Series : QR1SP

SET-4

प्रश्न–पत्र कोड
Q.P. Code 90

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 :

(I) कृपया जाँच कर लें कि इस प्रश्न–पत्र में मुद्रित पृष्ठ **31** हैं ।

(II) प्रश्न–पत्र में दाहिने हाथ की ओर दिए गए प्रश्न–पत्र कोड को परीक्षार्थी उत्तर–पुस्तिका के मुख–पृष्ठ पर लिखें ।

(III) कृपया जाँच कर लें कि इस प्रश्न–पत्र में **37** प्रश्न हैं ।

(IV) **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर–पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें ।**

(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 ।

NOTE :

(I) Please check that this question paper contains **31** printed pages.

(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) Please check that this question paper contains **37** questions.

(IV) **Please write down the serial number of the question in the answer-book at the given place before attempting it.**

(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.

सूचना विज्ञान पद्धतियाँ

INFORMATICS PRACTICES

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 70*

Time allowed : 3 hours *Maximum Marks : 70*

सामान्य निर्देश :

(i) ***सभी** प्रश्न **अनिवार्य** हैं ।*

(ii) *प्रश्न-पत्र **5** खण्डों में विभाजित है – खण्ड **क** से **ङ** तक ।*

(iii) *खण्ड – **क** में **21** प्रश्न (**1** से **21** तक) हैं । प्रत्येक प्रश्न **1** अंक का है ।*

(iv) *खण्ड – **ख** में **7** प्रश्न (**22** से **28** तक) हैं । प्रत्येक प्रश्न **2** अंकों का है ।*

(v) *खण्ड – **ग** में **4** प्रश्न (**29** से **32** तक) हैं । प्रत्येक प्रश्न **3** अंकों का है ।*

(vi) *खण्ड – **घ** में **2** प्रश्न (**33** से **34** तक) हैं । प्रत्येक प्रश्न **4** अंकों का है ।*

(vii) *खण्ड – **ङ** में **3** प्रश्न (**35** से **37** तक) हैं । प्रत्येक प्रश्न **5** अंकों का है ।*

(viii) *कुछ प्रश्नों में आंतरिक विकल्प दिये गये हैं । ऐसे प्रश्नों में केवल एक विकल्प का उत्तर दीजिए ।*

(ix) ***सभी** प्रोग्रामिंग प्रश्नों का उत्तर केवल Python भाषा में दिया जाना है ।*

(x) *यदि प्रश्न बहुविकल्पीय (MCQ) है, तो सही उत्तर का Text भी लिखा जाना चाहिए ।*

खण्ड – क

1. बताएँ कि निम्नलिखित कथन सत्य है या असत्य : **1**

   Pandas Series में, पोज़िशनल इंडेक्स (Positional index) एक स्ट्रिंग (string) या एक पूर्णांक (integer) हो सकता है ।

2. हम _____ मेथड (method) का उपयोग करके DataFrame **DF** में एक नई पंक्ति (row) जोड़ सकते हैं । **1**

   (A) `DF.add()` (B) `DF.loc[]`

   (C) `DF.loc()` (D) `DF.addloc[]`

3. नवीन ने विभिन्न प्रकार की अपशिष्ट सामग्री को यह एहसास किए बिना फेंक दिया कि ई-अपशिष्ट (e-waste) में हानिकारक पदार्थ होते हैं जो पर्यावरण को प्रदूषित कर सकते हैं । वह जानना चाहता है कि निम्नलिखित में से किसे ई-अपशिष्ट (e-waste) माना जाएगा ? **1**

   (A) प्लास्टिक की बोतल (B) टूटा हुआ स्मार्टफोन

   (C) एलुमिनियम फॉइल (D) केले का छिलका

General Instructions :

(i) ***All*** *questions are compulsory.*

(ii) *The examination paper contains* ***5*** *sections – Section* ***A*** *to Section* ***E****.*

(iii) ***Section A*** *consists of* ***21*** *questions (****1*** *to* ***21****). Each question carries* ***1*** *mark.*

(iv) ***Section B*** *consists of* ***7*** *questions (****22*** *to* ***28****). Each question carries* ***2*** *marks.*

(v) ***Section C*** *consists of* ***4*** *questions (****29*** *to* ***32****). Each question carries* ***3*** *marks.*

(vi) ***Section D*** *consists of* ***2*** *questions (****33*** *to* ***34****). Each question carries* ***4*** *marks.*

(vii) ***Section E*** *consists of* ***3*** *questions (****35*** *to* ***37****). Each question carries* ***5*** *marks.*

(viii) Internal choices have been provided in some questions. Attempt only one of the choices in such questions.

(ix) ***All*** *programming questions are to be answered using Python language only.*

(x) In case of MCQ, text of the correct answer should also be written.

SECTION – A

1. State whether the following statement is True or False : **1**

   In Pandas Series, the Positional index can be a string or an integer.

2. We can add a new row to a DataFrame `DF` using the _____ method. **1**

   (A) `DF.add()` (B) `DF.loc[]`

   (C) `DF.loc()` (D) `DF.addloc[]`

3. Naveen discarded various types of waste material without realizing that e-waste contains harmful substances that could pollute the environment. He wants to know which of the following will be considered as e-waste ? **1**

   (A) Plastic Bottle

   (B) Broken Smartphone

   (C) Aluminium Foil

   (D) Banana Peel

4. किस परिदृश्य (scenario) में लाइन चार्ट (line chart) की तुलना में बार चार्ट (bar chart) को प्राथमिकता दी जाती है ? **1**

(A) एक वर्ष में मासिक तापमान रुझानों को दर्शाने के लिए ।

(B) विभिन्न कक्षाओं में छात्रों की संख्या की तुलना करने के लिए ।

(C) समय के साथ स्टॉक मूल्य में उतार-चढ़ाव दिखाने के लिए ।

(D) दिनों के अनुसार वेबसाइट ट्रैफिक के रुझानों का विश्लेषण करने के लिए ।

5. निम्नलिखित में से कौन सी नेटवर्क टोपोलॉजी (network topology) सभी डिवाइसों (devices) को जोड़ने के लिए एक केंद्रीय केबल (backbone) का उपयोग करती है ? **1**

(A) मेश (Mesh) (B) स्टार (Star)

(C) ट्री (Tree) (D) बस (Bus)

6. निम्नलिखित कथन सत्य है या असत्य, बताएँ : **1**

SQL में, एक एग्रीगेट फ़ंक्शन (aggregate function) प्रत्येक कॉलम, जिस पर वह apply किया जाता है, के लिए अनेक मान रिटर्न (values return) करता है ।

7. रोहिणी ने एक नए प्रकार का वॉटर प्यूरीफायर (जल शोधक) विकसित किया है जो एक अनन्य फिल्ट्रेशन विधि (unique filtration method) का उपयोग करता है । उसे अपने आविष्कार की रक्षा के लिए किस प्रकार के बौद्धिक संपदा अधिकार (Intellectual Property Right) के लिए आवेदन करना चाहिए ? **1**

(A) ट्रेडमार्क (Trademark)

(B) कॉपीराइट (Copyright)

(C) पेटेंट (Patent)

(D) कॉपीराइट और ट्रेडमार्क दोनों (Both Copyright & Trademark)

8. आदित्य **df** नामक एक **DataFrame** पर काम कर रहा है । उसने यह स्टेटमेंट लिखा है : **1**

```
print(df.loc['S2'])
```

उपरोक्त स्टेटमेंट क्या करेगा ?

(A) लेबल **'S2'** वाली पंक्ति (row) का डेटा प्रदर्शित करेगा ।

(B) **DataFrame** के कॉलम प्रदर्शित करेगा ।

(C) लेबल **'S2'** वाले कॉलम का data type प्रदर्शित करेगा ।

(D) **DataFrame** के इंडेक्स नंबर प्रदर्शित करेगा ।

4. In which scenario is a bar chart preferred over a line chart ? **1**

(A) To visualise monthly temperature trends over a year.

(B) To compare the number of students in different classes.

(C) To show stock price movements over time.

(D) To analyse trends in website traffic over days.

5. Which of the following network topology uses a central cable (backbone) to connect all devices ? **1**

(A) Mesh

(B) Star

(C) Tree

(D) Bus

6. State whether the following statement is True or False :

In SQL, an aggregate function returns multiple values for each column on which it is applied. **1**

7. Rohini has developed a new kind of water purifier that uses a unique filtration method. Which type of Intellectual Property Right should she apply to protect her invention ? **1**

(A) Trademark

(B) Copyright

(C) Patent

(D) Both Copyright & Trademark

8. Aditya is working on a **DataFrame** named **df.** He has written the statement : **1**

```
print(df.loc['S2'])
```

What will the above statement do ?

(A) Display the data of the row having label **'S2'**.

(B) Display the columns of the **DataFrame**.

(C) Display the data type of the column having label **'S2'**.

(D) Display the index numbers of the **DataFrame**.

9. निम्नलिखित SQL कमांड का परिणाम क्या होगा ? 1

```
SELECT LENGTH ('Data Base');
```

(**नोट** : `Data` और `Base` शब्दों के बीच एक स्पेस है ।)

(A) 7 (B) 8

(C) 9 (D) Error (त्रुटि)

10. निम्न में से कौन स्टेटिक (static) वेब पेज की एक मुख्य विशेषता है ? 1

(A) इसकी कन्टेंट (content) बहुत जल्दी-जल्दी बदलती रहती है ।

(B) यह अलग-अलग उपयोगकर्ताओं को अलग-अलग कन्टेंट (content) दिखाता है ।

(C) यह डायनामिक (dynamic) वेब पेज की तुलना में धीरे लोड (load) होता है ।

(D) यह तब तक वही कन्टेंट (content) दिखाता है जब तक कि कोड (code) को मैन्युअली (manually) न बदला जाए ।

11. निम्नलिखित में से कौन सा DML का सही विस्तृत रूप है ? 1

(A) Device Management Language

(B) Device Manipulation Language

(C) Data Management Language

(D) Data Manipulation Language

12. CSV का विस्तृत रूप है _____ Separated Values । 1

(A) Colon (B) CTRL

(C) Comma (D) Caret

13. निम्नलिखित में से क्या अच्छे नेट शिष्टाचार (net etiquette) को बनाए रखने का एक उदाहरण है ? 1

(A) अजनबियों को स्पैम ईमेल या मैसेज भेजना ।

(B) ऑनलाइन चर्चाओं में दूसरों की राय को अनदेखा करना ।

(C) ओनर (owner) की अनुमति के बिना कॉपीराइट सामग्री का उपयोग न करना ।

(D) किसी की निजी जानकारी सार्वजनिक रूप से साझा करना ।

9. What will be the result of the following SQL command ? **1**

```
SELECT LENGTH ('Data Base');
```

(Note : There is single space between the words **Data** and **Base**.)

(A) 7 (B) 8

(C) 9 (D) Error

10. Which of the following is a key feature of a Static Web Page ? **1**

(A) Its content updates very frequently.

(B) It displays different content to different users.

(C) It loads slower than a Dynamic Web Page.

(D) It shows the same content unless the code is manually updated.

11. Which of the following is the correct expanded form of DML ? **1**

(A) Device Management Language

(B) Device Manipulation Language

(C) Data Management Language

(D) Data Manipulation Language

12. CSV stands for _____ Separated Values. **1**

(A) Colon

(B) CTRL

(C) Comma

(D) Caret

13. Which of the following is an example of maintaining good net etiquette ? **1**

(A) Spamming emails or messages to strangers.

(B) Ignoring other's opinions in online discussions.

(C) Not using copyrighted materials without permission of the owner.

(D) Sharing someone's private information publicly.

