(A) 6 और 6 (B) 9 और 3

(C) 3 और 9 (D) 3 और 3

6. मानवों में, जब पाचन की प्रक्रिया पूर्ण हो जाती है तब (i) प्रोटीन, (ii) कार्बोहाइड्रेट, और (iii) वसा अंतिमत: परिवर्तित हो जाते हैं क्रमश: :

(A) (i) ऐमीनो अम्ल, (ii) ग्लूकोस और (iii) वसीय अम्ल में

(B) (i) ऐमीनो अम्ल, (ii) ग्लूकोस, (iii) वसीय अम्ल और ग्लिसरॉल में

(C) (i) ग्लूकोस, (ii) वसीय अम्ल और ग्लिसरॉल, (iii) ऐमीनो अम्ल में

(D) (i) शर्करा, (ii) ऐमीनो अम्ल, (iii) वसीय अम्ल और ग्लिसरॉल में

7. पत्तियों के मुरझाने का कारण है वृद्धि संदमक करने वाला पादप हॉर्मोन जिसे कहते हैं :

(A) ऑक्सिन (B) साइटोकाइनिन

(C) ऐब्सिसिक अम्ल (D) जिबरेलिन

8. कायिक प्रवर्धन की विधि द्वारा उगाए जा सकने वाले पादप हैं :

(A) गन्ना, गुलाब, अंगूर (B) गन्ना, सरसों, आलू

(C) केला, संतरा, सरसों (D) पपीता, सरसों, आलू

9. बीज के अंकुरण के समय खाद्य के स्रोत वाला बीज का भाग है :

(A) बीजपत्र (B) मूलांकुर

(C) प्रांकुर (D) भ्रूण

3. Four solutions, namely glucose, alcohol, hydrochloric acid and sulphuric acid filled in four separate beakers are connected one by one in an electric circuit with a bulb. The solutions in which the bulb will glow when current is passed are :

(A) Glucose and alcohol

(B) Alcohol and hydrochloric acid

(C) Glucose and sulphuric acid

(D) Hydrochloric acid and sulphuric acid

4. The metals which are found in both free state as well as combined state are :

(A) Gold and platinum (B) Platinum and silver

(C) Copper and silver (D) Gold and silver

5. The number of single and double bonds present in a molecule of benzene (C_6H_6) respectively, are :

(A) 6 and 6 (B) 9 and 3

(C) 3 and 9 (D) 3 and 3

6. In human beings, when the process of digestion is completed, the (i) proteins, (ii) carbohydrates, and (iii) fats are respectively finally converted into :

(A) (i) Amino acids, (ii) glucose and (iii) fatty acids

(B) (i) Amino acids, (ii) glucose, (iii) fatty acids and glycerol

(C) (i) Glucose, (ii) fatty acids and glycerol, (iii) amino acids

(D) (i) Sugars, (ii) amino acids, (iii) fatty acids and glycerol

7. A plant growth inhibitor hormone which causes wilting of leaves is called :

(A) Auxin (B) Cytokinin

(C) Abscisic acid (D) Gibberellin

8. The plants that can be raised by the method of vegetative propagation are :

(A) Sugarcane, roses, grapes (B) Sugarcane, mustard, potato

(C) Banana, orange, mustard (D) Papaya, mustard, potato

9. The part of seed which is a source of food during germination of seed is :

(A) Cotyledon (B) Radicle

(C) Plumule (D) Embryo

10. नर युग्मक और मादा युग्मक के संलयन द्वारा युग्मनज बनता है । किसी मानव के युग्मनज में गुणसूत्रों की संख्या होती है :

(A) 23 (B) 44

(C) 46 (D) 92

11. काँच और जल के निरपेक्ष अपवर्तनांक क्रमश: $\frac{3}{2}$ और $\frac{4}{3}$ हैं । यदि काँच में प्रकाश की चाल 2×10^8 m/s है, तो जल में प्रकाश की चाल है :

(A) $\frac{9}{4} \times 10^8$ m/s (B) $\frac{5}{2} \times 10^8$ m/s

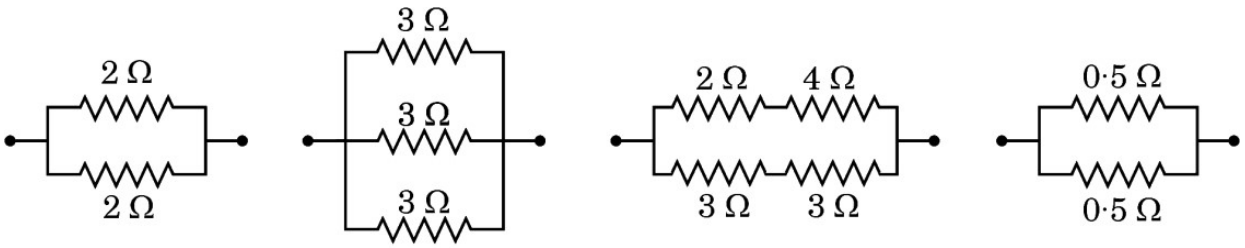
(C) $\frac{7}{3} \times 10^8$ m/s (D) $\frac{16}{9} \times 10^8$ m/s

12. जब श्वेत प्रकाश का कोई किरण-पुंज किसी ऐसे क्षेत्र से गुज़रता है जहाँ धूल के अत्यन्त सूक्ष्म कण विद्यमान हैं, तो उस क्षेत्र में मुख्य रूप से प्रकीर्णित होने वाला प्रकाश का वर्ण (रंग) है :

(A) लाल (B) संतरी

(C) नीला (D) पीला

13. निम्नलिखित प्रतिरोधकों के संयोजनों पर विचार कीजिए :



I II III IV

इनमें तुल्यांक प्रतिरोध 1 Ω वाला/वाले संयोजन है/हैं :

(A) I और IV (B) केवल IV

(C) I और II (D) I, II और III

14. 20 Ω प्रतिरोध की कोई विद्युत इस्तरी 5 A धारा लेती है । इस इस्तरी में 30 सेकण्ड में उत्पन्न ऊष्मा है :

(A) 15000 J (B) 6000 J

(C) 1500 J (D) 3000 J

10. A zygote is formed by the fusion of a male gamete and a female gamete. The number of chromosomes in the zygote of a human is :

(A) 23 (B) 44

(C) 46 (D) 92

11. Absolute refractive index of glass and water is $\frac{3}{2}$ and $\frac{4}{3}$ respectively. If the speed of light in glass is 2×10^8 m/s, the speed of light in water is :

(A) $\frac{9}{4} \times 10^8$ m/s (B) $\frac{5}{2} \times 10^8$ m/s

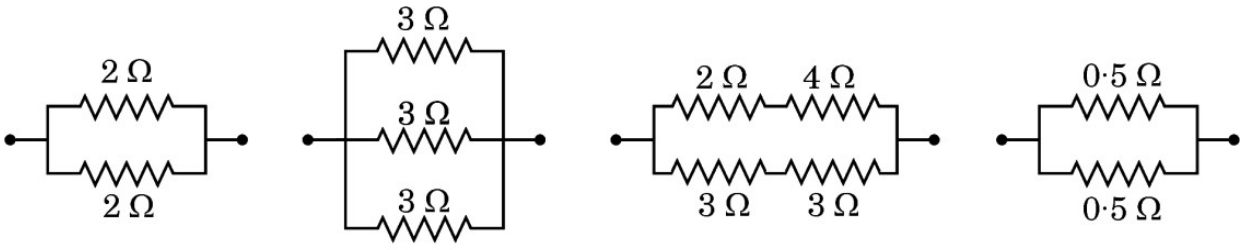
(C) $\frac{7}{3} \times 10^8$ m/s (D) $\frac{16}{9} \times 10^8$ m/s

12. When a beam of white light passes through a region having very fine dust particles, the colour of light mainly scattered in that region is :

(A) Red (B) Orange

(C) Blue (D) Yellow

13. Consider the following combinations of resistors :



I II III IV

The combinations having equivalent resistance 1 Ω is/are :

(A) I and IV (B) Only IV

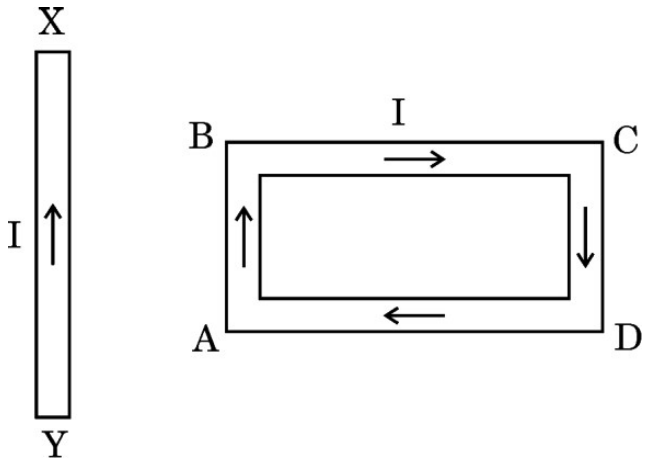
(C) I and II (D) I, II and III

14. An electric iron of resistance 20 Ω draws a current of 5 A. The heat developed in the iron in 30 seconds is :

(A) 15000 J (B) 6000 J

(C) 1500 J (D) 3000 J

15. कोई आयताकार पाश ABCD जिससे धारा I प्रवाहित हो रही है किसी सीधे चालक XY के निकट इस प्रकार स्थित है कि चालक पाश की भुजा AB के समान्तर है तथा पाश के ही तल में है । यदि आरेख में दर्शाए अनुसार चालक में स्थायी धारा I स्थापित कर दी जाए, तो चालक XY :



(A) स्थिर रहेगा ।

(B) पाश की भुजा AB की ओर गति करेगा ।

(C) पाश की भुजा AB से दूर की ओर गति करेगा ।

(D) अपने अक्ष के परित: घूर्णन करेगा ।

16. नीचे कुछ अपशिष्ट दिए गए हैं :

(i) बगीचे का अपशिष्ट

(ii) बॉल प्वॉइन्ट पेन के रिफिल

(iii) दवाइयों की खाली काँच की बोतल

(iv) फलों और सब्ज़ियों के छिलके

(v) पुरानी सूती कमीज़

इनमें से अजैव-निम्नीकरणीय अपशिष्ट हैं :

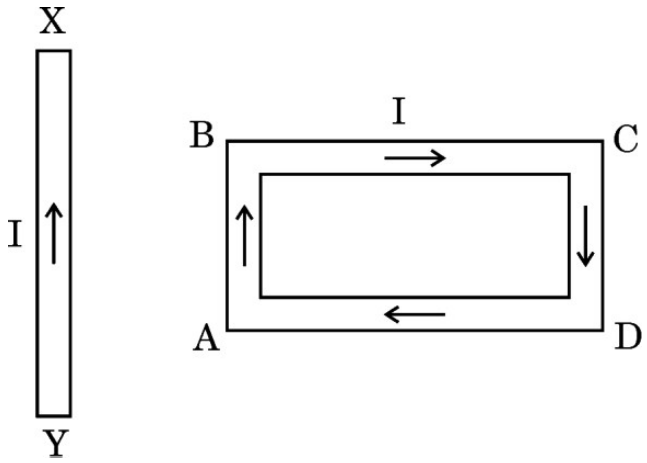
(A) (i) और (ii)

(B) (ii) और (iii)

(C) (i), (iv) और (v)

(D) (i), (iii) और (iv)

15. A rectangular loop ABCD carrying a current I is situated near a straight conductor XY, such that the conductor is parallel to the side AB of the loop and is in the plane of the loop. If a steady current I is established in the conductor as shown, the conductor XY will



(A) remain stationary.