14. एक डिक्शनरी (dictionary) से Pandas Series बनाने के संदर्भ में, निम्नलिखित में से कौन सा कथन सही है ? **1**

(A) डिक्शनरी (dictionary) की वैल्यूज (values) Series के इंडेक्स बन जाते हैं ।

(B) डिक्शनरी (dictionary) की कीज (keys) Series की वैल्यूज (values) बन जाते हैं ।

(C) डिक्शनरी (dictionary) की कीज (keys) Series के इंडेक्स बन जाते हैं ।

(D) डिक्शनरी (dictionary) की कीज (keys) को अनदेखा करते हुए, Series में 0 से शुरू होने वाले डिफ़ॉल्ट इंटीजर (default integer) इंडेक्स होंगे ।

15. Pandas में, जब पोज़िशनल इंडेक्स **start** और **end** का उपयोग करके **ser1[start : end]** की सहायता से Series **ser1** का एक हिस्सा निकाला (extract किया) जाता है, तो निम्नलिखित में से कौन सा कथन सत्य है ? **1**

(A) अंतिम इंडेक्स (**end** index) का एलिमेंट आउटपुट में शामिल होता है ।

(B) अंतिम इंडेक्स (**end** index) का एलिमेंट आउटपुट से बाहर होगा ।

(C) शुरुआती और अंतिम दोनों इंडेक्स (**start** and **end** indices) के एलिमेंट आउटपुट से बाहर होंगे ।

(D) शुरुआती इंडेक्स (**start** index) का एलिमेंट आउटपुट से बाहर होगा ।

16. निशा, किसी दूसरे देश में, अपने दोस्त को इंटरनेट पर वॉयस कॉल (voice call) करने के लिए एक एंड्रॉइड ऐप का उपयोग कर रही है । इस मामले में कौन सा प्रोटोकॉल उपयोग किया जा रहा है ? **1**

(A) चैट (Chat)

(B) वीओआईपी (VoIP)

(C) ईमेल (Email)

(D) टीवी (TV)

17. बताएँ कि निम्नलिखित कथन सत्य है या असत्य : **1**

यदि **string2, string1** में एक सबस्ट्रिंग (substring) के रूप में मौजूद नहीं है तो SQL में, **INSTR** (**string1, string2**) फ़ंक्शन 0 रिटर्न (return) करता है ।



14. In the context of creating a Pandas Series from a dictionary, which of the following statement is correct ? **1**

(A) The values of the dictionary become the indices of the Series.

(B) The keys of the dictionary become the values of the Series.

(C) The keys of the dictionary become the indices of the Series.

(D) The Series will have default integer indices starting from 0, ignoring the dictionary keys.

15. In Pandas, when extracting a portion of a Series **`ser1`** using **`ser1[start:end]`** with positional indices **`start`** and **`end`**, which of the following statements is true ? **1**

(A) The element at the **`end`** index is included in the output.

(B) The element at the **`end`** index is excluded from the output.

(C) The elements at both the **`start`** and **`end`** indices are excluded from the output.

(D) The element at the **`start`** index is excluded from the output.

16. Nisha is using an Android app to make a voice call over the internet to her friend in another country. Which protocol is being used in this case ? **1**

(A) Chat

(B) VoIP

(C) Email

(D) TV

17. State whether the following statement is True or False : **1**

The **`INSTR(string1, string2)`** function in SQL returns 0 if **`string2`** is not present as a substring in **`string1`**.

18. एक Pandas **DataFrame** में, एक कॉलम (column) को हटाने (delete करने) के लिए **axis** का कौन सा मान (value) उपयोग किया जाएगा ? **1**

(A) **axis = -1** (B) **axis = 0**

(C) **axis = 1** (D) **axis = 2**

19. निम्नलिखित SQL कमांड का परिणाम क्या होगा ? **1**

```
SELECT ROUND (15.678, 2);
```

(A) **15.00** (B) **15.67**

(C) **15.68** (D) **16.00**

प्रश्न–**20** और प्रश्न–**21** अभिकथन (Assertion) (A) और कारण (Reason) (R) प्रकार के प्रश्न हैं । सही विकल्प चुनें :

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

(B) (A) और (R) दोनों सत्य हैं, परंतु (R), (A) की सही व्याख्या नहीं करता है ।

(C) (A) सत्य है, परंतु (R) असत्य है ।

(D) (A) असत्य है, परंतु (R) सत्य है ।

20. **अभिकथन (A)** : Pandas DataFrame कई कॉलम (columns) में कई डेटा टाइप (data type) के मानों (values) को स्टोर कर सकता है । **1**

कारण (R) : DataFrames 2D arrays के उपयोग से कार्यान्वित (implement) किए जाते हैं, जो केवल संख्यात्मक मानों की अनुमति देता है (allow करता है) ।

21. **अभिकथन (A)** : यदि **name** कॉलम में कुछ **NULL** मान (values) हैं, तो SQL क्वेरी **SELECT COUNT(name) FROM students**; का आउटपुट **SELECT COUNT(*) FROM students;** के आउटपुट से भिन्न होगा : **1**

कारण (R) : **COUNT(column_name)** उस column में **NON NULL** मानों (values) की गिनती (count) रिटर्न (return) करता है, जबकि **COUNT(*)** तालिका (table) में रिकॉर्ड (records) की संख्या रिटर्न (return) करता है ।



18. In a Pandas **DataFrame**, which value for **axis** will be used to delete a column ? **1**

(A) **axis = -1**

(B) **axis = 0**

(C) **axis = 1**

(D) **axis = 2**

19. What will be the result of the following SQL command ? **1**

```
SELECT ROUND(15.678, 2);
```

(A) **15.00**

(B) **15.67**

(C) **15.68**

(D) **16.00**

Q. **20** and Q. **21** are Assertion (A) and Reason (R) Type questions. Choose the correct option as :

(A) Both (A) and (R) are True, and (R) correctly explains (A).

(B) Both (A) and (R) are True, but (R) does not correctly explain (A).

(C) (A) is True, but (R) is False.

(D) (A) is False, but (R) is True.

20. **Assertion (A)** : Pandas DataFrame can store values of multiple data types in multiple Columns. **1**

Reason (R) : DataFrames are implemented using 2D arrays, which allows only numeric values.

21. **Assertion (A)** : The output of the SQL query **SELECT COUNT (name) FROM students**; will differ from the output of **SELECT COUNT (*) FROM students;** if there are some **NULL** values in the **name** column. **1**

Reason (R) : **COUNT(column_name)** returns the count of **NON NULL** values in that column, whereas **COUNT(*)** returns the number of records in the table.

खण्ड – ख

22. (a) पायथन (Python) में Pandas लाइब्रेरी की कोई भी दो विशेषताएँ (characteristics) सूचीबद्ध करें । **2**

अथवा

(b) DataFrame के संदर्भ में बूलियन इंडेक्सिंग (Boolean Indexing) के उद्देश्य को संक्षेप में बताएँ । अपने उत्तर को एक उपयुक्त उदाहरण के साथ समझाएँ ।

23. अंजना ने ऑनलाइन विभिन्न रचनाकारों से प्राप्त निःशुल्क ड़िजाइन तत्वों (free design elements) का उपयोग करके एक वेबसाइट बनाई थी । इसके बाद उसने वेबसाइट को सार्वजनिक पहुँच (public access) के लिए प्रकाशित (publish) कर दिया लेकिन उपयोग किए गए डिज़ाइन तत्त्वों के स्रोत (source) का उल्लेख नहीं किया । **2**

(i) इस स्थिति में आईपीआर (IPR) के एक संभावित उल्लंघन की पहचान करें ।

(ii) किन्हीं दो लाइसेंसिंग मॉडल (licensing models) के नाम बताएँ जो शर्तों के साथ डिजिटल रचनात्मक कार्य (digital creative work) के कानूनी पुनःउपयोग (legal reuse) की अनुमति देते हैं ।

24. आरडीबीएमएस (RDBMS) के संदर्भ में निम्नलिखित शब्दों को परिभाषित करें : **2**

a. डोमेन (Domain)

b. टपल (Tuple)

25. (a) एक नेटवर्क में निम्नलिखित नेटवर्क डिवाइसों की भूमिका समझाएँ : **2**

(I) मॉडेम (Modem)

(II) गेटवे (Gateway)

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(b) एक वेब ब्राउज़र में ऐड-ऑन्स (add-ons) और प्लग-इन्स (plug-ins) के बीच अंतर स्पष्ट करें ।

26. निम्नलिखित कार्यों को करने के लिए SQL क्वेरी (SQL queries) लिखें : **2**

(I) दिनांक `'2026-01-01'` का महीना (संख्यात्मक रूप में) प्रदर्शित करें ।

(II) दिनांक `'2026-01-01'` का केवल वर्ष भाग (year part) प्रदर्शित करें ।



SECTION – B

22. (a) List any two characteristics of Pandas library in Python. **2**

OR

(b) Briefly explain the purpose of Boolean Indexing with respect to DataFrames. Support your answer with a suitable example.

23. Anjana had created a website using free design elements sourced from different creators online. She then published the site for public access but did not mention the source of the design elements used. **2**

(i) Identify one possible violation of IPR in this situation,

(ii) Name any two licensing models that allow legal reuse of digital creative work with conditions.

24. Define the following terms with respect to RDBMS : **2**

a. Domain

b. Tuple

25. (a) Explain the role of the following network devices in a network : **2**

(I) Modem

(II) Gateway

OR

(b) Differentiate between add-ons and plug-ins in a web browser.

26. Write SQL queries to perform the following : **2**

(I) Display the month (in numeric form) of the date `'2026-01-01'`.

(II) Display only the year part from the date `'2026-01-01'`.

27. (a) डेटा सुरक्षा (data protection) क्या है ? **2**

(b) साइबर अपराध (cyber crime) के जोखिम से बचने के लिए कोई दो एहतियाती उपाय / सावधानियाँ बताएँ ।

28. (a) निहारिका तीन एलिमेंट **'a', 'b',** और **'c'** का उपयोग करके एक **NumPy array** से एक Pandas **Series** बनाना चाहती है, और कस्टम इंडेक्स **'first', 'second'** और **'third'** असाइन (assign) करना चाहती है । नीचे दिए गए कोड को पूरा करने में उसकी मदद करें । **2**

```
import pandas as pd
import ______ as np
arr = np._____ (['a' , 'b' , 'c'])
s = pd._____(arr,_____=['first','second','third'])
print(s)
```

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(b) निम्नलिखित कोड का आउटपुट लिखें :

```
import pandas as pd
s1 = pd.Series ([1, 2, 3], index = ['a','b','c'])
s2 = pd.Series ([4, 5, 6], index = ['b' , 'c', 'd'])
print (s1 + S2)
```

खण्ड – ग

29. मनदीप को एक ईमेल मिला जिसमें बताया गया कि उसने एक लॉटरी जीती है, हालाँकि उसने कभी किसी ऐसी प्रतियोगिता में भाग नहीं लिया था । उसे राशि को प्रोसेस (process) करने के लिए बैंक विवरण प्रदान करने को कहा गया । मनदीप ने आवश्यक विवरण प्रदान कर दिए लेकिन अगले कुछ ही मिनटों में उसके खाते से एक लाख रुपये डेबिट हो गए । **3**

दी गयी केस स्टडी (case study) के आधार पर निम्नलिखित प्रश्नों के उत्तर दें :

(i) मनदीप किस प्रकार के साइबर अपराध (cyber crime) का शिकार हुआ है ?

(ii) ईमेल के अलावा, इस प्रकार के साइबर अपराध को अंजाम देने के लिए आजकल ईमेल के अलावा कौन से दो सामान्य तरीकों का उपयोग किया जा रहा है ?

(iii) भारत में इंटरनेट उपयोगकर्ताओं के अधिकारों की रक्षा करने वाले किसी एक कानून का नाम बताइए ।

27. (a) What is data protection ? **2**

(b) Mention any two precautionary measures one can take to avoid the risk of cybercrime.

28. (a) Niharika wants to create a Pandas **Series** using a **NumPy array** with three elements **'a','b',** and **'c',** and assign custom indexes **'first','second'** and **'third'**. Help her complete the code below. **2**

```
import pandas as pd
import ______ as np
arr = np._____ (['a' , 'b' , 'c'])
s = pd._____(arr,_____=['first','second','third'])
print(s)
```

OR

(b) Write the output of the following code :

```
import pandas as pd
s1 = pd.Series ([1, 2, 3], index = ['a','b','c'])
s2 = pd.Series ([4, 5, 6], index = ['b','c','d'])
print(s1 + S2)
```

SECTION – C

29. Mandeep received an email stating he won a lottery though he had never participated in any such event. He was asked to provide bank details to process the amount. Mandeep provided the required details but within next few minutes ₹ One lakh was debited from his account. **3**

Answer the following questions based on the given case study :

(i) Mandeep is the victim of which type of cybercrime ?

(ii) Other than email, mention any two common methods through which this type of cybercrime is being committed these days.

(iii) Name one law that safeguards the rights of Internet users in India.

30. (a) नीचे दिखाए गए Pandas Series को बनाने और प्रदर्शित करने के लिए एक पायथन प्रोग्राम (Python program) लिखें : 3

```
July    31
Aug     31
Sept    30
Oct     31
```

इंडेक्स लेबल (Index labels) महीनों के नाम हैं – **July, Aug, Sept, Oct**

संबंधित स्केलर मान (scalar values) इन महीनों में दिनों की संख्या हैं – **31, 31, 30, 31**

अथवा

(b) **customer.csv** नामक एक CSV फ़ाइल में ग्राहकों का रिकॉर्ड है । फ़ाइल की पहली पंक्ति हेडर (header) को दर्शाती है । फ़ाइल से sample डेटा नीचे दिखाया गया है :

```
Name, Age, City
Rudra,17,Kolkata
Divya,19,Dehradun
Nabeel,22,Lucknow
```

CSV फ़ाइल से डेटा को **DF** नामक एक Pandas **DataFrame** में इम्पोर्ट (import) करने और अंतिम दो पंक्तियों (rows) को प्रदर्शित करने के लिए एक पायथन प्रोग्राम (Python Program) लिखें ।

31. (i) निम्नलिखित विनिर्देशों के अनुसार, **PRODUCTS** नामक एक तालिका (table) बनाने के लिए एक SQL कथन (statement) लिखें : 3

Column Name	Data Type	Key
PID	Integer	Primary Key
PName	Varchar of size 30	
PCat	Char of size 15	
Price	Decimal Number	

(ii) **PRODUCTS** तालिका में, उन सभी वस्तुओं की कीमत **100** से बढ़ाने के लिए एक SQL क्वेरी (query) लिखिए, जिनकी उत्पाद श्रेणी (product category) **Grocery** है ।



30. (a) Write a Python program to create and display a Pandas Series as shown below : **3**

```
July    31
Aug     31
Sept    30
Oct     31
```

The index labels are the names of the months – **July, Aug, Sept, Oct**.

The corresponding scalar values are the number of days in these respective months – **31, 31, 30, 31.**

OR

(b) A CSV file named **customer.csv** contains records of customers. The first row of the file represents the header. Sample data from the file is shown below :

```
Name, Age, City
Rudra,17,Kolkata
Divya,19,Dehradun
Nabeel,22,Lucknow
```

Write a Python program to import data from the CSV file into a Pandas **DataFrame** named **DF** and display the last two rows.

31. (i) Write an SQL statement to create a table named **PRODUCTS** with the following specifications : **3**

Column Name	Data Type	Key
PID	Integer	Primary Key
PName	Varchar of size 30	
PCat	Char of size 15	
Price	Decimal Number	

(ii) Write an SQL query to increase the price of all items by **100**, whose product category is **Grocery**, in the table **PRODUCTS**.

32. (a) निम्नलिखित तालिकाओं पर विचार करें : 3

Table 1:TEACHER, जो शिक्षक की आईडी **(TID)**, शिक्षक का नाम **(TName)**, अनुभव **(Experience)**, और उनके शहर **(City)** को store करती है।

TID	TName	Experience	City
1	Kartik	5	Bhopal
2	Shahnaz	6	Nagpur
3	Rajendra	7	Delhi
4	Tanvi	4	Bhopal
5	Alam	9	Delhi

Table 2:SUBJECT, जो विषय की आईडी (**SID**), विषय का नाम (**SubName**) और उस विषय को पढ़ाने वाले शिक्षक की आईडी (**TID**) को store करती है।

SID	SubName	TID
101	Physics	1
102	Chemistry	2
103	Mathematics	3
104	Informatics Practices	4
105	Computer Science	5

निम्नलिखित के लिए उपयुक्त SQL क्वेरी (query) लिखें :

(I) उस विषय के रिकॉर्ड को डिलीट (delete) करें जिसकी **TID** 4 के बराबर है।

(II) उन शिक्षकों के नाम प्रदर्शित करें जिनके पास **5** वर्ष से अधिक का अनुभव है और जो **Nagpur** में रहते हैं।

(III) विषय के नामों को उनके शिक्षक के नामों के साथ प्रदर्शित करें।

अथवा

32. (a) Consider the following tables : **3**

Table 1 : **TEACHER**, which stores Teacher ID **(TID)**, Teacher Name **(TName)**, Experience **(Experience)** and City **(City)** that they live in.

TID	TName	Experience	City
1	Kartik	5	Bhopal
2	Shahnaz	6	Nagpur
3	Rajendra	7	Delhi
4	Tanvi	4	Bhopal
5	Alam	9	Delhi

Table 2 : **SUBJECT**, which stores Subject ID (**SID**), Subject Name (**SubName**) and **ID** of the teacher(**TID**) teaching that Subject.

SID	SubName	TID
101	Physics	1
102	Chemistry	2
103	Mathematics	3
104	Informatics Practices	4
105	Computer Science	5

Write appropriate SQL query for the following :

(I) Delete the record of the subject whose **TID** is equal to **4**.

(II) Display the names of teachers who have more than **5** years of experience and who stay in **Nagpur**.

(III) Display subject names along with their teacher names.

OR

(b) नीचे दी गई **LIBRARY** तालिका पर विचार करें ।

BookId	Title	Genre	Price
101	Python Basics	Technology	278
201	The Silent Patient	Fiction	340
301	Data Science	Technology	291
401	Oceans	Marine Life	NULL

(I) किस/किन Attribute(s) को कैंडीडेट की (Candidate key) माना जा सकता है ? अपने उत्तर का कारण बताएँ ।

(II) निम्नलिखित मानों के साथ एक नया रिकॉर्ड इन्सर्ट (insert) करने के लिए एक SQL क्वेरी (query) लिखें :

```
BookId : 501
Title : AI for ALL
Genre : Technology
Price : 589
```

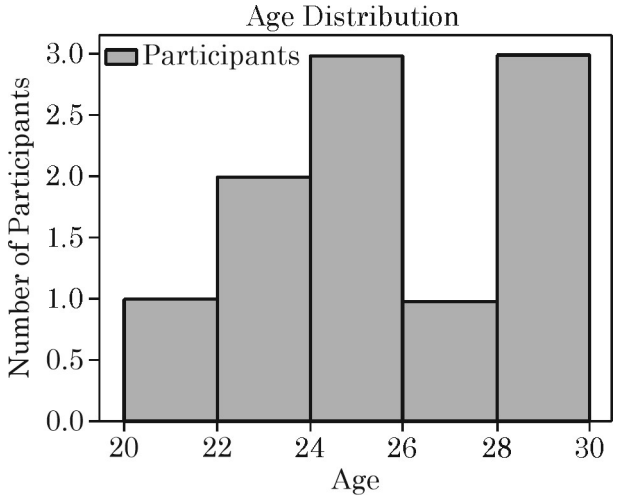
(III) तालिका में एक नया कॉलम **Author** जो Character data type का है और जिसका माप (size) 20 है, जोड़ने के लिए एक SQL क्वेरी लिखें ।

खण्ड – घ

33. सुश्री अंजलि, एक डेटा विश्लेषक (data analyst), को एक कार्यशाला (workshop) में दस प्रतिभागियों के आयु वितरण (age distribution) को प्रदर्शित करने के लिए एक हिस्टोग्राम (histogram) बनाने का कार्य दिया गया है । उसे उनकी आयु की निम्नलिखित लिस्ट (list) प्रदान की गई है : 4

```
Ages = [22, 25, 24, 28, 30, 24, 29, 27, 21, 23]
```

उसने इसके लिए एक पायथन प्रोग्राम (Python Program) लिखना शुरू कर दिया है । हालाँकि, कोड अधूरा है । रिक्त हिस्सों (missing parts) को भरकर प्रोग्राम को पूरा करने में उसकी मदद करें, ताकि नीचे दिया गया हिस्टोग्राम प्रदर्शित (display) हो सके ।



(b) Consider the table **LIBRARY** as given below.

BookId	Title	Genre	Price
101	Python Basics	Technology	278
201	The Silent Patient	Fiction	340
301	Data Science	Technology	291
401	Oceans	Marine Life	NULL

(I) Which attribute(s) can be considered as the Candidate keys(s) ? Justify your answer.

(II) Write an SQL query to insert a new record with the following values :

BookId : 501

Title : AI for ALL

Genre : Technology

Price : 589

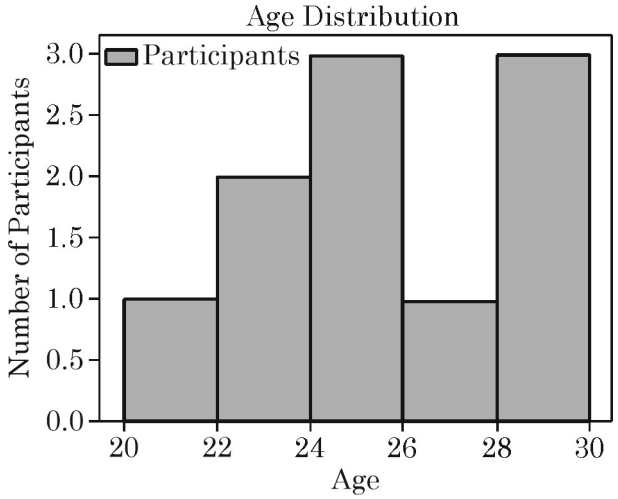
(III) Write an SQL query to add a new column **Author** that is a character data type of size 20.

SECTION – D

33. Ms. Anjali, a data analyst, has been assigned the task of creating a histogram to display the age distribution of ten participants in a workshop. She has been provided with the following list of their ages : **4**

```
Ages = [22, 25, 24, 28, 30, 24, 29, 27, 21, 23]
```

She has started writing a Python program for it. However, the code is incomplete. Help her complete the program by filling in the missing parts, so that the histogram as shown below is displayed.



```
import matplotlib.pyplot as plt
Ages = [22, 25, 24, 28, 30, 24, 29, 27, 21, 23]
binsize=[20,22,24,26,28,30]
plt._____(Ages, bins=binsize, edgecolor = 'black',
label = 'Participants')   # Statement-1
_____.xlabel('Age')       # Statement-2
plt.ylabel('Number of Participants')
plt.title("Age Distribution")
plt._____                 # Statement-3
_________                 # Statement-4
```

I. **Statement-1** के रूप में चिह्नत पंक्ति में रिक्त स्थान के लिए उपयुक्त कोड लिखें जो हिस्टोग्राम को प्लॉट करता है ।

II. x अक्ष (x axis) पर लेबल (**label**) सेट करने के लिए आवश्यक मॉड्यूल (module) के उपयोग हेतु सही अलियास (alias) को **Statement-2** के रिक्त स्थान में भरें ।

III. ग्राफ पर लेजेंड (legend) प्रदर्शित करने के लिए सही पायथन कोड (Python Code) **Statement-3** के रिक्त स्थान में भरें ।

IV. ग्राफ प्रदर्शित करने के लिए उपयुक्त पायथन कोड (Python Code) **Statement-4** के रिक्त स्थान में भरें ।

34. (a) शालिनी, जो होटल उद्योग में डेटाबेस डिज़ाइनर (database designer) के रूप में काम करती है, ने मेहमानों (guests) के विवरण को ट्रैक करने के लिए **Guest** नामक एक तालिका (table) बनाई है, जैसा कि नीचे दिखाया गया है : **4**

Table : Guest

GuestID	GuestName	RoomNumber	CheckInDate	Charges
G101	Harish	101	2025-04-03	3000
G102	Sunita	101	2025-04-03	3000
G103	Ramesh	102	2025-05-04	5000
G104	Bhumika	103	2025-06-02	3500