(B) move towards the side AB of the loop.

(C) move away from the side AB of the loop.

(D) rotate about its axis.

16. Some wastes are given below :

(i) Garden waste

(ii) Ball point pen refills

(iii) Empty medicine bottles made of glass

(iv) Peels of fruits and vegetables

(v) Old cotton shirt

The non-biodegradable wastes among these are :

(A) (i) and (ii)

(B) (ii) and (iii)

(C) (i), (iv) and (v)

(D) (i), (iii) and (iv)

प्रश्न संख्या 17 से 20 के लिए, दो कथन दिए गए हैं — जिनमें एक को अभिकथन (A) तथा दूसरे को कारण (R) द्वारा अंकित किया गया है । इन प्रश्नों के सही उत्तर नीचे दिए गए कोडों (A), (B), (C) और (D) में से चुनकर दीजिए ।

(A) अभिकथन (A) और कारण (R) दोनों सही हैं और कारण (R), अभिकथन (A) की सही व्याख्या करता है ।

(B) अभिकथन (A) और कारण (R) दोनों सही हैं, परन्तु कारण (R), अभिकथन (A) की सही व्याख्या ***नहीं*** करता है ।

(C) अभिकथन (A) सही है, परन्तु कारण (R) ग़लत है ।

(D) अभिकथन (A) ग़लत है, परन्तु कारण (R) सही है ।

17. *अभिकथन (A) :* धातु के सल्फाइड अयस्कों से अयस्क को बिना भर्जन किए धातु निष्कर्षित नहीं किया जा सकता है ।

कारण (R) : भर्जन से सल्फाइड अयस्क सीधे ही धातु में परिवर्तित हो जाते हैं ।

18. *अभिकथन (A) :* मानव हृदय में अलिन्द की अपेक्षा निलय की पेशीय भित्ति मोटी होती है ।

कारण (R) : निलय को शरीर के विभिन्न अंगों में रुधिर को पंप करना होता है ।

19. *अभिकथन (A) :* चुम्बकीय क्षेत्र रेखाएँ कभी भी एक-दूसरे का प्रतिच्छेदन नहीं करती हैं ।

कारण (R) : यदि वह प्रतिच्छेदन करें, तो प्रतिच्छेदन बिन्दु पर दिक्सूची की सुई दो दिशाओं की ओर संकेत करेगी जो संभव नहीं है ।

20. *अभिकथन (A) :* जीवन के सभी वायवीय रूपों के लिए ऑक्सीजन आवश्यक है ।

कारण (R) : ऑक्सीजन के स्वतंत्र परमाणु आणविक ऑक्सीजन से संयुक्त होकर ओज़ोन बनाते हैं ।

For Questions number 17 to 20, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

17. *Assertion (A) :* The extraction of metals from their sulphide ores cannot take place without roasting of the ore.

Reason (R) : Roasting converts sulphide ores directly into metals.

18. *Assertion (A) :* In the human heart ventricles have thicker muscular walls than atria.

Reason (R) : Ventricles have to pump the blood into various organs.

19. *Assertion (A) :* Magnetic field lines never intersect each other.

Reason (R) : If they intersect, then at the point of intersection, the compass needle would point towards two directions, which is not possible.

20. *Assertion (A) :* Oxygen is essential for all aerobic forms of life.

Reason (R) : Free oxygen atoms combine with molecular oxygen to form ozone.

खण्ड ख

*प्रश्न संख्या **21** से **26** अति लघु-उत्तरीय प्रश्न हैं ।*

21. (a) किसी स्वच्छ व शुष्क परखनली में 1 ग्राम ठोस सोडियम क्लोराइड लेकर उसमें सांद्र सल्फ्यूरिक अम्ल मिलाया गया ।

(i) अभिक्रिया में उत्सर्जित होने वाली गैस का नाम लिखिए ।

(ii) क्या प्रेक्षण किया जाएगा जब इस गैस का परीक्षण (I) शुष्क, तथा (II) आर्द्र (गीले) नीले लिटमस पेपर से किया जाएगा ? इस गैस की प्रकृति (अम्लीय/क्षारकीय) के बारे में अपना निष्कर्ष लिखिए । *2*

अथवा

(b) कुछ धातुएँ अम्लों से अभिक्रिया करके लवण और हाइड्रोजन गैस बनाती हैं । कोई उदाहरण देकर इसे स्पष्ट कीजिए । इस गैस की उपस्थिति का परीक्षण आप किस प्रकार करेंगे ? *2*

22. ज्वाला परीक्षण द्वारा संतृप्त और असंतृप्त हाइड्रोकार्बन के बीच विभेदन कीजिए । संतृप्त हाइड्रोकार्बन के दहन की अभिक्रिया के उत्पादों की सूची बनाइए । *2*

23. (a) हमें पौधों की मृदा को नियमित रूप से पानी देने की आवश्यकता होती है । परन्तु यह पानी अंतिमत: पौधे की पत्तियों तक पहुँच जाता है । व्याख्या कीजिए कि ऐसा किस प्रकार होता है । *2*

अथवा

(b) अमीबा द्वारा दर्शाए जाने वाले पोषण के प्रकार का नाम लिखिए । व्याख्या कीजिए कि यह जीव अपना भोजन किस प्रकार ग्रहण करता है और उसे पचाता है । *2*

24. किसी प्रजाति (स्पीशीज़) की उत्तरजीविता को विभिन्नताओं द्वारा बढ़ावा मिलता है । उदाहरण देकर इसे स्पष्ट कीजिए । *2*

25. जरा-दूरदृष्टिता से पीड़ित किसी व्यक्ति को द्विफोकसी लेंसों की आवश्यकता है । यदि उसे $-4{\cdot}0$ डाइऑप्टर और $+2{\cdot}0$ डाइऑप्टर क्षमता के दो लेंसों की आवश्यकता हो, तो इन दोनों में से कौन-सा लेंस उसकी दूर की दृष्टि (निकट-दृष्टि दोष) का संशोधन करेगा और इसकी फोकस दूरी क्या है ? *2*

26. दो तारों A और B जो समान पदार्थ, समान लम्बाई और क्रमश: व्यास $0{\cdot}2$ mm और $0{\cdot}3$ mm के हैं, को एक-एक करके किसी परिपथ में संयोजित किया गया है । इन दोनों में से कौन-सा एक तार परिपथ में धारा के प्रवाह में अधिक प्रतिरोध उत्पन्न करेगा ? अपने उत्तर की पुष्टि कीजिए । *2*

SECTION B

Questions no. ***21*** *to* ***26*** *are very short answer type questions.*

21. (a) 1 gram of solid sodium chloride was taken in a clean and dry test tube and concentrated sulphuric acid was added to it.

(i) Name the gas evolved in the reaction.

(ii) What will be observed when this gas is tested with (I) dry, and (II) wet blue litmus paper ? Write your conclusion about the nature (acidic/basic) of this gas. *2*

OR

(b) Some metals react with acids to produce salt and hydrogen gas. Illustrate it with an example. How will you test the presence of this gas ? *2*

22. Distinguish between a saturated and an unsaturated hydrocarbon by flame test. List the products of combustion reaction of a saturated hydrocarbon. *2*

23. (a) We need to water the soil in plants on a regular basis. But it ultimately reaches the leaves of the plant. Explain how this takes place. *2*

OR

(b) Name the type of nutrition exhibited by Amoeba. Explain how food is taken in and digested by this organism. *2*

24. The survival of a species is promoted through creation of variations. Illustrate with an example. *2*

25. A person suffering from presbyopia needs bifocal lens. If he needs two lens of power – 4·0 dioptre and + 2·0 dioptre, which one of these two lenses is for the correction of distant vision and what is its focal length ? *2*

26. Two wires A and B of same material, having same lengths and diameters 0·2 mm and 0·3 mm respectively, are connected one by one in a circuit. Which one of these two wires will offer more resistance to the flow of current in the circuit ? Justify your answer. *2*

खण्ड ग

*प्रश्न संख्या **27** से **33** लघु उत्तरीय प्रश्न हैं ।*

27. यौगिक $CaSO_4 \cdot \frac{1}{2} H_2O$ का सामान्य नाम और रासायनिक नाम लिखिए । इसको बनाने की विधि लिखिए । उस अभिक्रिया का रासायनिक समीकरण दीजिए जिसमें $CaSO_4 \cdot \frac{1}{2} H_2O$ जल से अभिक्रिया करता है । *3*

28. एथेनॉल का एथेनॉइक अम्ल में परिवर्तन उपचयन (ऑक्सीकरण) अभिक्रिया क्यों है ? इस परिवर्तन में उपयोग होने वाले उपचायक का नाम लिखिए । इस उपचयन अभिक्रिया का रासायनिक समीकरण लिखिए । यह अभिक्रिया उस अभिक्रिया से किस प्रकार भिन्न है जिसमें एथेनॉल का ऑक्सीजन की उपस्थिति में दहन होता है ? *3*

29. (a) नामांकित आरेख की सहायता से, मुकुलन द्वारा हाइड्रा में जनन की प्रक्रिया की व्याख्या कीजिए । इस प्रक्रिया में जनन में भाग लेने वाली कोशिकाओं के नाम लिखिए । *3*

अथवा

(b) मानव जनन तंत्र में निम्नलिखित में से प्रत्येक की दो-दो भूमिकाओं की सूची बनाइए : *3*

(i) शुक्राशय और प्रोस्टेट ग्रंथि

(ii) अण्डवाहिनी

(iii) वृषण

30. प्रभावी लक्षणों और अप्रभावी लक्षणों के बीच दो अन्तरों की सूची बनाइए । मेंडल के पीले बीज (YY) और हरे बीज (yy) के मटर के पौधों के बीच संकरण कराने पर F_2 संतति के मटर के पौधों में पीले बीज वाले पौधों की प्रतिशतता क्या थी ? *3*

31. मानव नेत्र की समंजन क्षमता की परिभाषा दीजिए । जब हम किसी बिम्ब की नेत्र से दूरी में वृद्धि करते हैं, तो नेत्र में प्रतिबिम्ब दूरी का क्या होता है ? इस प्रकरण में मानव नेत्र के उस भाग का नाम और भूमिका की व्याख्या कीजिए जो इसके लिए उत्तरदायी है । *3*

32. कोई छात्र ड्राइंग बोर्ड पर सफ़ेद कागज़ की शीट लगाता है । वह इस कागज़ के केन्द्र पर एक छड़ चुम्बक रखता है । वह इस छड़ चुम्बक के चारों ओर एकसमान रूप से कुछ लोह-चूर्ण छिड़कता है । इसके पश्चात वह ड्राइंग बोर्ड को धीरे से थपथपाता है और देखता है कि, लोह-चूर्ण स्वयं एक विशेष पैटर्न में व्यवस्थित हो जाता है ।

(a) लोह-चूर्ण एक विशेष पैटर्न में क्यों व्यवस्थित हो जाता है ?