निम्नलिखित के लिए उपयुक्त SQL क्वेरी लिखें :

I. अतिथि के नाम के अंतिम 3 अक्षरों (characters) को अपर केस (upper case) में प्रदर्शित करें ।

II. अतिथि का नाम Check-in तिथि के दिन के नाम के साथ प्रदर्शित करें ।

III. Charges को **1000** से विभाजित करने पर शेषफल (remainder) प्रदर्शित करें ।

IV. प्रत्येक अतिथि के नाम के तीन अक्षरों (characters) को, जो दूसरे अक्षर (character) से शुरू हों, निकाल (extract) कर प्रदर्शित करें ।

अथवा



```
import matplotlib.pyplot as plt
Ages = [22, 25, 24, 28, 30, 24, 29, 27, 21, 23]
binsize=[20,22,24,26,28,30]
plt._______(Ages, bins=binsize, edgecolor = 'black',
label = 'Participants')  # Statement-1
______.xlabel('Age')     # Statement-2
plt.ylabel('Number of Participants')
plt.title("Age Distribution")
plt._______                    # Statement-3
_________                      # Statement-4
```

I. Write the suitable code for the blank space in the line marked as **Statement-1** which plots the histogram.

II. Fill in the blank in **Statement-2** to use the correct alias of the required module to set the label on x axis.

III. Fill in the blank in **Statement-3** with the correct Python code to display the legend on the graph.

IV. Fill in the blank in **Statetment-4** with the appropriate Python code to display the graph.

34. (a) Shalini, who works as a database designer in the hotel industry, has created a table named **Guest** to keep track of guest details as shown below : **4**

Table : Guest

GuestID	GuestName	RoomNumber	CheckInDate	Charges
G101	Harish	101	2025-04-03	3000
G102	Sunita	101	2025-04-03	3000
G103	Ramesh	102	2025-05-04	5000
G104	Bhumika	103	2025-06-02	3500

Write a suitable SQL query for the following :

I. Display last 3 characters of guest name in upper case.

II. Display the name of the guest along with the day name of check-in date.

III. Display the remainder when charges are divided by **1000**.

IV. Extract and display three characters, starting from the second character, of each guest name.

OR

(b) निम्नलिखित तालिका (table) पर विचार करें और निम्नलिखित SQL क्वेरीज़ का आउटपुट लिखें :

Table : ORDERS

ORDERID	CUSTOMERNAME	TOTALAMOUNT	DISCOUNT	ORDERDATE
101	Hemant	5000	10	2024-03-01
102	Neha	7000	15	NULL
103	Keshav	3000	5	2024-01-20
104	Sandhya	4500	NULL	2023-12-25

निम्नलिखित SQL क्वेरीज़ का आउटपुट लिखें :

I. `SELECT CUSTOMERNAME FROM ORDERS WHERE DISCOUNT IS NOT NULL;`

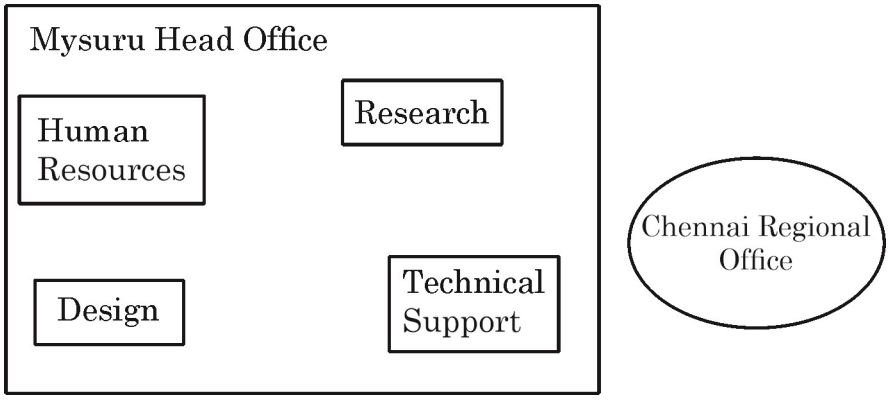
II. `SELECT CUSTOMERNAME, DISCOUNT FROM ORDERS WHERE DISCOUNT BETWEEN 5 AND 10;`

III. `SELECT MONTHNAME(ORDERDATE) FROM ORDERS WHERE ORDERDATE IS NOT NULL;`

IV. `SELECT ORDERID, DAY(ORDERDATE) FROM ORDERS;`

खण्ड – ङ

35. My Solutions Pvt. Ltd. एक प्रतिष्ठित सॉफ्टवेयर डेवलपमेंट (software development) और आइटी कंसल्टिंग फर्म (IT consulting firm) है । कंपनी का मुख्यालय (head office) Mysuru में स्थित है और Chennai में इसका एक क्षेत्रीय कार्यालय (regional office) है । Mysuru कार्यालय में चार विभाग शामिल है : मानव संसाधन (Human Resources), अनुसंधान (Research), डिज़ाइन (Design) और तकनीकी सहायता (Technical Support) । **5**



(b) Consider the following table and write the output of the following SQL Queries.

Table : ORDERS

ORDERID	CUSTOMERNAME	TOTALAMOUNT	DISCOUNT	ORDERDATE
101	Hemant	5000	10	2024-03-01
102	Neha	7000	15	NULL
103	Keshav	3000	5	2024-01-20
104	Sandhya	4500	NULL	2023-12-25

Write the output of the following SQL Queries :

I. `SELECT CUSTOMERNAME FROM ORDERS WHERE DISCOUNT IS NOT NULL;`

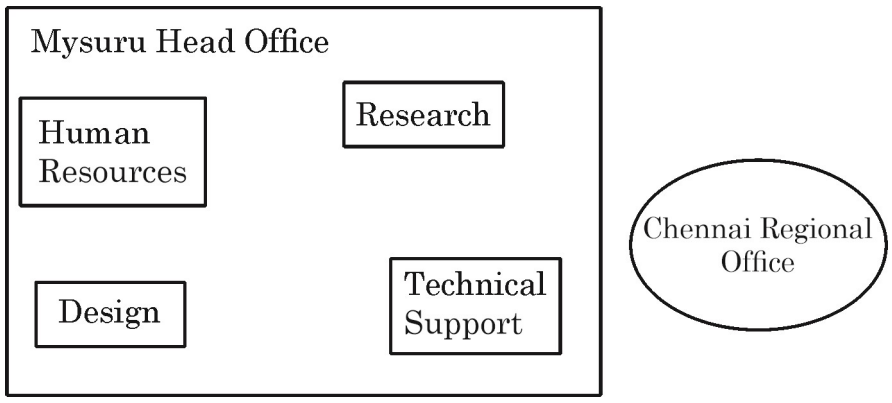
II. `SELECT CUSTOMERNAME, DISCOUNT FROM ORDERS WHERE DISCOUNT BETWEEN 5 AND 10;`

III. `SELECT MONTHNAME(ORDERDATE) FROM ORDERS WHERE ORDERDATE IS NOT NULL;`

IV. `SELECT ORDERID, DAY(ORDERDATE) FROM ORDERS;`

SECTION – E

35. My Solutions Pvt. Ltd. is a reputed software development and IT consulting firm. The company's head office is located in Mysuru, and it has a regional office in Chennai. The Mysuru office comprises four departments: Human Resources, Research, Design and Technical Support. **5**



इन विभागों के बीच की दूरियाँ और Mysuru तथा Chennai के बीच की दूरी इस प्रकार हैं :

Human Resources से **Research**	**55 metres**
Human Resources से **Design**	**75 metres**
Human Resources से **Technical Support**	**140 metres**
Research से **Design**	**40 metres**
Research से **Technical Support**	**80 metres**
Design से **Technical Support**	**60 metres**
Mysuru Office से **Chennai Office**	**350 kilometres**

प्रत्येक विभाग/कार्यालय में कंप्यूटर (computer) की संख्या इस प्रकार है :

Human Resources	**30**
Research	**80**
Design	**50**
Technical Support	**20**
Chennai Office	**35**

एक नेटवर्क इंजीनियर (network engineer) के रूप में, आपको I से V तक सूचीबद्ध विभिन्न प्रश्नों के लिए समाधान प्रस्तावित करने हैं ।

I. Mysuru कार्यालय में मुख्य सर्वर (main server) स्थापित (install) करने के लिए सबसे उपयुक्त विभाग की पहचान करें । एक मान्य कारण के साथ अपने उत्तर का औचित्य सिद्ध करें ।

II. Mysuru कार्यालय में विभागों के बीच वायर्ड नेटवर्क कनेक्टिविटी (wired network connectivity) स्थापित (establish) करने के लिए एक केबल लेआउट डिज़ाइन (cable layout design) बनाएँ ।

III. Research department के अंदर कई कंप्यूटरों को जोड़ने के लिए उपयुक्त नेटवर्क डिवाइस (network device) सुझाएँ ।

IV. Mysuru और Chennai कार्यालय को जोड़ने के लिए किस प्रकार का नेटवर्क (LAN, MAN, WAN) सबसे उपयुक्त होगा ?

V. यदि लंबी दूरी के कारण Human Resources और Technical Support विभागों के बीच डेटा प्रेषित (transmit) करते समय सिग्नल की शक्ति (signal strength) कमजोर हो जाती है, तो किस डिवाइस का उपयोग किया जाना चाहिए ?

The distances between these departments and between Mysuru and Chennai are as follows :

Human Resources to Research	**55 metres**
Human Resources to Design	**75 metres**
Human Resources to Technical Support	**140 metres**
Research to Design	**40 metres**
Research to Technical Support	**80 metres**
Design to Technical Support	**60 metres**
Mysuru Office to Chennai Office	**350 kilometres**

The number of computers in each department/office is as follows :

Human Resources	**30**
Research	**80**
Design	**50**
Technical Support	**20**
Chennai Office	**35**

As a network engineer, you have to propose solutions for various queries listed from I to V.

I. Identify the most suitable department to install the main server in the Mysuru office. Justify your answer with a valid reason.

II. Create a cable layout design to establish Wired network connectivity between the departments in the Mysuru Office.

III. Suggest the appropriate network device to connect multiple computers within the Research department.

IV. What type of network (LAN, MAN, WAN) would best connect the Mysuru and Chennai office ?

V. Which device should be used if the signal strength weakens while transmitting data between the Human Resources and Technical Support departments due to the long distance between them ?