(b) चुम्बक के सिरों पर लोह-चूर्ण की भीड़ (अधिक निकटता) क्या इंगित करती है ?

(c) वह रेखाएँ, जिनके अनुदिश लोह-चूर्ण संरेखित होता है, क्या निरूपित करती हैं ?

(d) यदि यह छात्र किसी धारावाही परिनालिका के भीतर किसी कार्डबोर्ड को क्षैतिजत: रखकर उपर्युक्त क्रियाकलाप को दोहराए, तो लोह-चूर्ण किस पैटर्न में व्यवस्थित होगा ? इन प्रेक्षित रेखाओं के पैटर्न के आधार पर चुम्बकीय क्षेत्र के बारे में निकाले गए निष्कर्ष का उल्लेख कीजिए । *3*

SECTION C

Questions no. ***27*** *to* ***33*** *are short answer type questions.*

27. Write the common name and the chemical name of the compound $CaSO_4 \cdot \frac{1}{2} H_2O$. Write the method of its preparation. Give chemical equation for the reaction, when water reacts with $CaSO_4 \cdot \frac{1}{2} H_2O$. *3*

28. Why is the conversion of ethanol to ethanoic acid an oxidation reaction ? Name the oxidising agent used in this conversion. Write chemical equation for this oxidation reaction. How is this reaction different from the reaction in which ethanol burns in the presence of oxygen ? *3*

29. (a) Explain with the help of a labelled diagram, the process of reproduction in Hydra by budding. Name the cells used for reproduction in this process. *3*

OR

(b) List two roles of each of the following in human reproductive system : *3*

(i) Seminal vesicles and prostate gland

(ii) Oviduct

(iii) Testis

30. List two differences between dominant traits and recessive traits. What percentage of pea plants in the F_2 generation were with yellow seeds in Mendel's cross between the pea plants having yellow (YY) and green coloured (yy) seeds ? *3*

31. Define the term power of accommodation of human eye. What happens to the image distance in the eye when we increase the distance of an object from the eye ? Name and explain the role of the part of human eye responsible for it in this case. *3*

32. A student fixes a sheet of white paper on a drawing board. He places a bar magnet in the centre of it. He sprinkles some iron filings uniformly around the bar magnet. Then he taps the drawing board gently and observes that the iron filings arrange themselves in a particular pattern.

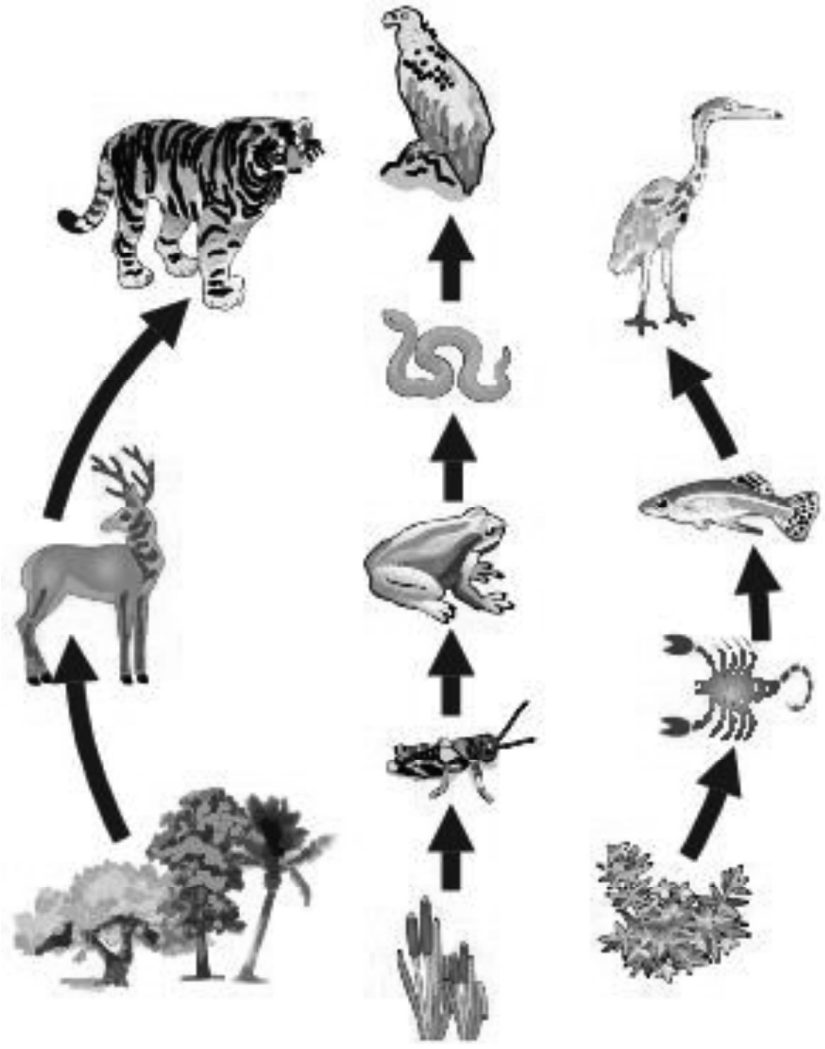
(a) Why do iron filings arrange in a particular pattern ?

(b) What does the crowding of iron filings at the ends of the magnet indicate ?

(c) What do the lines, along which the iron filings align, represent ?

(d) If the student places a cardboard horizontally in a current carrying solenoid and repeats the above activity, in what pattern would the iron filings arrange ? State the conclusion drawn about the magnetic field based on the observed pattern of the lines. *3*

33. नीचे दिए गए चित्र का अध्ययन कीजिए, जिसमें तीन आहार शृंखला (a), (b) और (c) दर्शाई गई हैं और निम्नलिखित प्रश्नों के उत्तर दीजिए : *3*



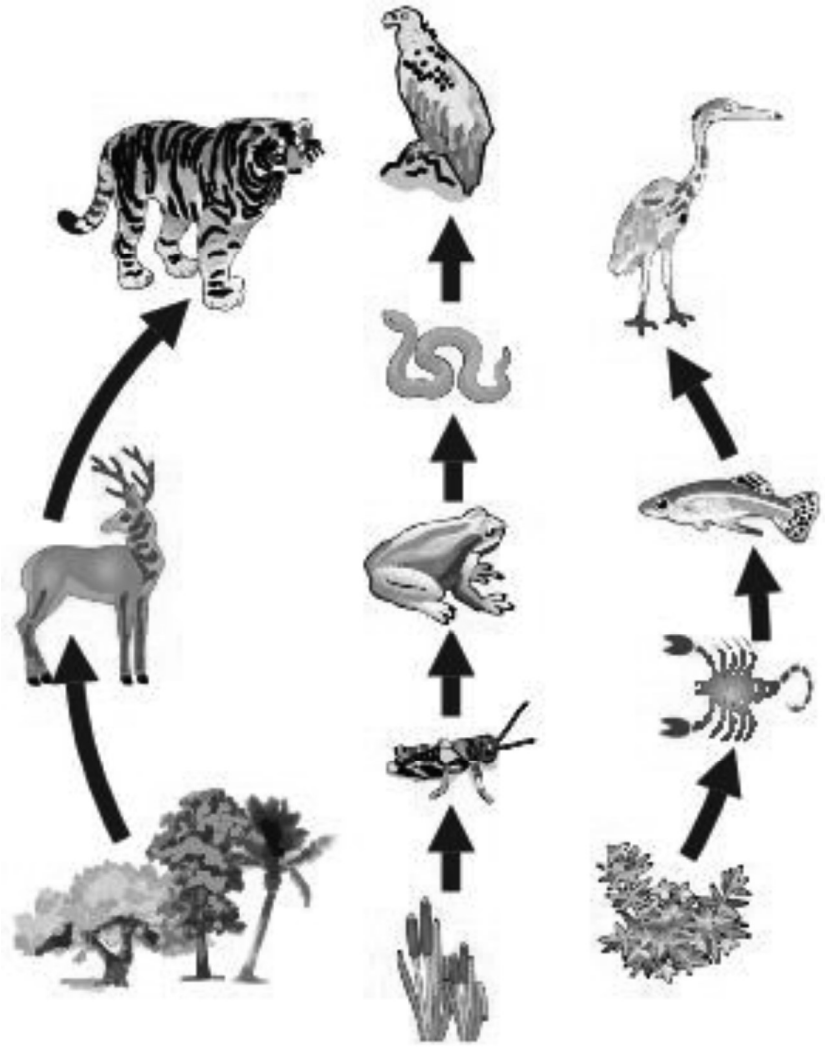
(a) (b) (c)

(i) उन पारितंत्रों के प्रकार के नाम लिखिए जिनमें आहार शृंखलाएँ (b) और (c) विद्यमान होती हैं ।

(ii) प्रत्येक आहार शृंखला का प्रथम पोषी स्तर उत्पादकों का है । क्यों ? ये उत्पादक अपने उपयोग के लिए सूर्य की कितने प्रतिशत ऊर्जा को पकड़ (ग्रहण) पाते हैं ?

(iii) चित्र में सभी तीरों की दिशा केवल एक ही ओर क्यों दर्शाई गई है, इनकी दिशा उल्टी क्यों नहीं हो सकती है ? पुष्टि कीजिए ।

33. Study the picture given below showing three food chains (a), (b) and (c) and answer the following questions : *3*



(a) (b) (c)

(i) Name the type of ecosystems that exist in food chains (b) and (c).

(ii) The first trophic level in all food chains are producers. Why ? What percentage of solar energy do these producers capture for their use ?

(iii) Why are the arrows shown in the diagram in one direction only and not vice versa ? Justify.

खण्ड घ

*प्रश्न संख्या **34** से **36** दीर्घ उत्तरीय प्रश्न हैं ।*

34. (a) रासायनिक अभिक्रिया किसे कहते हैं ? यह दर्शाने के लिए कि रासायनिक अभिक्रिया हुई है जिसमें (i) रंग में परिवर्तन तथा (ii) ताप में परिवर्तन हुआ है, प्रत्येक प्रकरण के लिए एक-एक क्रियाकलाप का वर्णन कीजिए । *5*

अथवा

(b) (i) वियोजन (अपघटन) अभिक्रिया की परिभाषा लिखिए । हम यह किस प्रकार कह सकते हैं कि (I) जल का विद्युत-अपघटन, तथा (II) सूर्य के प्रकाश में उद्भासित करने पर सिल्वर ब्रोमाइड का काला हो जाना वियोजन अभिक्रियाएँ हैं ? प्रत्येक प्रकरण में सम्मिलित ऊर्जा के प्रकार का उल्लेख कीजिए ।

(ii) "रासायनिक अभिक्रियाएँ जिनमें (I) कैल्शियम ऑक्साइड बनता है, और (II) जिसमें कैल्शियम हाइड्रॉक्साइड बनता है, एक-दूसरे की विपरीत अभिक्रियाएँ हैं ।" रासायनिक समीकरणों की सहायता से इस कथन की पुष्टि कीजिए । *5*

35. (a) (i) प्रतिवर्ती चाप की परिभाषा लिखिए । जन्तुओं में प्रतिवर्ती चाप क्यों विकसित हुआ है ? जब आप अचानक किसी गर्म वस्तु को स्पर्श करते हैं, तो होने वाली घटनाओं को क्रमवार रेखांकित कीजिए ।

(ii) तंत्रिका तंत्र के उस भाग का नाम लिखिए जो केन्द्रीय तंत्रिका तंत्र तथा शरीर के अन्य भागों के बीच संचार में सहायता करता है । इस तंत्र के दो अवयव कौन-से हैं ? *5*

अथवा

(b) (i) किसी उद्दीपन की अनुक्रिया में 'छुई-मुई' पौधे की पत्तियाँ मुड़ने लगती हैं और मुरझा जाती हैं । उद्दीपन का नाम लिखिए और इतनी तीव्र गति का कारण दीजिए । क्या इस गति में कोई वृद्धि सम्मिलित होती है ?

(ii) पौधों में गुरुत्वानुवर्तन की परिभाषा दीजिए । धनात्मक और ऋणात्मक गुरुत्वानुवर्तन से क्या तात्पर्य है ? प्रत्येक प्रकार का एक-एक उदाहरण दीजिए । *5*

SECTION D

Questions no. ***34*** *to* ***36*** *are long answer type questions.*

34. (a) What is a chemical reaction ? Describe one activity each to show that a chemical change has occurred in which (i) change of colour, and (ii) change in temperature has taken place. *5*

OR

(b) (i) Define a decomposition reaction. How can we say that (I) electrolysis of water, and (II) blackening of silver bromide when exposed to sunlight, are decomposition reactions ? Mention the type of energy involved in each case.

(ii) "The type of reactions in which (I) calcium oxide is formed, and (II) calcium hydroxide is formed are opposite reactions to each other." Justify this statement with the help of chemical equations. *5*

35. (a) (i) Define a reflex arc. Why have reflex arcs evolved in animals ? Trace the sequence of events which occur, when you suddenly touch a hot object.

(ii) Name the part of nervous system which helps in communication between the central nervous system and other parts of the body. What are the two components of this system ? *5*

OR

(b) (i) Leaves of 'chhui-mui' plant begin to fold up and droop in response to a stimulus. Name the stimulus and write the cause for such a rapid movement. Is there any growth involved in the movement ?

(ii) Define geotropism in plants. What is meant by positive and negative geotropism ? Give one example of each type. *5*

36. (a) निम्नलिखित प्रेक्षण तालिका में किसी उत्तल लेंस के लिए बिम्ब दूरी (u) के साथ प्रतिबिम्ब दूरी (v) का विचरण दिया गया है । इसका विश्लेषण कीजिए और नीचे दिए गए प्रश्नों के उत्तर दीजिए :

क्रम संख्या	बिम्ब दूरी (u) cm	प्रतिबिम्ब दूरी (v) cm
1	– 150	+ 30
2	– 75	+ 37·5
3	– 50	+ 50
4	– 37·5	+ 75
5	– 30	+ 150
6	– 15	+ 37·5

(i) परिकलित किए बिना उत्तल लेंस की फोकस दूरी ज्ञात कीजिए । अपने उत्तर की पुष्टि कीजिए ।

(ii) कौन-सा प्रेक्षण सही नहीं है ? क्यों ? बिम्ब की इसी स्थिति के लिए प्रतिबिम्ब की स्थिति ज्ञात करने के लिए किरण आरेख खींचिए ।

(iii) u = – 30 cm के लिए आवर्धन का सन्निकट मान ज्ञात कीजिए । *5*

अथवा

(b) (i) किसी लेंस के मुख्य अक्ष की परिभाषा दीजिए । यह दर्शाने के लिए किरण आरेख खींचिए कि क्या होता है जब किसी अवतल लेंस के मुख्य अक्ष के समान्तर कोई प्रकाश किरण इस लेंस से गुज़रती है ।

(ii) किसी अवतल लेंस की फोकस दूरी 20 cm है । किसी 5 cm ऊँचे बिम्ब को इस लेंस के सामने कितनी दूरी पर रखा जाए कि उसका प्रतिबिम्ब लेंस से 15 cm दूरी पर बने ? प्रतिबिम्ब का साइज़ भी परिकलित कीजिए । *5*

36. (a) The variation of image distance (v) with object distance (u) for a convex lens is given in the following observation table. Analyse it and answer the questions that follow :

S. No.	Object distance (u) cm	Image distance (v) cm
1	– 150	+ 30
2	– 75	+ 37·5
3	– 50	+ 50
4	– 37·5	+ 75
5	– 30	+ 150
6	– 15	+ 37·5

(i) Without calculation, find the focal length of the convex lens. Justify your answer.

(ii) Which observation is not correct ? Why ? Draw ray diagram to find the position of the image formed for this position of the object.

(iii) Find the approximate value of magnification for u = – 30 cm. *5*

OR

(b) (i) Define principal axis of a lens. Draw a ray diagram to show what happens when a ray of light parallel to the principal axis of a concave lens passes through it.

(ii) The focal length of a concave lens is 20 cm. At what distance from the lens should a 5 cm tall object be placed so that its image is formed at a distance of 15 cm from the lens ? Also calculate the size of the image formed. *5*

खण्ड ङ

निम्नलिखित प्रश्न स्रोत-आधारित/केस-आधारित प्रश्न हैं । केस को सावधानीपूर्वक पढ़िए और दिए गए प्रश्नों के उत्तर दीजिए ।

37. तीन धातुओं मैग्नीशियम, ऐलुमिनियम और आयरन के नमूने लिए गए और इनके पृष्ठों को रेगमाल से रगड़ा गया । इसके पश्चात इन नमूनों को पृथक्-पृथक् परखनलियाँ, जिनमें तनु हाइड्रोक्लोरिक अम्ल था, में रखा गया था । प्रत्येक परखनली में थर्मामीटर भी इस प्रकार निलंबित किए गए कि उनके बल्ब अम्ल में डूबे हों । बुलबुले बनने की दरों का प्रेक्षण किया गया । उपर्युक्त क्रियाकलाप को तनु नाइट्रिक अम्ल के साथ दोहराया गया और प्रेक्षणों को रिकॉर्ड किया गया ।

निम्नलिखित प्रश्नों के उत्तर दीजिए :

(a) जब क्रियाकलाप को तनु हाइड्रोक्लोरिक अम्ल के साथ किया गया, तब किस परखनली में बुलबुले बनने की दर सबसे तीव्र थी तथा थर्मामीटर ने उच्चतम ताप दर्शाया था ? *1*

(b) किस धातु ने तनु हाइड्रोक्लोरिक अम्ल से अभिक्रिया नहीं की ? कारण दीजिए । *1*

(c) (i) जब कोई धातु तनु नाइट्रिक अम्ल से अभिक्रिया करती है, तो हाइड्रोजन गैस क्यों नहीं निकलती है ? इस अभिक्रिया में उत्पन्न अंतिम उत्पाद के नाम लिखिए । *2*

अथवा

(c) (ii) उस अभिक्रिया के प्रकार का नाम लिखिए जिसके आधार पर धातुओं की सक्रियता निश्चित की जाती है । आपके पास दो धातुएँ X और Y हैं । आप यह किस प्रकार सुनिश्चित करेंगे कि इनमें से कौन-सी अन्य से अधिक अभिक्रियाशील है ? *2*

SECTION E

The following questions are source-based/case-based questions. Read the case carefully and answer the questions that follow.

37. Three metal samples of magnesium, aluminium and iron were taken and rubbed with sand paper. These samples were then put separately in test tubes containing dilute hydrochloric acid. Thermometers were also suspended in each test tube so that their bulbs dipped in the acid. The rate of formation of bubbles was observed. The above activity was repeated with dilute nitric acid and the observations were recorded.

Answer the following questions :

(a) When activity was done with dilute hydrochloric acid, then in which one of the test tubes was the rate of formation of bubbles the fastest and the thermometer showed the highest temperature ? *1*

(b) Which metal did not react with dilute hydrochloric acid ? Give reason. *1*

(c) (i) Why is hydrogen gas not evolved when a metal reacts with dilute nitric acid ? Name the ultimate products formed in the reaction. *2*

OR

(c) (ii) Name the type of reaction on the basis of which reactivity of metals is decided. You have two metals X and Y. How would you decide which is more reactive than the other ? *2*

38. वृक्क उत्तरजीविता के लिए महत्त्वपूर्ण जैव अंग हैं । संक्रमण, आघात अथवा वृक्क में सीमित रुधिर प्रवाह जैसे कई कारक हैं जो वृक्क की क्रियाशीलता को कम कर देते हैं । ये शरीर में विषैले अपशिष्टों को संचित कराते हैं जिनके कारण मृत्यु तक हो सकती है । वृक्क के अपक्रिय होने की अवस्था में, कृत्रिम वृक्क का उपयोग किया जा सकता है । कृत्रिम वृक्क अपशिष्ट उत्पादों को रुधिर से अपोहन (dialysis) द्वारा निकालने की एक युक्ति है ।

(a) (i) उस धमनी का नाम लिखिए जो ऑक्सीजनित रुधिर को वृक्क तक ले जाती है ।

(ii) बोमन संपुट में उपस्थित बहुत पतली भित्ति वाली रुधिर केशिकाओं के गुच्छ का नाम लिखिए । *1*

(b) मानव उत्सर्जन तंत्र के उस अंग का नाम लिखिए जहाँ मूत्र एकत्र (भंडारित) होता है । यह अंग तंत्रिका नियंत्रण में होता है अथवा हॉर्मोन नियंत्रण में ? *1*

(c) (i) मूत्र बनने में सम्मिलित दो प्रमुख चरणों की सूची बनाइए और इनके कार्यों का संक्षेप में उल्लेख कीजिए । *2*

अथवा

(c) (ii) वृक्काणु के किस भाग में चयनित पुनरवशोषण होता है ? उन कारकों की सूची बनाइए जिन पर जल की मात्रा का पुनरवशोषण निर्भर करता है । *2*

38. Kidneys are vital organs for survival. Several factors like infections, injury or restricted blood flow to kidneys reduce the activity of kidneys. This leads to accumulation of poisonous wastes in the body, which can even lead to death. In case of kidney failure, an artificial kidney can be used. An artificial kidney is a device to remove waste products from the blood through dialysis.