36. नीचे दिखाए गए **scholarship** डेटाफ्रेम (DataFrame) पर विचार करें : **3 + 1 + 1 = 5**

	Name	Course	Amount
0	Ananya	B.Sc.	62000
1	Karan	B.Tech	67000
2	Simran	MCA	64000
3	Rahul	BCA	70000
4	Priya	BA	69000

निम्नलिखित प्रश्नों के उत्तर दें :

I. डिक्शनरी ऑफ सीरीज (Dictionary of Series) विधि का उपयोग करके दिए गए DataFrame को बनाने और प्रदर्शित करने के लिए पायथन कोड (Python Code) लिखें ।

II. पंक्ति इंडेक्स (row index) का नाम बदलकर `['a', 'b', 'c', 'd', 'e']` करें ।

III. दिए गए DataFrame की अंतिम पंक्ति (row) को delete करने के लिए पायथन स्टेटमेंट (Python statement) लिखें ।

37. (a) निम्नलिखित के लिए उपयुक्त SQL क्वेरी लिखें : **5**

I. दिनांक/समय एक्सप्रेशन (date/time expression) `'2026-01-01 10:10:10'` से केवल दिनांक भाग (date part) प्रदर्शित करने के लिए ।

II. **Customer** तालिका में **Cust_Name** कॉलम से सभी ग्राहकों के नाम को लोअरकेस (lowercase) में बदलने के लिए ।

III. **Location** तालिका में **City_Name** कॉलम से पहले 4 अक्षरों (characters) को निकालने (extract करने) के लिए ।

IV. **EVENT** तालिका में **CITY** कॉलम से अग्रणी रिक्त स्थान (leading spaces) हटाने के बाद शहर का नाम प्रदर्शित करने के लिए ।

V. **Employees** तालिका में **Salary** कॉलम से औसत वेतन (average salary) ज्ञात करने के लिए ।

अथवा



36. Consider the DataFrame **Scholarship** shown below : **3 + 1 + 1 = 5**

	Name	Course	Amount
0	Ananya	B.Sc.	62000
1	Karan	B.Tech	67000
2	Simran	MCA	64000
3	Rahul	BCA	70000
4	Priya	BA	69000

Answer the following questions :

I. Write Python code to create and display the given DataFrame using the Dictionary of Series method.

II. Rename row indexes to **['a', 'b', 'c', 'd', 'e']**

III. Write Python statement to remove the last row of the given DataFrame

37. (a) Write suitable SQL query for the following : **5**

I. To display only the date part from the date/time expression '2026-01-01 10:10:10'

II. To convert all customer names from the **Cust_Name** column to lowercase in the **Customer** table.

III. To extract the first 4 characters from the **City_Name** column in **Location** table.

IV. To display the name of the city from the **CITY** column in **EVENT** table, after removing leading spaces.

V. To find the average salary from **Salary** column in **Employees** table.

OR

(b) निम्नलिखित के लिए उपयुक्त SQL क्वेरी लिखें :

I. 17^2 का मान प्रदर्शित करने के लिए ।

II. **Employee** तालिका के **Hire_Date** कॉलम में तिथियों का दिन भाग (day part) प्रदर्शित करने के लिए ।

III. **Bill** तालिका में **Biil_Amount** कॉलम का अधिकतम मान (maximum value) प्रदर्शित करने के लिए ।

IV. **Branch** तालिका में **Location** कॉलम से प्रारंभिक (leading) और अंतिम (trailing) स्पेस (space) हटाने के लिए ।

V. **Employees** तालिका में **tot_sal** कॉलम से कुल वेतन (total salary) प्रदर्शित करने के लिए ।

(b) Write suitable SQL query for the following :

I. To display the value of 17^2 .

II. To display the day part of the dates in the **`Hire_Date`** column of the **`Employee`** table.

III. To display the maximum value of the **`Bill_Amount`** column in the **`Bill`** table.

IV. To remove leading and trailing spaces from the **`Location`** column in the **`Branch`** table.

V. To display total salary from **`tot_sal`** column in **`Employees`** table.

———————

Marking Scheme (English Version)

Strictly Confidential

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Senior Secondary School Examination 2026

SUBJECT NAME: INFORMATICS PRACTICES SUBJECT CODE: 065 (Set 4 Q.P. CODE 90)

General Instructions:	
1	The CBSE has decided to introduce On Screen Marking (OSM) for the evaluation of Class XII answer Book with the 2026 Examination.
2	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.
3	"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 the 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."
4	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-XII, while evaluating two competency-based questions, please try to understand the given answer and even if the reply is not from the marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.**
5	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.
6	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.
7	Evaluators will mark (✓) wherever the answer is correct. For wrong answers 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 the most common mistake which evaluators are committing.**
8	If a question has parts, please award marks on the right-hand side for each part in the OSM Portal. Marks awarded for different parts of the question will be totaled up by the OSM System.
9	If a question does not have any parts, marks must be awarded in the left-hand margin in the OSM Portal. This may also be followed strictly.

10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of 70 marks 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 :- ● 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 answers.) ● Half or a part of the 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	The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for Spot Evaluation**" before starting the actual evaluation.
16	The candidates are entitled to obtain a 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.
17	**If a candidate attempts both alternatives/options in a question where only one option/ alternative is required to be attempted, the Evaluator shall award marks in both the options. The system will take the higher of two scores and disregard the other response.**
18	**In a question having two options/alternatives, if a candidate has attempted only one, then the evaluator shall mark "NA" (Not attempted) against the option that has not been attempted by the candidate.**

MARKING SCHEME
INFORMATICS PRACTICES 065

Max. Marks: 70

General Instructions :

(i) *All questions are compulsory.*

(ii) *The examination contains **5** sections - Section **A** to Section **E**.*

(iii) ***Section A** consists of **21** questions (1 to 21). Each question carries **1** mark.*

(iv) ***Section B** consists of **7** questions (22 to 28). Each question carries **2** marks.*

(v) ***Section C** consists of **4** questions (29 to 32). Each question carries 3 marks.*

(vi) ***Section D** consists of **2** questions (33 to 34). Each question carries 4 marks.*

(vii) ***Section E** consists of **3** questions (35 to 37). Each question carries 5 marks.*

(viii) *Internal choices have been provided in some questions. Attempt only one of the choices in such questions.*

(ix) *All programming questions are to be answered using Python Language only.*

(x) *In case of MCQs, text of the correct answer should also be written.*

Specific Instructions:

- The answers given in the marking scheme are SUGGESTIVE. Examiners are requested to award marks for all alternative correct Solutions/Answers conveying a similar meaning
- All programming questions have to be answered with respect to Python only
- In Python, ignore case sensitivity for identifiers (Variable / Functions / Structures / Class Names)
- In Python indentation is mandatory, however, the number of spaces used for indenting may vary
- In SQL related questions – both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions – all date entries should be acceptable for Example: 'YYYY-MM-DD', 'YY-MM-DD', 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions – semicolon should be ignored for terminating the SQL statements
- In SQL related questions – ignore case sensitivity

- In SQL output questions – ignore the column headers
- In SQL output questions – ignore the order of rows until **`ORDER BY`** is specified

SECTION - A		
1.	State whether the following statement is True or False : In Pandas Series, the Positional index can be a string or an integer.	1
Ans	**False**	
	(1 mark for writing the correct answer)	
2.	We can add a new row to a DataFrame **`DF`** using the _____ method. (A) **`DF.add()`** (B) **`DF.loc[]`** (C) **`DF.loc()`** (D) **`DF.addloc[]`**	1
Ans	(B) **`DF.loc[]`**	
	(1 Mark for writing the correct option)	
3.	Naveen discarded various types of waste material without realizing that e-waste contains harmful substances that could pollute the environment. He wants to know which of the following will be considered as e-waste ? (A) Plastic Bottle (B) Broken Smartphone (C) Aluminium Foil (D) Banana Peel	1
Ans	(B) Broken Smartphone	
	(1 Mark for writing the correct option)	
4.	In which scenario is a bar chart preferred over a line chart ? (A) To visualise monthly temperature trends over a year. (B) To compare the number of students in different classes. (C) To show stock price movements over time. (D) To analyse trends in website traffic over days.	1
Ans	(B) To compare the number of students in different classes	
	(1 Mark for writing the correct option)	
5.	Which of the following network topology uses a central cable (backbone) to connect all devices? (A) Mesh (B) Star	1

	(C) Tree (D) Bus	
Ans	(D) Bus	
	(1 Mark for writing the correct option)	
6.	State whether the following statement is True or False : In SQL, an aggregate function returns multiple values for each column on which it is applied.	1
Ans	False	
	(1 Mark for writing the correct answer)	
7.	Rohini has developed a new kind of water purifier that uses a unique filtration method. Which type of Intellectual Property Right should she apply to protect her invention ? (A) Trademark (B) Copyright (C) Patent (D) Both Copyright & Trademark	1
Ans	(C) Patent	
	(1 Mark for writing the correct option)	
8.	Aditya is working on a **`DataFrame`** named **`df`**. He has written the statement : **`print(df.loc['S2'])`** What will the above statement do ? (A) Display the data of the row having label **`'S2'`**. (B) Display the columns of the **`DataFrame`**. (C) Display the data type of the column having label **`'S2'`**. (D) Display the index numbers of the **`DataFrame`**.	1
Ans	(A) Display the data of the row having label '**`S2`**'.	
	(1 Mark for writing the correct option)	
9.	What will be the result of the following SQL command ? **`SELECT LENGTH ('Data Base');`** (Note: There is a single space between the words **`Data`** and **`Base`**.) (A) **`7`** (B) **`8`** (C) **`9`** (D) Error	1
Ans	(C) 9	
	(1 Mark for writing the correct option)	
10.	Which of the following is a key feature of a Static Web Page ? (A) Its content updates very frequently. (B) It displays different content to different users.	1

	(C) It loads slower than a Dynamic Web Page. (D) It shows the same content unless the code is manually updated.	
Ans	(D) It shows the same content unless the code is manually updated.	
	(1 Mark for writing the correct option)	
11.	Which of the following is the correct expanded form of DML ? (A) Device Management Language (B) Device Manipulation Language (C) Data Management Language (D) Data Manipulation Language	1
Ans	(D) Data Manipulation Language	
	(1 Mark for writing the correct option)	
12.	CSV stands for _____ Separated Values. (A) Colon (B) CTRL (C) Comma (D) Caret	1
Ans	(C) Comma	
	(1 Mark for writing the correct option)	
13.	Which of the following is an example of maintaining good net etiquette ? (A) Spamming emails or messages to strangers. (B) Ignoring other's opinions in online discussions. (C) Not using copyrighted materials without permission of the owner. (D) Sharing someone's private information publicly.	1
Ans	(C) Not using copyrighted materials without permission of the owner.	
	(1 Mark for writing the correct option)	
14.	In the context of creating a Pandas Series from a dictionary, which of the following statement is correct ? (A) The values of the dictionary become the indices of the Series. (B) The keys of the dictionary become the values of the Series. (C) The keys of the dictionary become the indices of the Series. (D) The Series will have default integer indices starting from 0, ignoring the diction keys.	1
Ans	(C) The keys of the dictionary become the indices of the Series	
	(1 Mark for writing the correct option)	
15.	In Pandas, when extracting a portion of a Series **`ser1`** using **`ser1[start:end]`** with	1

	positional indices **start** and **end**, which of the following statements is true ? (A) The element at the **end** index is included in the output. (B) The element at the **end** index is excluded from the output. (C) The elements at both the **start** and **end** indices are excluded from the output. (D) The element at the **start** index is excluded from the output.	
Ans	(B) The element at the end index is excluded from the output.	
	(1 Mark for the correct answer)	
16.	Nisha is using an Android app to make a voice call over the internet to her friend in another country. Which protocol is being used in this case ? (A) Chat (B) VoIP (C) Email (D) TV	1
Ans	(B) VoIP	
	(1 Mark for the correct answer)	
17.	State whether the following statement is True or False : The **INSTR(string1, string2)** function in SQL returns 0 if **string2** is not present as a substring in **string1**.	1
Ans	True	
	(1 Mark for the correct answer)	
18.	In a Pandas **DataFrame**, which value for the axis will be used to delete a column ? (A) **axis = -1** (B) **axis = 0** (C) **axis = 1** (D) **axis = 2**	1
Ans	(C) **axis = 1**	
	(1 Mark for the correct answer)	
19.	What will be the result of the following SQL command : **SELECT ROUND(15.678, 2);** **(A)** 15.00 **(B)** 15.67 **(C)** 15.68 **(D)** 16.00	1
Ans	(C) 15.68	
	(1 Mark for the correct answer)	
	Q. **20** and Q. **21** are Assertion (A) and Reason (R) Type questions. Choose the correct option as : (A) Both (A) and (R) are True, and (R) correctly explains (A). (B) Both (A) and (R) are True, but (R) does not correctly explain (A).	

	(C) (A) is True, but (R) is False. (D) (A) is False, but (R) is True.	
20.	**Assertion (A)** : Pandas DataFrame can store values of multiple data types in multiple Columns. **Reason (R)** : DataFrames are implemented using 2D arrays, which allows only numeric values.	1
Ans	(C) (A) is True, but (R) is False.	
	(1 Mark for writing the correct option)	
21.	**Assertion (A)** : The output of the SQL query **`SELECT COUNT (name) FROM students;`** will differ from the output of **`SELECT COUNT (*) FROM students;`** if there are some **`NULL`** values in the **`name`** column. **Reason (R)** : **`COUNT (column_name)`** returns the count of **`NON NULL`** values in that column, whereas **`COUNT(*)`** returns the number of records in the table.	1
Ans	(A) Both (A) and (R) are True, and (R) correctly explains (A).	
	(1 Mark for writing the correct option)	
	SECTION - B	
22.	**(a)** List any two characteristics of Pandas library in Python.	2
Ans	(a) Characteristics of Pandas library in Python: **Tabular data structure :** Works with data in the form of DataFrames (tables) and Series **Easy data handling:** Allows quick reading, writing, and modification of data **Powerful data analysis :**Supports filtering, sorting, grouping, and calculations **Handles missing data :**Can easily detect and fill/remove missing values **Fast and efficient :**Works well even with large datasets **Supports multiple file formats :**Can read/write multiple file formats like CSV, Excel.	
	(1 Mark each for writing any two correct characteristics)	
	OR (b) Briefly explain the purpose of Boolean Indexing with respect to DataFrames. Support your answer with a suitable example.	
Ans	(b) Boolean Indexing is used to filter and extract specific rows from a DataFrame based on given condition(s). It returns only those rows where the condition is True. **Example:** **`import pandas as pd`** **`data = {'Name': ['Ajay', 'Riya', 'David', 'Peter'],`** **`'Age': [25, 30, 35, 40],'Score': [85, 90, 95, 80]}`** **`df = pd.DataFrame(data)`** **`condition = df['Age'] > 30`** **`result = df[condition]`**	

```
print(result)

Output
   Name    Age    Score
2  David   35     95
3  Peter   40     80
```

(1 Mark for explaining the purpose of Boolean Indexing and 1 Mark for writing any correct example)
Note:
Full 2 marks if indexing is explained only using example with correct condition (with or without output).

23. Anjana had created a website using free design elements sourced from different creators online. She then published the site for public access but did not mention the source of the design elements used. (2)
(i) Identify one possible violation of IPR in this situation,
(ii) Name any two licensing models that allow legal reuse of digital creative work with conditions.

Ans
(i) Copyright Infringement/Copyright Violation
(ii) Creative Commons (CC) licenses,
GNU General Public License (GPL)

(1 Mark for part (i) and ½ mark for writing each correct example in part (ii))
NOTE: Open Source to be accepted for part (ii)

24. Define the following terms with respect to RDBMS : (2)
a. Domain
b. Tuple

Ans
a. Domain: The set of all possible values that a column (attribute) can contain.
b. Tuple: A row in a table representing a complete record.

a. (1 Mark for writing the correct definition of Domain)
b. (1 Mark for writing the correct definition of Tuple)

25. (a) Explain the role of the following network devices in a network : (2)
(I) Modem
(II) Gateway

Ans
(a) (I) Modem: Converts digital signals into analog signals and vice versa.
(II) Gateway: A gateway acts as a bridge between two different networks.

(1 Mark for explaining correct role of Modem)
(1 Mark for explaining correct role of Gateway)

OR

(b) Differentiate between add-ons and plug-ins in a web browser.

Ans
(b)

Add-ons	Plug-ins
• Add-ons enhance or customize the browser like adding features, blocking ads, managing passwords, etc.	• Plug-ins are designed to enable the browser to handle specific types of content. • Example: Adobe Flash Player

		• Example: Mozilla Firefox add-ons like ad blockers or theme changers.	
	(2 Marks for differentiating between Add-ons and Plug-ins ***(Full 2 marks to be awarded if difference explained through example)*** ***Note: 1 mark to be awarded if either Add-ons or Plug-ins is explained***		
26.	Write SQL queries to perform the following : (I) Display the month (in numeric form) of the date `'2026-01-01'`. (II) Display only the year part from the date `'2026-01-01'`.		2
Ans	(I) `SELECT MONTH('2026-01-01');` (II) `SELECT YEAR('2026-01-01');`		
	(I) (½ mark for writing SELECT, ½ mark for MONTH(`'2026-01-01'`)) ***(II) (½ mark for writing SELECT, ½ mark for YEAR(`'2026-01-01'`))***		
27.	(a) What is data protection ? (b) Mention any two precautionary measures one can take to avoid the risk of cybercrime.		2
Ans	**(a)** Data protection refers to the practice of safeguarding data from unauthorized access, misuse, loss, or damage.		
	(1 Mark for writing the correct definition of data protection)		
	(b) Precautions to avoid cybercrime (Any two): (i) Use strong passwords and do not share them. (ii) Avoid clicking on suspicious links or emails. (iii) Install and regularly update antivirus software. (iv) Do not share personal or sensitive information online.		
	(½ Mark for writing each correct precaution)		

28.	(a) Niharika wants to create a Pandas **Series** using a **NumPy array** with three elements **'a'**, **'b'**, and **'c'**, and assign custom indexes **'first','second'** and '**third**'. Help her complete the code below.
	`import pandas as pd`
	`import ______ as np`
	`arr = np.______ (['a','b','c'])`
	`s = pd._____(arr,______=['first','second','third'])`
	`print(s)`
			2

Ans	(a)
	`import pandas as pd`
	`import numpy as np`
	`arr = np.array(['a', 'b', 'c'])`
	`s = pd.Series(arr, index=['first', 'second', 'third'])`
	`print(s)`		

	(½ Mark for filling each blank correctly)		

Ans	**OR**
	(b) Write the output of the following code:
	`import pandas as pd`
	`s1 = pd.Series ([1,2,3], index = ['a','b','c'])`		

	`s2 = pd.Series ([4,5,6], index = ['b','c','d'])` `print(s1 + S2)`	

	(b) `a NaN`
	`b 6.0`
	`c 8.0`
	`d NaN`	

	(½ Mark for writing each correct row of output) ***Note:*** ● ***Full 2 marks to be awarded if ERROR in code is mentioned, as in print() statement S2 is in uppercase*** ● ***Mentioning "dtype:float64" in the output to be ignored.*** ● ***1 mark for writing either of the correct column of output*** ● ***½ Mark for any 2 correct values in the given output***	
	SECTION - C	
29.	Mandeep received an email stating he won a lottery though he had never participated in any such event. He was asked to provide bank details to process the amount. Mandeep provided the required details but within next few minutes ₹ One lakh was debited from his account. Answer the following questions based on the given case study :	3
	(i) Mandeep is the victim of which type of cybercrime ?	
Ans	(i) Mandeep is a victim of Phishing.	
	(1 Mark for writing correct type of cybercrime) ***Note: Online Fraud/Scam to be accepted.***	
	(ii) Other than email, mention any two common methods through which this type of cybercrime is being committed these days.	
Ans	(ii) Common methods through which this type of cybercrime is being committed are as follows: SMS Voice calls Social Media Fake Websites Whatsapp messages	
	(½ Mark each for mentioning Any two correct methods of cybercrime)	
	(iii) Name one law that safeguards the rights of Internet users in India.	
Ans	(iii) Information Technology (IT) Act 2000 OR IT Act	
	(1 Mark for naming the correct law)	

30.	(a) Write a Python program to create and display a Pandas Series as shown below :
	`July 31`
	`Aug 31`
	`Sept 30`
	`Oct 31`
	The index labels are the names of the months - **`July, Aug, Sept, Oct.`**
		3

The corresponding scalar values are the number of days in these respective months - 31, 31, 30, 31.

Ans

```
import pandas as pd
months = ['July', 'Aug', 'Sept', 'Oct']
days = [31, 31, 30, 31]
s = pd.Series(days, index=months) OR s = pd.Series(days, months)
print(s)
```

OR

```
import pandas as pd
days = pd.Series(data=[31, 31, 30, 31],
                 index=['July', 'Aug', 'Sept', 'Oct'] )
print(days)
```

OR

```
import pandas as pd
days = pd.Series({'July':31, 'Aug':31, 'Sept':30, 'Oct':31})
print(days)
```

(½ Mark for correct import statement)
(½ Mark for creating index of months)
(½ Mark for creating corresponding values of days)
(1 Mark for pd.Series( ))
(½ Mark for correct print statement)

OR **3**

(b) A CSV file named **customer.csv** contains records of customers. The first row of the file represents the header. Sample data from the file is shown below :

```
Name, Age, City
Rudra,17,Kolkata
Divya,19,Dehradun
Nabeel,22,Lucknow
```

Write a Python program to import data from the CSV file into a Pandas **DataFrame** named **DF** and display the last two rows.

Ans (b)

```
import pandas as pd
DF = pd.read_csv("customer.csv")
print(DF.tail(2))
```

(1 Mark for each correct statement)
Note: ignore Path of csv file if mentioned by the student

31. (i) Write an SQL statement to create a table named **PRODUCTS** with the following specifications : **3**

Column Name	Data Type	Key
PID	Integer	Primary Key
PName	Varchar of size 30	
PCat	Char of size 15	
Price	Decimal Number	

Ans

```
CREATE TABLE PRODUCTS (
  PID INT PRIMARY KEY,
  PName VARCHAR(30),
  PCAT CHAR(15),
  PRICE FLOAT
```

	`);`	
	(½ Mark for `CREATE TABLE PRODUCTS`) *(½ Mark for correct attributes and datatypes)* *(½ Mark for Primary Key)*	
	(ii) Write an SQL query to increase the price of all the items by **100,** whose product category is **`Grocery`,** in the table **`PRODUCTS`.**	
Ans	`UPDATE PRODUCTS SET PRICE=PRICE+100 WHERE PCAT='Grocery';`	
	(½ Mark for writing `UPDATE PRODUCTS`) *(½ Mark for `SET PRICE=PRICE+100`)* *(½ Mark for `WHERE PCAT='Grocery'`)*	
32.	(a) Consider the following tables : **Table 1 : `TEACHER`,** which stores Teacher ID **`(TID)`**, Teacher Name **`(TName)`**, Experience **`(Experience)`** and City **`(City)`** that they live in.	3

TID	TName	Experience	City
1	Kartik	5	Bhopal
2	Shahnaz	6	Nagpur
3	Rajendra	7	Delhi
4	Tanvi	4	Bhopal
5	Alam	9	Delhi

Table 2 : `SUBJECT`, which stores Subject ID **`(SID)`**, Subject Name **`(SubName)`** and **`ID`** of the teacher **`(TID)`** teaching that Subject.

SID	SubName	TID
101	Physics	1
102	Chemistry	2
103	Mathematics	3
104	Informatics Practices	4
105	Computer Science	5

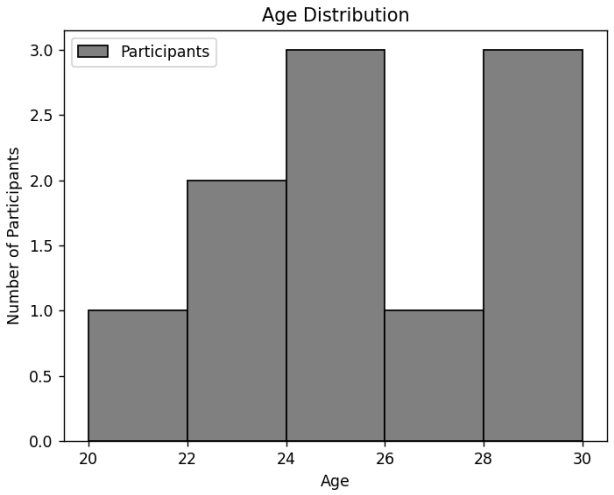
Write appropriate SQL query for the following:

	(I) Delete the record of the subject whose **`TID`** is equal to **`4`**.	
Ans	(I) `DELETE FROM SUBJECT WHERE TID = 4;`	
	(½ Mark for `DELETE FROM SUBJECT`) *(½ Mark for `WHERE TID=4`)*	
	(II) Display the names of teachers who have more than **5** years of experience and who stay in **`Nagpur`.**	
Ans	(II) `SELECT TNAME FROM TEACHER WHERE EXPERIENCE>5 AND CITY = 'Nagpur';`	

	(½ Mark for **SELECT TNAME FROM TEACHER***)* *(½ Mark for* **WHERE EXPERIENCE>5 AND CITY='Nagpur'***)*	
	(III) Display subject names along with their teacher names.	
Ans	(III) **SELECT SUBNAME, TNAME FROM SUBJECT NATURAL JOIN TEACHER;** **OR** **SELECT SUBNAME, TNAME FROM SUBJECT, TEACHER** **WHERE SUBJECT.TID = TEACHER.TID;** **OR** **SELECT SUBNAME, TNAME FROM SUBJECT S, TEACHER T** **WHERE S.TID = T.TID;** **OR** **SELECT SUBNAME, TNAME FROM SUBJECT S JOIN TEACHER T** **ON S.TID = T.TID;**	
	(½ Mark ***SELECT SUBNAME, TNAME FROM SUBJECT, TEACHER****)* *(½ Mark* ***NATURAL JOIN TEACHER*** *OR* ***WHERE SUBJECT.TID=TEACHER.TID****)*	
	OR **(b)** Consider the table **LIBRARY** as given below.	