(a) (i) Name the artery that brings oxygenated blood to the kidney.

(ii) Name the cluster the thin-walled blood capillaries present in the Bowman's capsule. *1*

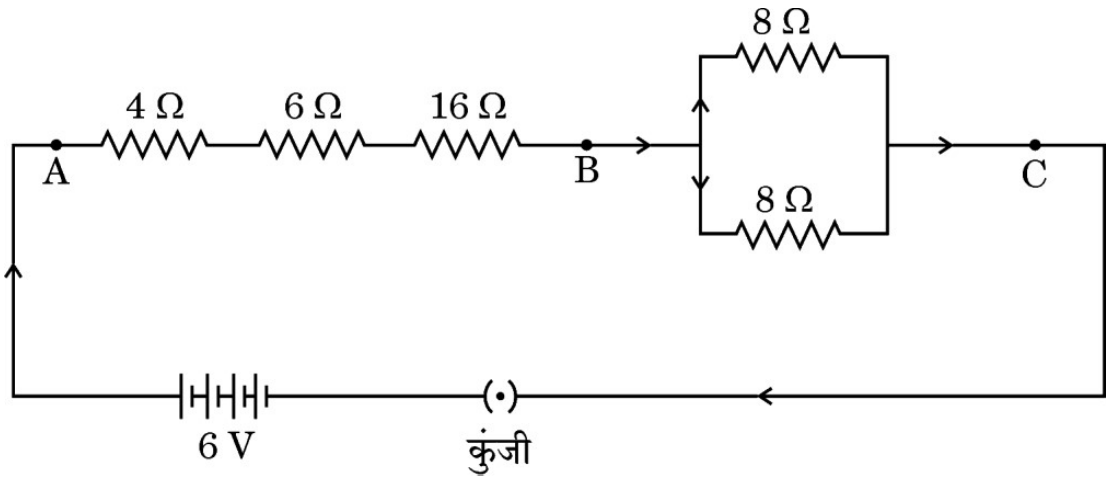
(b) In human excretory system name the organ which stores urine. Is this organ under hormonal control or nervous control ? *1*

(c) (i) List two major steps involved in the formation of urine and state in brief their functions. *2*

OR

(c) (ii) In which part of the nephron does selective reabsorption take place ? List the factors which the amount of water reabsorbed depends on. *2*

39. निम्नलिखित परिपथ का अध्ययन कीजिए :



इस परिपथ के आधार पर, निम्नलिखित प्रश्नों के उत्तर दीजिए :

(a) बिन्दु A और B के बीच कुल प्रतिरोध का मान ज्ञात कीजिए । *1*

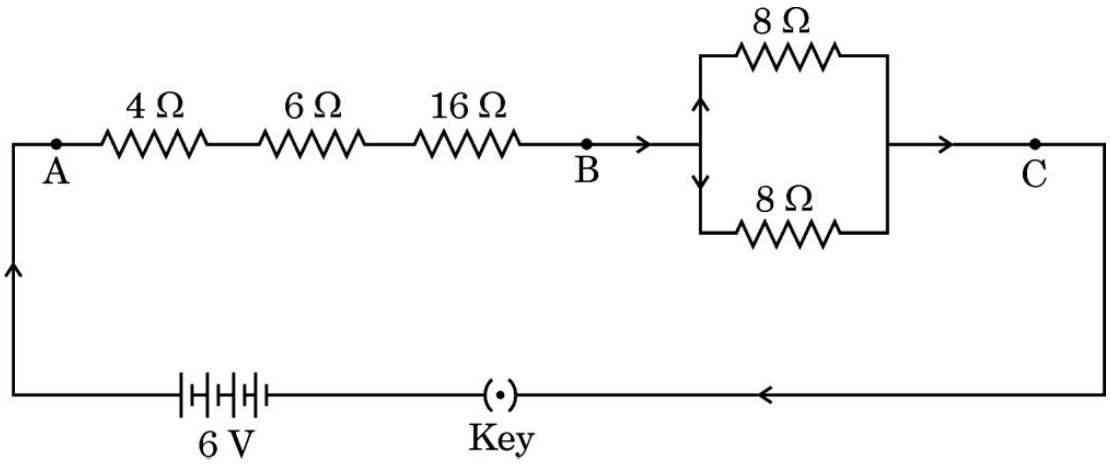
(b) बिन्दु B और C के बीच प्रतिरोध ज्ञात कीजिए । *1*

(c) (i) जब कुंजी बन्द है, तब बैटरी से ली जाने वाली धारा परिकलित कीजिए । *2*

अथवा

(c) (ii) उपर्युक्त परिपथ में 16 Ω के प्रतिरोधक अथवा उस संयोजन जिसमें 8 Ω के दो प्रतिरोधक पार्श्व में संयोजित हैं, इन दोनों में से किसके सिरों पर विभवान्तर अधिक है ? अपने उत्तर की पुष्टि कीजिए । *2*

39. Study the following circuit :



On the basis of this circuit, answer the following questions :

(a) Find the value of total resistance between the points A and B. *1*

(b) Find the resistance between the points B and C. *1*

(c) (i) Calculate the current drawn from the battery, when the key is closed. *2*

OR

(c) (ii) In the above circuit, the 16 Ω resistor or the parallel combination of two resistors of 8 Ω, which one of the two will have more potential difference across its two ends ? Justify your answer. *2*

Marking Scheme
Strictly Confidential
Secondary School Examination, 2024
SUBJECT NAME SCIENCE (086) (Q.P. CODE 31/4/1)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc. may invite action under various rules of the Board and IPC."
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.
4	The Marking scheme carries only suggested value points for the answers These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark(√) wherever answer is correct. For wrong answer CROSS 'X" be marked. Evaluators will not put right (✓)while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note "Extra Question".
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 0-80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.

12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.
13	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- Leaving answer or part thereof unassessed in an answer book. Giving more marks for an answer than assigned to it. Wrong totaling of marks awarded on an answer. Wrong transfer of marks from the inside pages of the answer book to the title page. Wrong question wise totaling on the title page. Wrong totaling of marks of the two columns on the title page. Wrong grand total. Marks in words and figures not tallying/not same. Wrong transfer of marks from the answer book to online award list. Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the "Guidelines for Spot Evaluation" before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME

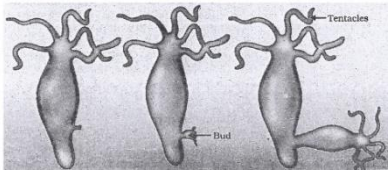
Secondary School Examination, 2024

SCIENCE (Subject Code–086)

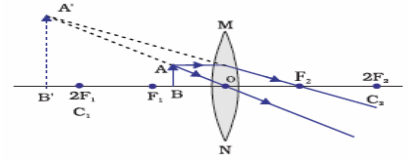
[Paper Code: 31/4/1]

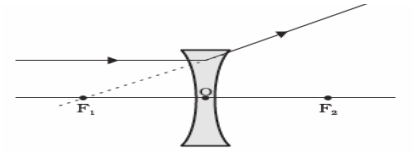
Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(B)/Displacement reaction	1	1
2	(D)/ HCl and NH_4OH	1	1
3	(D)/Hydrochloric acid and Sulphuric acid	1	1
4	(C)/Copper and Silver	1	1
5	(B)/9 and 3	1	1
6	(B)/ (i)Amino acid, (ii)glucose, (iii)fatty acid and glycerol	1	1
7	(C)/Abscisic acid	1	1
8	(A)/Sugarcane, roses, grapes	1	1
9	(A)/Cotyledon	1	1
10	(C)/46	1	1
11	(A)/9/4 x 10^8 m/s	1	1
12	(C)/Blue	1	1
13	(C)/I and II	1	1
14	(A)/15000 J	1	1
15	(B)/move towards the side AB of the loop	1	1
16	(B)/(ii) and (iii)	1	1
17	(B) /Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).	1	1
18	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)	1	1
19	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)	1	1
20	(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A)	1	1
	SECTION B		
21	(a) (i) • HCl gas was evolved (ii) (I) No change in colour (II) Wet blue litmus turns red • HCl gas is acidic in nature **OR** (b) • $Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$ (g) **(Any other example)** • Hydrogen burns with a pop sound when a burning matchstick is brought near it.	½ ½ ½ ½ 1 1	2
22	saturated hydrocarbon: Burns with clean blue flame/ Complete combustion unsaturated hydrocarbon: Burns with yellow flame with lots of black smoke. or Sooty flame / Incomplete combustion • Carbon dioxide; Water	½ +½ ½; ½	2

23	(a) When water is lost through stomata in the leaves by transpiration, it creates a suction force/transpiration pull. Due to which water is pulled up through xylem of the roots to the leaves. **OR** (b) • Heterotrophic /Holozoic Nutrition • Amoeba takes in food using temporary finger-like projections/pseudopodia of the cell which fuse over the food particle forming a food vacuole. Inside the food vacuole complex substances are broken down into simpler substances. / (**award marks if explained diagrammatically**)	2 1 1	2
24	Example − A population of bacteria living in temperate waters that can withstand heat due to the rise in temperature due to global warming will survive better in a heat wave than the non-variant bacteria having no capacity to tolerate heat wave. Thus, suitable variations promote survival. (**Any other example)**	2	2
25	• For distant vision: lens of power – 4·0 dioptre • f $(meter) = \frac{1}{P} = \frac{1}{-4{\cdot}0D}$ = −0.25 m or -25 cm	1 1	2
26	• Wire A will offer more resistance Justification: • R $\propto \frac{l}{A}$ /thinner the wire, more resistance to the flow of current.	1 1	2
	SECTION C		
27	• Plaster of Paris; Calcium sulphate hemihydrate •Prepared from gypsum ($CaSO_4 \cdot 2H_2O$) by heating it at 373K $CaSO_4 \cdot \frac{1}{2} H_2O + 1\frac{1}{2} H_2O \longrightarrow CaSO_4 \cdot 2H_2O$	½ + ½ 1 1	3
28	• Oxygen is added to ethanol to produce ethanoic acid. • Alkaline potassium permanganate or Acidified potassium dichromate • $CH_3 - CH_2OH \xrightarrow[\text{Or acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3COOH$ • It is oxidation reaction while other is combustion reaction/ burning of ethanol is exothermic while other is endothermic.	½ ½ 1 1	3
29	(a) In hydra, a bud develops as an outgrowth due to repeated cell division at one specific site. These buds develop into tiny individuals and when fully mature, detach from the parent body and become new independent individuals.  • Regenerative cells. **OR** (b) (i)Seminal vesicles and prostate glands: • Secrete a fluid for nourishment of sperms. • Secrete a fluid which makes the transport of the sperms easier (ii) Oviduct: • Egg is carried from ovary to the womb or uterus. • Site of Fertilization	1 1 ½ ½ ½ + ½ ½ + ½	

	(iii) Testis: • Produces sperms • Secretion of hormone – testosterone	½ + ½	3
30	<table><tr><th>Dominant Traits</th><th>Recessive Traits</th></tr><tr><td>(i) When both dominant and recessive traits are inherited, the dominant trait gets expressed.</td><td>(i) When both dominant and recessive traits are inherited, the recessive trait does not get expressed.</td></tr><tr><td>(ii) A single copy of dominant trait is enough to get it expressed.</td><td>(ii) Both the copies of a trait should be recessive to get it expressed.</td></tr></table> • 75% yellow seeds	1 x 2 1	3
31	•Ability of the eye lens to adjust its focal length. • Image distance remains unchanged •Ciliary muscles – • While focusing on distant objects ciliary muscles relax, eye lens becomes thin and its focal length increases.	1 1 ½ ½	3
32	(a) Because a magnetic field exists around the bar magnet (b) Strength of the magnetic field is maximum near the poles of the magnet (c) The lines represent the magnetic field lines (d) Equidistant parallel lines, magnetic field inside the solenoid is uniform	½ 1 ½ ½+½	3
33	(i) •Terrestrial /Grassland / cropland •Aquatic /Pond (ii)First trophic level are always producers or autotrophs as they can capture the solar energy and convert it into chemical energy. • 1% energy is captured. (iii)Because energy flows in one direction only. Justification: when energy passes from one trophic level to other it cannot revert back.	½ ½ ½ ½ ½ ½	3
	SECTION D		
34	(a) A chemical reaction involves the breaking and making of bonds between atoms to produce new substances. / when reactant changes to products. (i) Add lead nitrate solution to potassium iodide solution taken in a test tube. The colour changes from colourless solution to yellow ppt. / $Pb(No_3)_2 + 2KI \longrightarrow PbI_2\downarrow + 2KNO_3$ (Yellow) (D***educt ½ marks if colour is not mentioned in the reaction)*** (**or any example**) (ii) Calcium oxide reacts vigorously with water to produce slaked lime (calcium hydroxide) releasing a large amount of heat. / $CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq) + Heat$ (Quick lime) (Slaked lime) (**or any example**) **OR** (b) (i) •A reactant breaks down to give two or more products. /A reaction which requires energy to split a compound or reactant in two or more simple substances.	1 1+1 1+1 1	

	(I) Water splits into hydrogen gas and oxygen gas. • Electrical energy (II) Silver bromide decomposes into silver and bromine • Light energy (ii) (I) Formation of calcium oxide: $CaCO_3(s) \xrightarrow{Heat} CaO(s) + CO_2(g)$ • It is an endothermic reaction/decomposition reaction. (II) Formation of calcium hydroxide: $CaO + H_2O \longrightarrow Ca(OH)_2$ +Heat • It is exothermic/combination reaction	½ ½ ½ ½ ½ ½ ½ ½	5
35	(a) (i) • The pathway in which impulses travel during the reflex action is called a reflex arc. • Because the thinking part of the brain is not fast enough/for quick response to avoid injury. • Reflex arc :  (ii) Peripheral Nervous System Components : Cranial Nerves; Spinal Nerves **OR** (b) (i) •Touch • **T**he shape of the leaves changes by changing the amount of water in them. • No (ii) Growth of a part of plant in response to the pull of earth or gravity is called geotropism. • Positive geotropism − Movement of plant part towards the earth gravity. Example − Roots grow downwards • Negative geotropism − Movement of plant part away from the force of gravity. Example − Shoots grow upwards.	1 ½ 1+½ 1 ½; ½ ½ 1 ½ 1 ½+½ ½+½	5
36	(a) (i) S. No. 3, 2f is 50 cm. ∴ 2f = 50 cm, or f = 25 cm. Justification: Object distance(u) and image distance (v) are same so it implies that object is placed at 2F. (ii) S. No. 6, is not correct. Reason: For u = −15 cm, sign of v **must** be – ve (as the image is formed on the same side of the lens as the object)  	1 1 ½ ½ 1	

	(deduct ½ mark if the direction of the rays are not shown)		
	(iii) Magnification : $m = \frac{v}{u}$ $= \frac{+150\ cm}{-30\ cm} = -5\ cm$	1	
	OR		
	(b) (i) Principal axis : It is an imaginary line passing through the two centres of curvatures of a lens.	1	
	 	1	
	(ii) f = − 20 cm; h = 5 cm; v = −15 cm	½	
	$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ *or* $\frac{1}{u} = \frac{1}{v} - \frac{1}{f} = \frac{1}{(-15)} - \frac{1}{(-20)}$ $= \frac{-1}{60\ cm}$	½ 1	
	or u = − 60 cm object is at a distance of 60 cm from the lens • Size of the image(magnification): m = $\frac{h'}{h} = \frac{v}{u}$ $h' = \frac{v}{u} \times h = \frac{(-15)}{(-60)} \times 5$ = 1·25 cm	1	5
	SECTION E		
37	(a) In the test tube containing magnesium. (b) All three metals react with HCl because they are more reactive than hydrogen**.** **(Award marks if student write any less reactive metal with reason)**	1 1	
	(c) (i)Because HNO_3 is a strong oxidizing agent and oxidizes the H_2 produced to water. • Ultimate products are water, oxides of nitrogen.	1 1	
	OR		
	(c) (ii) • Displacement Reaction • If metal X displaces metal Y from its salt solution it is more reactive than Y or vice versa.	1 1	4
38	(a) (i) Renal Artery (ii) Glomerulus	½ ½	
	(b) • Urinary bladder • Nervous control	½ ½	
	(c) (i) Filtration: Nitrogenous wastes such as urea or uric acid are removed	½+½	
	Reabsorption: Glucose, amino acids, salts/some useful materials and major amounts of water reabsorbed	½+½	
	OR		

	(c) (ii)Tubular part of nephron. • The amount of water absorbed depends on: -how much water is there in the body. -how much dissolved waste is there to be excreted.	1 ½ ½	 4
39	(a) $R_S = 4\ \Omega + 6\ \Omega + 16\ \Omega = 26\ \Omega$ (b) $\frac{1}{R_P} = \frac{1}{8\ \Omega} + \frac{1}{8\ \Omega} = \frac{1}{4}\ \Omega$ $R_p = 4\ \Omega$ (c) (i) Total resistance = 26 Ω + 4 Ω = 30 Ω Potential difference = V = 6V Current I = $\frac{V}{R}$ $\frac{6}{30} = \frac{1}{5}\ A$ or 0·2 A. **OR** (c)(ii) 16 Ω Justification: According to Ohm's law when same current flows, the potential difference across a higher resistance is always higher./ Potential difference across 16 Ω =V=IR = 0.2x16=3.2V Potential difference across 8 Ω =V=$IR_{(total)}$ = 0.2x4 =0.8V	1 1 1 ½ ½ 1 1	 4

Marking Scheme
Strictly Confidential
Secondary School Examination, 2024
SUBJECT NAME SCIENCE (086) (Q.P. CODE 31/4/2)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc. may invite action under various rules of the Board and IPC."
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.
4	The Marking scheme carries only suggested value points for the answers These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark(√) wherever answer is correct. For wrong answer CROSS 'X" be marked. Evaluators will not put right (✓)while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note "Extra Question".
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

11	A full scale of marks 0-80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.
13	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- Leaving answer or part thereof unassessed in an answer book. Giving more marks for an answer than assigned to it. Wrong totaling of marks awarded on an answer. Wrong transfer of marks from the inside pages of the answer book to the title page. Wrong question wise totaling on the title page. Wrong totaling of marks of the two columns on the title page. Wrong grand total. Marks in words and figures not tallying/not same. Wrong transfer of marks from the answer book to online award list. Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the "Guidelines for Spot Evaluation" before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME

Secondary School Examination, 2024

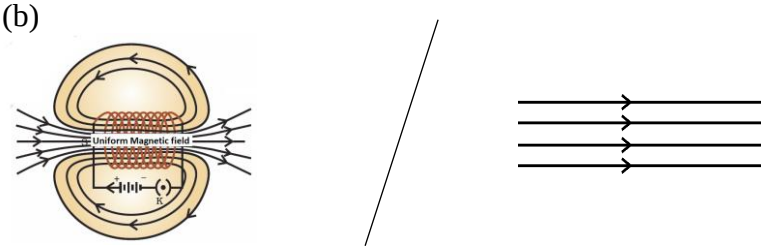
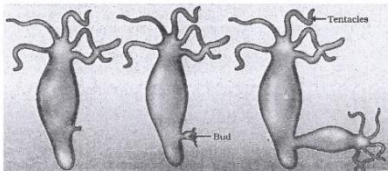
SCIENCE (Subject Code–086)

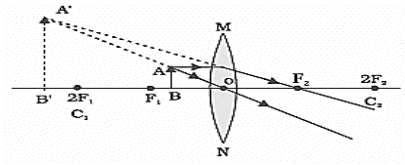
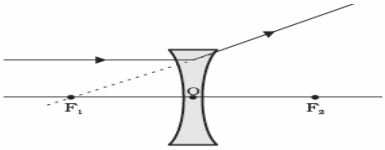
[Paper Code: 31/4/2]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(C)/ Double Displacement reaction	1	1
2	(C)/46	1	1
3	(A)/Cotyledon	1	1
4	(A)/Sugarcane, roses, grapes	1	1
5	(C)/Abscisic acid	1	1
6	(D)/ HCl and NH_4OH	1	1
7	(D)/Hydrochloric acid and Sulphuric acid	1	1
8	(C)/Copper and Silver	1	1
9	(B)/9 and 3	1	1
10	(B)/ (i)Amino acid, (ii)glucose, (iii)fatty acid and glycerol	1	1
11	(B)/(ii) and (iii)	1	1
12	(B)/move towards the side AB of the loop	1	1
13	(A)/9/4 x 10^{8} m/s	1	1
14	(C)/Blue	1	1
15	(C)/I and II	1	1
16	(A)/15000 J	1	1
17	(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).	1	1
18	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
19	(B) /Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).	1	1
20	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)	1	1
	SECTION B		
21	(a) When water is lost through stomata in the leaves by transpiration, it creates a suction force/transpiration pull. Due to which water is pulled up through xylem of the roots to the leaves. **OR** (b) • Heterotrophic /Holozoic Nutrition • Amoeba takes in food using temporary finger-like projections/pseudopodia of the cell which fuse over the food particle forming a food vacuole. Inside the food vacuole complex substances are broken down into simpler substances. / (a**ward marks if explained diagrammatically**)	2 1 1	2
22	(a) $2\ CH_3COOH + Na_2CO_3 \longrightarrow 2\ CH_3COONa + H_2O + CO_2$ (b) Pass the gas/CO_2 in lime water. It turns lime water milky.	1 1	2
23	(a) (i) • HCl gas was evolved (ii) (I) No change in colour	 ½ ½	