BookId	Title	Genre	Price
101	Python Basics	Technology	278
201	The Silent Patient	Fiction	340
301	Data Science	Technology	291
401	Oceans	Marine Life	NULL

	(I) Which attribute(s) can be considered as the Candidate keys(s)? Justify your answer.	
Ans	(I) **BookId** **BookId is unique to every row of table.** **NOTE:** **BookId and Title to be accepted with correct justification**	
	(½ Mark for writing correct attribute) *(½ Mark for Justification)*	
	(II) Write an SQL query to insert a new record with the following values: **BookId : 501** **Title : AI for ALL** **Genre : Technology** **Price : 589**	
Ans	(II) **INSERT INTO LIBRARY** **VALUES (501, 'AI for ALL', 'Technology', 589);** **OR** **INSERT INTO LIBRARY (BookId, Title, Genre, Price)** **VALUES (501, 'AI for ALL', 'Technology', 589);**	
	(½ Mark for ***INSERT INTO LIBRARY****)* *(½ Mark for* ***VALUES(*****(501, 'AI for ALL', 'Technology', 589);***)*	

	(III) Write an SQL query to add a new column **Author** that is a character data type of size 20.	
Ans	(III) **ALTER TABLE LIBRARY ADD COLUMN AUTHOR VARCHAR(20);** **OR** **ALTER TABLE LIBRARY ADD AUTHOR VARCHAR(20) ;** **OR** **ALTER TABLE LIBRARY ADD COLUMN AUTHOR CHAR(20) ;** **OR** **ALTER TABLE LIBRARY ADD AUTHOR CHAR(20) ;**	
	(½ Mark for ALTER TABLE LIBRARY) ***(½ Mark for ADD AUTHOR VARCHAR(20)/CHAR(20))***	
	SECTION - D	
33.	Ms. Anjali, a data analyst, has been assigned the task of creating a histogram to display the age distribution of ten participants in a workshop. She has been provided with the following list of their ages : **Ages = [22, 25, 24, 28, 30, 24, 29, 27, 21, 23]** She has started writing a Python program for it. However, the code is incomplete. Help her complete the program by filling in the missing parts, so that the histogram as shown below is displayed. 	4
	import matplotlib.pyplot as plt **Ages = [22, 25, 24, 28, 30, 24, 29, 27, 21, 23]** **binsize = [20,22,24,26,28,30]** **plt._____(Ages, bins=binsize, edgecolor = 'black', label = 'Participants') # Statement-1** **_____.xlabel('Age') # Statement-2** **plt.ylabel('Number of Participants')** **plt.title("Age Distribution")** **plt._____ # Statement-3** **_____ # Statement-4**	
(I)	Write the suitable code for the blank space in the line marked as **Statement-1** which plots the histogram.	
Ans	**hist**	

	(1 Mark for mentioning hist)	
(II)	Fill in the blank in **Statement-2** to use the correct alias of the required module to set the label on x-axis.	
Ans	`plt`	
	(1 Mark for mentioning plt)	
(III)	Fill in the blank in **Statement-3** with the correct Python code to display the legend on the graph.	
Ans	`legend()`	
	(1 Mark for mentioning legend()) ***Note: ½ mark to be awarded if legend is mentioned without ()***	
(IV)	Fill in the blank in **Statement-4** with the appropriate Python code to display the graph.	
Ans	`plt.show()`	
	(1 Mark for mentioning plt.show()) ***Note: ½ mark to be awarded for plt, ½ mark for show(), if plt.show is mentioned without () ½ mark should be awarded***	
34.	(a) Shalini, who works as a database designer in the hotel industry, has created a table named **Guest** to keep track of guest details as shown below : **Table : Guest** **GuestID** | **GuestName** | **RoomNumber** | **CheckInDate** | **Charges** G101 | Harish | 101 | 2025-04-03 | 3000 G102 | Sunita | 101 | 2025-04-03 | 3000 G103 | Ramesh | 102 | 2025-05-04 | 5000 G104 | Bhumika | 103 | 2025-06-02 | 3500 Write a suitable SQL query for the following :	4
(I)	Display last 3 characters of guest name in upper case.	

Ans	`SELECT UPPER(RIGHT(GuestName, 3)) FROM Guest;`
	OR
	`SELECT UPPER(SUBSTR(GuestName, -3)) FROM Guest;`
	OR
	`SELECT UPPER(SUBSTRING(GuestName, -3)) FROM Guest;`	

	(½ Mark for `RIGHT()` OR `SUBSTR()` OR `SUBSTRING()`) ***(½ Mark for `UPPER()/UCASE()`)***	
(II)	Display the name of the guest along with the day name of check-in date.	
Ans	`SELECT GuestName, DAYNAME(CheckInDate) FROM Guest;`	
	(½ Mark for `SELECT GuestName`) ***(½ Mark for `DAYNAME()`)***	
(III)	Display the remainder when charges are divided by `1000`.	
Ans	`SELECT MOD(Charges,1000) FROM Guest;`	
	(½ Mark for `SELECT`)	

	(½ Mark for **MOD ()***)*	
(IV)	Extract and display three characters, starting from the second character, of each guest name.	
Ans	**SELECT SUBSTR(GuestName,2,3) FROM Guest;** **OR** **SELECT MID(GuestName,2,3) FROM Guest;**	
	(½ Mark for ***SELECT****)* *(½ Mark for* **SUBSTR** *()/* ***MID****())*	
	OR (b) Consider the following table and write the output of the following SQL Queries. **Table : ORDERS** **ORDERID** | **CUSTOMERNAME** | **TOTALAMOUNT** | **DISCOUNT** | **ORDERDATE** **101** | **Hemant** | **5000** | **10** | **2024-03-01** **102** | **Neha** | **7000** | **15** | **NULL** **103** | **Keshav** | **3000** | **5** | **2024-01-20** **104** | **Sandhya** | **4500** | **NULL** | **2023-12-25** Write the output of the following SQL Queries :	
I.	**SELECT CUSTOMERNAME FROM ORDERS WHERE DISCOUNT IS NOT NULL;**	
Ans	**CUSTOMERNAME** **Hemant** **Neha** **Keshav**	
	(1 Mark for ***correct output****)*	
II.	**SELECT CUSTOMERNAME, DISCOUNT FROM ORDERS WHERE DISCOUNT BETWEEN 5 AND 10;**	
Ans	**CUSTOMERNAME** | **DISCOUNT** **Hemant** | **10** **Keshav** | **5**	
	(1 Mark for correct output)	
III.	**SELECT MONTHNAME(ORDERDATE) FROM ORDERS WHERE ORDERDATE IS NOT NULL;**	
Ans	**MONTHNAME(ORDERDATE)** **March** **January** **December**	
	(1 Mark for correct output)	

IV. `SELECT ORDERID, DAY(ORDERDATE) FROM ORDERS;`

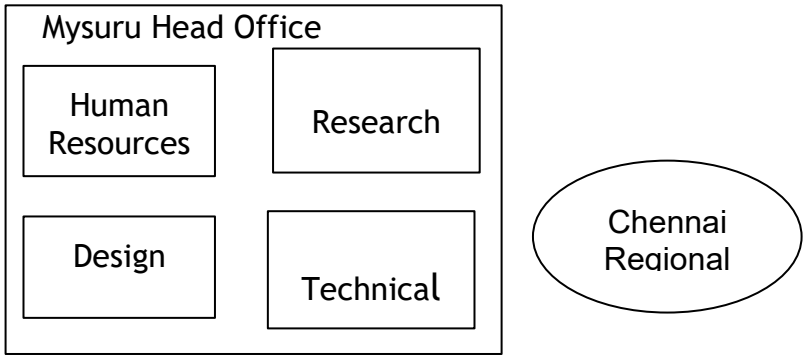
Ans

ORDERID	DAY(ORDERDATE)
101	1
102	NULL
103	20
104	25

(1 Mark for correct output)

SECTION - E

35. My Solutions Pvt. Ltd. is a reputed software development and IT consulting firm. The company's head office is located in Mysuru, and it has a regional office in Chennai. The Mysuru office comprises four departments: Human Resources, Research, Design and Technical Support. **5**



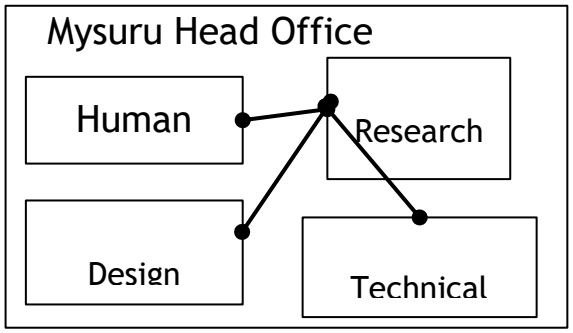
The distances between these departments and between Mysuru and Chennai are as follows :

Human Resources to Research	55 metres
Human Resources to Design	75 metres
Human Resources to Technical Support	140 metres
Research to Design	40 metres
Research to Technical Support	80 metres
Design to Technical Support	60 metres
Mysuru Office to Chennai Office	350 kilometres

The number of computers in each department/office is as follows :

Human Resources	30
Research	80
Design	50
Technical Support	20
Chennai Office	35

As a network engineer, you have to propose solutions for various queries listed from I to V.

	I. Identify the most suitable department to install the main server in the Mysuru office. Justify your answer with a valid reason.	
Ans	Research department. Justification: Research department has maximum number of computers.	
	(½ Mark for writing the correct department) *(½ Mark for correct justification)*	
	II. Create a cable layout design to establish Wired network connectivity between the departments in the Mysuru Office.	
Ans		
	(1 Mark for creating correct cable layout) *Note: Any other valid cable layout design to be accepted*	
	III. Suggest the appropriate network device to connect multiple computers within the Research department.	
Ans	Switch or Hub	
	(1 Mark for writing appropriate network device)	
	IV. What type of network (LAN, MAN, WAN) would best connect the Mysuru and Chennai office ?	
Ans	WAN	
	(1 Mark for writing correct type of network)	
	V. Which device should be used if the signal strength weakens while transmitting data between the Human Resources and Technical Support departments due to the long distance between them ?	
Ans	Repeater	
	(1 Mark for writing the correct device)	
36.	Consider the DataFrame **`Scholarship`** shown below : **`Name Course Amount`**	**3+** **1+** **1=**

	0 Ananya B.Sc. 62000 1 Karan B.Tech 67000 2 Simran MCA 64000 3 Rahul BCA 70000 4 Priya BA 69000 Answer the following questions :	**5**
	I. Write Python code to create and display the given DataFrame using the Dictionary of Series method.	