	(II) Wet blue litmus turns red • HCl gas is acidic in nature **OR** (b) •$Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$ (g) **(Any other example)** •Hydrogen burns with a pop sound when a burning matchstick is brought near it.	½ ½ 1 1	2
24	• Wrinkled and yellow, Round and green • Traits are independently inherited.	½ + ½ 1	2
25	• Scattering of light. • Example − When sunlight passes through a canopy of dense forest/ when a fine beam of sunlight enters a smoke filled room through a small hole. **(or any other)**	1 1	2
26	• Joule's Law − Heat produced in a resistor is directly proportional to: -Square of current for a given resistance -Resistance for a given conductor and -Time for which the current flows though the resister, • If any unduly high electric current flows through the circuit, the temperature of the fuse wire increases. This melts the fuse wire and breaks the circuit.	1 1	2
	SECTION C		
27	• Copper Chloride; Blue- green • $CuO + 2HCl \longrightarrow CuCl_2 + H_2O$ • CuO is basic.	½ ; ½ 1 1	3
28	•Ability of the eye lens to adjust its focal length. • Image distance remains unchanged • Ciliary muscles – While focusing on distant objects ciliary muscles relax, eye lens becomes thin and its focal length increases.	1 1 ½ ½	3
29	(i) •Terrestrial /Grassland / cropland •Aquatic /Pond (ii) First trophic level are always producers or autotrophs as they can capture the solar energy and convert it into chemical energy. • 1% energy is captured. (iii)Because energy flows in one direction only. Justification: when energy passes from one trophic level to other it cannot revert back.	½ ½ ½ ½ ½ ½	3
30	Three examples: • In some animals, the temperature at which the fertilized eggs are kept determines whether the animals developing in the eggs will be male or female. • In snails, individuals can change sex. • In human beings, the sex of the individual is genetically determined i.e. genes inherited from parents decide whether the child will be a boy or a girl.	 1 1 1	3
31	• Oxygen is added to ethanol to produce ethanoic acid. • Alkaline potassium permanganate or Acidified potassium dichromate. $CH_3 - CH_2OH \xrightarrow[\text{Or acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3COOH$ •	½ ½ 1	

	• It is oxidation reaction while other is combustion reaction/ burning of ethanol is exothermic while other is endothermic.	1	3
32	(a) A solenoid is made by winding insulated copper wire over a non-conducting cylindrical tube closely and tightly wound in the shape of a cylindrical spring. <table><tr><td>Solenoid</td><td>Circular coil</td></tr><tr><td>Length of solenoid is much greater as compared to its diameter.</td><td>Its diameter is much greater as compared to its length.</td></tr><tr><td>Strong magnetic field</td><td>Weak magnetic field</td></tr></table> (b)  • Field lines are in the form of parallel straight lines which indicates that the field is uniform.	1 1 ½ ½	3
33	(a) In hydra, a bud develops as an outgrowth due to repeated cell division at one specific site. These buds develop into tiny individuals and when fully mature, detach from the parent body and become new independent individuals.  • Regenerative cells. **OR** • (b) (i)Seminal vesicles and prostate glands: • Secrete a fluid for nourishment of sperms. • Secrete a fluid which makes the transport of the sperms easier (ii) Oviduct: • Egg is carried from ovary to the womb or uterus. • Site of Fertilization • (iii) Testis: • Produces sperms • Secretion of hormone – testosterone	1 1 ½ ½ ½ + ½ ½ + ½ ½ + ½	3
	SECTION D		

34	(a) (i) • Decomposition reaction • A reaction in which a single reactant breaks down to simpler products. (ii) Nitrogen dioxide, NO_2 (iii) $2Pb(NO_3)_2(s) \xrightarrow{Heat} 2PbO(s) + 4NO_2(g) + O_2(g)$ (Lead nitrate; Lead oxide; Nitrogen dioxide; Oxygen) (iv) Residue left − Lead oxide. • Dissolve the residue in water and test the solution using litmus paper/Universal indicator. The colour of the litmus paper changes to blue indicating that lead oxide is basic in nature. **OR** (b) (i) $Pb(NO_3)(aq) + 2\ KI(aq) \longrightarrow PbI_{2(ppt)} + 2\ KNO_{3(aq)}$ • Yes, it is a double displacement reaction. • In this reaction, exchange of ions between the reactants (Lead nitrate and potassium iodide) is taking place. • Lead iodide; $[Pb^{2+}]\ [I^-]$ (ii) Calcium hydroxide is prepared on adding water to quicklime (calcium oxide) / $CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq) + Heat$ (Quick lime; Slaked lime) • When CO_2 is passed through $Ca(OH)_2$ It turns milky white/ calcium carbonate is formed. • $Ca(OH)_2(aq) + CO_2(g) \rightarrow CaCO_3(s) + H_2O(l)$ (Calcium hydroxide; Calcium carbonate)	½ ½ ½ , ½ 1 1 1 1 ½ ½ ½ + ½ ½ ½ 1	5
35	(a) (i) S. No. 3, 2f is 50 cm. ∴ 2f = 50 cm, or f = 25 cm. Justification: Object distance(u) and image distance (v) are same so it implies that object is placed at 2F. (ii) S. No. 6, is not correct. Reason: For u = −15 cm, sign of v **must** be – ve (as the image is formed on the same side of the lens as the object)  ***(deduct ½ mark if the direction of the rays are not shown)*** (iii) Magnification : $m = \frac{v}{u}$ $= \frac{+150\ cm}{-30\ cm} = -5\ cm$ **OR** (b) (i) Principal axis : It is an imaginary line passing through the two centres of curvatures of a lens. 	1 1 ½ ½ 1 1 1 1	

	(ii) f = − 20 cm; h = 5 cm; v = −15 cm $\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$ *or* $\frac{1}{u}=\frac{1}{v}-\frac{1}{f}=\frac{1}{(-15)}-\frac{1}{(-20)}$ $=\frac{-1}{60\ cm}$ or u = − 60 cm object is at a distance of 60 cm from the lens • Size of the image(magnification): m = $\frac{h'}{h}=\frac{v}{u}$ $h'=\frac{v}{u}\times h=\frac{(-15)}{(-60)}\times 5$ = 1·25 cm	½ ½ 1 1	5
36	(a) (i) • The pathway in which impulses travel during the reflex action is called a reflex arc. • Because the thinking part of the brain is not fast enough/for quick response to avoid injury. • Reflex arc :  (ii) Peripheral Nervous System Components : Cranial Nerves; Spinal Nerves **OR** (b) (i) •Touch • The shape of the leaves changes by changing the amount of water in them. • No (ii) Growth of a part of plant in response to the pull of earth or gravity is called geotropism. • Positive geotropism − Movement of plant part towards the earth gravity. Example − Roots grow downwards • Negative geotropism − Movement of plant part away from the force of gravity. Example − Shoots grow upwards.	1 ½ 1+½ 1 ½; ½ ½ 1 ½ 1 ½+½ ½+½	5
	SECTION E		
37	(a) R_S = 4 Ω + 6 Ω + 16 Ω = 26 Ω (b) $\frac{1}{R_P}=\frac{1}{8\ \Omega}+\frac{1}{8\ \Omega}=\frac{1}{4}\ \Omega$ R_p = 4 Ω (c) (i) Total resistance = 26 Ω + 4 Ω = 30 Ω Potential difference = V = 6V Current I = $\frac{V}{R}$ $\frac{6}{30}=\frac{1}{5}\ A$ or 0·2 A.	1 1 1 ½ ½	

	OR (c) (ii) 16 Ω Justification: According to Ohm's law when same current flows, the potential difference across a higher resistance is always higher./ Potential difference across 16 Ω =V=IR = 0.2x16=3.2V Potential difference across 8 Ω =V=$IR_{(total)}$ = 0.2x4 =0.8V	 1 1	 4
38	(a) In the test tube containing magnesium. (b) All three metals react with HCl because they are more reactive than hydrogen**.** **(Award marks if student write any less reactive metal with reason)** (c) (i)Because HNO_3 is a strong oxidizing agent and oxidizes the H_2 produced to water. • Ultimate products are water, oxides of nitrogen. **OR** (c) (ii) • Displacement Reaction • If metal X displaces metal Y from its salt solution it is more reactive than Y or vice versa.	1 1 1 1 1	 4
39	(a) (i) Renal Artery (ii) Glomerulus (b) • Urinary bladder • Nervous control (c) (i) Filtration: Nitrogenous wastes such as urea or uric acid are removed Reabsorption: Glucose, amino acids, salts/some useful materials and major amounts of water reabsorbed **OR** (c) (ii)Tubular part of nephron. • The amount of water absorbed depends on : - how much water is there in the body. - how much dissolved waste is there to be excreted.	½ ½ ½ ½ ½+½ ½+½ 1 ½ ½	 4

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SUBJECT NAME SCIENCE (086) (Q.P. CODE 31/4/3)

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13	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- Leaving answer or part thereof unassessed in an answer book. Giving more marks for an answer than assigned to it. Wrong totaling of marks awarded on an answer. Wrong transfer of marks from the inside pages of the answer book to the title page. Wrong question wise totaling on the title page. Wrong totaling of marks of the two columns on the title page. Wrong grand total. Marks in words and figures not tallying/not same. Wrong transfer of marks from the answer book to online award list. Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the "Guidelines for Spot Evaluation" before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME

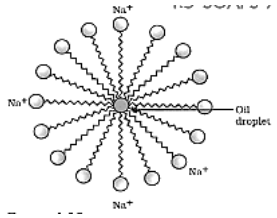
Secondary School Examination, 2024

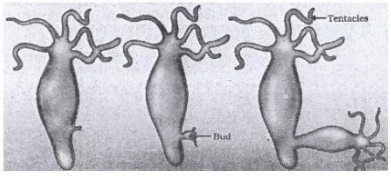
SCIENCE (Subject Code–086)

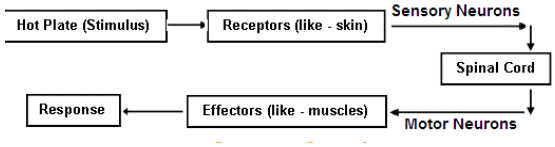
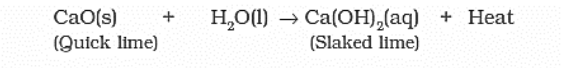
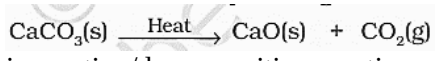
[Paper Code: 31/4/3]

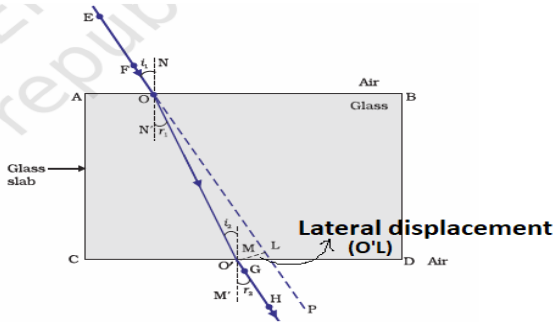
Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(A)/15000 J	1	1
2	(A)/ HCl, $Mg(OH)_2$	1	1
3	(C)/46	1	1
4	(A)/Cotyledon	1	1
5	(B)/Displacement reaction	1	1
6	(D)/Hydrochloric acid and Sulphuric acid	1	1
7	(C)/Copper and Silver	1	1
8	(C)/ Petals only	1	1
9	(B)/ (i)Amino acid, (ii)glucose, (iii)fatty acid and glycerol	1	1
10	(B)/9 and 3	1	1
11	(C)/Abscisic acid	1	1
12	(B)/(ii) and (iii)	1	1
13	(B)/move towards the side AB of the loop	1	1
14	(A)/9/4 x 10^8 m/s	1	1
15	(C)/Blue	1	1
16	(C)/I and II	1	1
17	(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).	1	1
18	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)	1	1
19	(B) /Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).	1	1
20	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)	1	1
	SECTION B		
21	(a) When water is lost through stomata in the leaves by transpiration, it creates a suction force/transpiration pull. Due to which water is pulled up through xylem of the roots to the leaves. **OR** (b) • Heterotrophic /Holozoic Nutrition. • Amoeba takes in food using temporary finger-like projections/pseudopodia of the cell which fuse over the food particle forming a food vacuole. Inside the food vacuole complex substances are broken down into simpler substances. / (**award marks if explained diagrammatically**)	2 1 1	2

22	• Micelles • 	½ 1 ½	2
23	(a) (i) • HCl gas was evolved (ii) (I) No change in colour (II) Wet blue litmus turns red • HCl gas is acidic in nature **OR** (b) • $Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$ (g) **(Any other example)** • Hydrogen burns with a pop sound when a burning matchstick is brought near it.	½ ½ ½ ½ 1 1	2
24	Each parent produces gametes that have half the number of chromosomes. During sexual reproduction, a female gamete fuses with a male gamete to form a zygote. Thus, zygote restores the original number of chromosomes in the progeny ensuring equal contribution of both the parents in the progeny.	2	2
25	• Black colour • As there would not be any particle to scatter light.	1 1	2
26	$R = \rho \frac{l}{A}$ $\rho = 1{\cdot}6 \times 10^{-8}\ \Omega$ m $A = 2 \times (10^{-3}\text{m})^2$ $l = 1000$ m $\therefore R = (1{\cdot}6 \times 10^{-8}\ \Omega\text{ m}) \times \frac{1000\text{ m}}{2 \times (10^{-3}\text{m})^2}$ $= 8{\cdot}0\ \Omega$	½ ½ 1	2
	SECTION C		
27	•Ability of the eye lens to adjust its focal length. • Image distance remains unchanged •Ciliary muscles – While focusing on distant objects ciliary muscles relax, eye lens becomes thin and its focal length increases.	1 1 ½ ½	3
28	(a) $CH_3 - COOH + CH_3 - CH_2OH \underset{}{\overset{Acid}{\rightleftharpoons}} CH_3 - \underset{\underset{O}{\|\|}}{C} - O - CH_2 - CH_3 + H_2O$ (b) $CH_3COOC_2H_5 \xrightarrow{NaOH} C_2H_5OH + CH_3COONa$ (c) $CH_3 - CH_2OH \xrightarrow[H_2SO_4]{Hot\ Conc.} CH_2 = CH_2 + H_2O$	1 1 1	3
29	(a) Because a magnetic field exists around the bar magnet (b) Strength of the magnetic field is maximum near the poles of the magnet (c) The lines represent the magnetic field lines (d) Equidistant parallel lines, magnetic field inside the solenoid is uniform	½ 1 ½ ½+½	3

30	(a) Two pairs of contrasting characters: • Round and wrinkled shape of seed • Violet and white flowers (Any other) (b) (i) No ; Tt (ii) 25% (iii) TT : Tt − 1:2	½ +½ ½ ; ½ ½ ½	3
31	• Plaster of Paris; Calcium sulphate hemihydrate •Prepared from gypsum ($CaSO_4 \cdot 2H_2O$) by heating it at 373K • $CaSO_4 \cdot \frac{1}{2} H_2O + 1\frac{1}{2} H_2O \longrightarrow CaSO_4 \cdot 2H_2O$	½ + ½ 1 1	3
32	(a) In hydra, a bud develops as an outgrowth due to repeated cell division at one specific site. These buds develop into tiny individuals and when fully mature, detach from the parent body and become new independent individuals.  • Regenerative cells. **OR** (b) (i)Seminal vesicles and prostate glands: • Secrete a fluid for nourishment of sperms. • Secrete a fluid which makes the transport of the sperms easier (ii) Oviduct: • Egg is carried from ovary to the womb or uterus. • Site of Fertilization (iii) Testis: • Produces sperms • Secretion of hormone – testosterone	1 1 ½ ½ ½ + ½ ½ + ½ ½ + ½	3
33	<table><tr><th>Biodegradable waste</th><th>Non-biodegradable waste</th></tr><tr><td>Wastes that are broken down by biological processes into simpler substances.</td><td>Wastes that are not broken down by biological processes into simpler substances.</td></tr></table> • Harmful effects: - Excessive use cause pollution. - Pesticides enter the food chain and cause biomagnification in humans and other animals. - Clogging of drains. - Death of cattle due to ingestion of plastics **(any two)**	2 ½ ½	3
	SECTION D		
34	(a) (i) • The pathway in which impulses travel during the reflex action is called a reflex arc. • Because the thinking part of the brain is not fast enough/for quick	1 ½	

	response to avoid injury. • Reflex arc :  (ii) Peripheral Nervous System Components : Cranial Nerves; Spinal Nerves **OR** (b) (i) •Touch • The shape of the leaves changes by changing the amount of water in them. • No (ii) Growth of a part of plant in response to the pull of earth or gravity is called geotropism. • Positive geotropism − Movement of plant part towards the earth gravity. Example − Roots grow downwards • Negative geotropism − Movement of plant part away from the force of gravity. Example − Shoots grow upwards.	1+½ 1 ½; ½ ½ 1 ½ 1 ½+½ ½+½	5
35	(a) A chemical reaction involves the breaking and making of bonds between atoms to produce new substances. / when reactant changes to products. (i) Add lead nitrate solution to potassium iodide solution taken in a test tube. The colour changes from colourless solution to yellow ppt. /  (**or any example**) (ii) Calcium oxide reacts vigorously with water to produce slaked lime (calcium hydroxide) releasing a large amount of heat. /  (**or any example**) ***(Deduct ½ marks if change in colour or heat is not mentioned in the reaction)*** **OR** (b) (i) •A reactant breaks down to give two or more products. /A reaction which requires energy to split a compound or reactant in two or more simple substances. (I) Water splits into hydrogen gas and oxygen gas. • Electrical energy (II) Silver bromide decomposes into silver and bromine • Light energy **(ii)** (I) Formation of calcium oxide:  • It is an endothermic reaction/decomposition reaction.	1 1+1 1+1 1 ½ ½ ½ ½ ½ ½	

	(II) Formation of calcium hydroxide: $CaO + H_2O \longrightarrow Ca(OH)_2$ +Heat • It is exothermic/combination reaction	½ ½	5
36	(a) (i) - The angle of incidence is equal to the angle of reflection. - The incident ray, the normal to the mirror at the point of incidence and the reflected ray, all lie in the same plane. (ii) u = – 15 cm, f = −10 cm (concave mirror) h = 5·0 cm Mirror formula $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{-1}{10\text{ cm}} + \frac{1}{15\text{ cm}} = \frac{-1}{30cm}$ or v = − 30 cm. The screen must be placed at a distance of 30 cm from the mirror in front of it $(m) = \frac{h'}{h} = -\frac{v}{u}$ $h = \frac{-v}{u} \times h = -\frac{-30\ cm}{-15\ cm} \times 5\ cm = -10$ cm **OR** (b)(i) -The incident ray, the refracted ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane. - The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for the given pair of media. / $\frac{\sin i}{\sin r} = constant$ (ii)  • The emergent ray is parallel to the incident ray. • Labelling of lateral displacement **(If labelling is not done deduct ½ marks)**	1+1 ½ ½ 1 1 1 1 2 ½ ½	5
	SECTION E		
37	(a) R_S = 4 Ω + 6 Ω + 16 Ω = 26 Ω (b) $\frac{1}{R_P} = \frac{1}{8\ \Omega} + \frac{1}{8\ \Omega} = \frac{1}{4}\ \Omega$ R_p = 4 Ω (c) (i) Total resistance = 26 Ω + 4 Ω = 30 Ω Potential difference = V = 6V Current I = $\frac{V}{R}$ $\frac{6}{30} = \frac{1}{5}\ A$ or 0·2 A.	1 1 1 ½ ½	

	OR (c)(ii) 16 Ω Justification: According to Ohm's law when same current flows, the potential difference across a higher resistance is always higher./ Potential difference across 16 Ω =V=IR = 0.2x16=3.2V Potential difference across 8 Ω =V=$IR_{(total)}$ = 0.2x4 =0.8V	 1 1	4
38	(a) In the test tube containing magnesium. (b) All three metals react with HCl because they are more reactive than hydrogen**.** **(Award marks if student write any less reactive metal with reason)** (c) (i)Because HNO_3 is a strong oxidizing agent and oxidizes the H_2 produced to water. • Ultimate products are water, oxides of nitrogen. **OR** (c) (ii) • Displacement Reaction • If metal X displaces metal Y from its salt solution it is more reactive than Y or vice versa.	1 1 1 1 1	4
39	(a) (i) Renal Artery (ii) Glomerulus (b) • Urinary bladder • Nervous control (c) (i) Filtration: Nitrogenous wastes such as urea or uric acid are removed Reabsorption: Glucose, amino acids, salts/some useful materials and major amounts of water reabsorbed **OR** (c) (ii)Tubular part of nephron. • The amount of water absorbed depends on : -how much water is there in the body. -how much dissolved waste is there to be excreted.	½ ½ ½ ½ ½+½ ½+½ 1 ½ ½	4