Ans	`import pandas as pd`
	`# Creating Series for each column`
	`name = pd.Series(["Ananya", "Karan", "Simran", "Rahul", "Priya"])`
	`course = pd.Series(["B.Sc.", "B.Tech", "MCA", "BCA", "BA"])`
	`amount = pd.Series([62000, 67000, 64000, 70000, 69000])`
	`# Creating DataFrame using Dictionary of Series`
	`data = {"Name": name, "Course": course, "Amount": amount }`
	`Scholarship = pd.DataFrame(data)`
	`# Display the DataFrame`
	`print(Scholarship)`
	OR
	`import pandas as pd`
	`# Creating Series for each column`
	`Name=["Ananya", "Karan", "Simran", "Rahul", "Priya"]`
	`Course=["B.Sc.", "B.Tech", "MCA", "BCA", "BA"]`
	`Amount=[62000, 67000, 64000, 70000, 69000]`
	`name = pd.Series(Name)`
	`course = pd.Series(Course)`
	`amount = pd.Series(Amount)`
	`# Creating DataFrame using Dictionary of Series`
	`data = {"Name": name, "Course": course, "Amount": amount}`
	`Scholarship = pd.DataFrame(data)`
	`# Display the DataFrame`
	`print(Scholarship)`	

	(½ Mark for import pandas as pd) *(½ Mark each for creation of Series for columns - Name, Course and Amount)* *(½ Mark for creation of DataFrame using dictionary of Series)* *(½ Mark for displaying the DataFrame)*	
	II. Rename row indexes to `['a', 'b', 'c', 'd', 'e']`	

Ans	`Scholarship.index = ['a', 'b', 'c', 'd', 'e']`
	OR
	`Scholarship = Scholarship.set_axis(['a', 'b', 'c', 'd', 'e'], axis=0)`
	OR
	`Scholarship = Scholarship.rename(index={0: 'a', 1: 'b', 2: 'c', 3: 'd',4: 'e'})`
	OR	

	Any other valid method	
	(1 mark for correctly renaming the row indexes) ***OR*** ***(½ mark for writing set_axis , ½ mark for correct values ['a','b','c','d','e'])***	
	III. Write Python statement to remove the last row of the given DataFrame	
Ans	**`Scholarship = Scholarship.drop(Scholarship.index[-1])`** **OR** **`Scholarship = Scholarship.iloc[:-1]`** **OR** **`Scholarship = Scholarship.drop('e')`** **OR** **`Scholarship = Scholarship.drop(4)`** **OR** **`Scholarship.drop(Scholarship.index[-1], inplace=True)`** **OR** **`Scholarship = Scholarship.drop(Scholarship.tail(1).index)`**	
	(½ mark for writing Scholarship.drop()/iloc[]) ***(½ mark for writing correct argument of drop()/iloc[])***	
37	(a) Write suitable SQL query for the following :	5
	I. To display only the date part from the date/time expression '2026-01-01 10:10:10'	
Ans	**`SELECT DATE('2026-01-01 10:10:10');`**	
	(½ Mark for SELECT) ***(½ Mark for DATE () with datetime string)***	
	II. To convert all customer names from the **`Cust_Name`** column to lowercase in the **`Customer`** table.	
Ans	**`SELECT LOWER(Cust_Name) FROM Customer;`** **OR** **`SELECT LCASE(Cust_Name) FROM Customer;`**	
	(½ Mark for SELECT) ***(½ Mark for LOWER ()/LCASE())***	
	III. To extract the first 4 characters from the **`City_Name`** column in **`Location`** table.	
Ans	**`SELECT LEFT(City_Name,4) FROM Location;`** **`OR`** **`SELECT SUBSTR(City_Name,1,4)FROM Location;`** **`OR`** **`SELECT MID(City_Name,1,4)FROM Location;`**	
	(½ Mark for SELECT) ***(½ Mark for correct SQL function LEFT() or SUBSTR())***	
	IV. To display the name of the city from the **`CITY`** column in **`EVENT`** table, after removing leading spaces.	
Ans	**`SELECT LTRIM(CITY) FROM EVENT;`**	
	(½ Mark for SELECT) ***(½ Mark for correct SQL function LTRIM())***	
	V. To find the average salary from **`Salary`** column in **`Employees`** table.	

Ans	**SELECT AVG(Salary) FROM Employees;** **OR** **SELECT SUM(Salary)/COUNT(Salary) FROM Employees;**	
	(½ Mark for SELECT) ***(½ Mark for correct SQL function AVG() OR SUM()/COUNT())***	
	OR	
	(b) Write suitable SQL query for the following :	
	I. **To display the value of 17^2 .**	
Ans	**SELECT POW(17,2);** **OR** **SELECT POWER(17, 2);**	
	(½ Mark for SELECT) ***(½ Mark for correct SQL function POW()/ POWER())***	
	II. To display the day part of the dates in the **Hire_Date** column of the **Employee** table.	
Ans	**SELECT DAY(Hire_Date)FROM Employee;**	
	(½ Mark for SELECT) ***(½ Mark for correct SQL function DAY())*** ***Note : DAYOFMONTH() also to be accepted***	
	III. To display the maximum value of the **Bill_Amount** column in the **Bill** table.	
Ans	**SELECT MAX(Bill_Amount) FROM Bill;**	
	(½ Mark for SELECT) ***(½ Mark for correct SQL function MAX())***	
	IV. To remove leading and trailing spaces from the **Location** column in the **Branch** table.	
Ans	**UPDATE Branch SET Location = TRIM(Location);** **OR** **SELECT TRIM(Location) FROM Branch;**	
	(½ Mark for UPDATE/SELECT) ***(½ Mark for correct SQL function TRIM())***	
	V. To display total salary from **tot_sal** column in **Employees** table.	
Ans	**SELECT SUM(tot_sal) FROM Employees;**	
	(½ Mark for SELECT) ***(½ Mark for correct SQL function SUM())*** ***Note:*** ***SELECT tot_sal FROM Employees; to be accepted*** ***(½ Mark for SELECT)*** ***(½ Mark for correct column)***	

Series : 4YWZX

SET – 4

रोल नं.
Roll No.

प्रश्न–पत्र कोड
Q.P. Code **90**

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.

सूचना विज्ञान पद्धतियाँ
INFORMATICS PRACTICES

निर्धारित समय : 3 घण्टे
Time allowed : 3 hours

अधिकतम अंक : 70
Maximum Marks : 70

- कृपया जाँच कर लें कि इस प्रश्न–पत्र में मुद्रित पृष्ठ **31** हैं ।
- कृपया जाँच कर लें कि इस प्रश्न–पत्र में **37** प्रश्न हैं ।
- प्रश्न–पत्र में दाहिने हाथ की ओर दिए गए प्रश्न–पत्र कोड को परीक्षार्थी उत्तर–पुस्तिका के मुख–पृष्ठ पर लिखें ।
- ***कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर–पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें ।***
- 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 ।

- Please check that this question paper contains **31** printed pages.
- Please check that this question paper contains **37** questions.
- 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.
- **Please write down the serial number of the question in the answer-book at the given place before attempting it.**
- 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 :

(i) *कृपया जाँच लें कि इस प्रश्न-पत्र में **37** प्रश्न हैं ।*

(ii) ***सभी** प्रश्न **अनिवार्य** हैं । परंतु कुछ प्रश्नों में आंतरिक विकल्प दिये गये हैं । ऐसे प्रश्नों में केवल एक विकल्प का उत्तर दीजिए ।*

(iii) *प्रश्न-पत्र को **5** खण्डों **क, ख, ग, घ** और **ङ** में बाँटा गया हैं ।*

(iv) *खण्ड - **क** में **21** प्रश्न (**1** से **21**) हैं और प्रत्येक प्रश्न **1** अंक का है ।*

(v) *खण्ड - **ख** में **7** प्रश्न (**22** से **28**) हैं और प्रत्येक प्रश्न **2** अंकों का है ।*

(vi) *खण्ड - **ग** में **4** प्रश्न (**29** से **32**) हैं और प्रत्येक प्रश्न **3** अंकों का है ।*

(vii) *खण्ड - **घ** में विषय अध्ययन प्रकार के **2** प्रश्न (**33** एवं **34**) हैं और प्रत्येक प्रश्न **4** अंकों का है ।*

(viii) *खण्ड - **ङ** में **3** प्रश्न (**35** से **37**) हैं और प्रत्येक प्रश्न **5** अंकों का है ।*

(ix) *सभी प्रोग्रामिंग प्रश्नों का उत्तर केवल पाइथन (Python) भाषा में दिया जाना है ।*

(x) *बहुविकल्पी प्रश्नों (Multiple Choice Questions) के मामले में सही उत्तर का Text भी लिखा जाना चाहिए ।*

खण्ड - क

1. कृपया बतायें कि निम्नलिखित कथन सही है या गलत : **1**

   Python (पाइथन) में हम empty DataFrame नहीं बना सकते ।

2. निम्नलिखित SQL Command का output क्या होगा ? **1**

```
SELECT MONTHNAME('2024-08-02');
```

   (A) 08 (B) 02

   (C) February (D) August

3. हमारे कम्प्यूटर में वेबसाइट्स द्वारा संगृहीत अस्थायी डेटा (temporary data) फाइल्स का उपयोग हमारे online क्रियाकलापों का पता (track) करने और browsing अनुभव को वैयक्तिक (personalize) करने के लिये किया जा सकता है । इन फाइल्स को कहा जाता है : **1**

   (A) प्लग इन्स (Plug-ins) (B) एड-आन्स (Add-ons)

   (C) कुकीज़ (Cookies) (D) बुकमार्क्स (Bookmarks)

General Instructions :

(i) *Please check this question paper contains **37** questions.*

(ii) ***All** questions are compulsory. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.*

(iii) *The paper is divided into 5 sections – A, B, C, D and E.*

(iv) ***Section A** consists of **21** questions (**1** to **21**). Each question carries **1** mark.*

(v) ***Section B** consists of **7** questions (**22** to **28**). Each question carries **2** marks.*

(vi) ***Section C** consists of **4** questions (**29** to **32**). Each question carries **3** marks.*

(vii) ***Section D** consists of **2** case study type questions (**33** & **34**). Each question carries **4** marks.*

(viii) ***Section E** consists of **3** questions (**35** to **37**). Each question carries **5** marks.*

(ix) ***All** programming questions are to be answered using Python language only.*

(x) *In case of MCQs, text of the correct answer should also be written.*

SECTION – A

1. State whether the following statement is True or False : **1**
In Python, we cannot create an empty DataFrame.

2. What will be the output of the following SQL command ? **1**

```
SELECT MONTHNAME('2024-08-02');
```

(A) 08 (B) 02

(C) February (D) August

3. Temporary data files stored by websites in our computer can be used to track our online activities and also to personalize browsing experience. These files are known as : **1**

(A) Plug-ins (B) Add-ons

(C) Cookies (D) Bookmarks

4. निम्नलिखित में से कौन सा SQL में समुच्चय फंक्शन (aggregate function) नहीं है ? 1

(A) `COUNT(*)` (B) `MIN()`

(C) `LEFT()` (D) `AVG()`

5. रहीम ने एक अद्वितीय कम्प्यूटर सॉफ्टवेयर तैयार किया है और वह इसे बिना उसकी अनुमति के कॉपी करने या उपयोग करने से बचाना चाहता है । इसके लिये वह कानूनी-संरक्षण लागू करने पर विचार कर रहा है । अपने सॉफ्टवेयर की सुरक्षा के लिये रहीम को किस प्रकार की बौद्धिक संपदा संरक्षण (Intellectual Property Protection) लागू करना चाहिए ? 1

(A) कापी राइट (Copyright) (B) प्लेजियरिस्म (Plagiarism)

(C) ट्रेडमार्क (Trademark) (D) लीज़ (Lease)

6. यदि स्पष्ट रूप से उल्लेख न किया गया हो तो Pandas Series के लिये default index type क्या होता है ? 1

(A) स्ट्रिंग (String) (B) लिस्ट (List)

(C) न्यूमेरिक (Numeric) (D) बुलियन (Boolean)

7. Python में Plot को save करने के लिये `matplotlib` लाइब्रेरी का कौन सा function उपयोग किया जाता है ? 1

(A) `save()` (B) `saveplot()`

(C) `export()` (D) `savefig()`

8. कृपया बतायें कि निम्नलिखित कथन सही है या गलत :

SQL में `MOD()` फंक्शन (function) दो संख्याओं के बीच विभाजन कार्य (division operation) के भागफल (Quotient) को बताता है । 1

9. Python Pandas में एक आयामी (one-dimensional) labelled data को स्टोर करने के लिये निम्नलिखित में से किस डेटा संरचना (data structure) का उपयोग किया जाता है ? 1

(A) इंटीजर (Integer) (B) डिक्शनरी (Dictionary)

(C) सिरीज (Series) (D) डेटा फ्रेम (DataFrame)

4. Which of the following is not an aggregate function in SQL ? **1**

(A) `COUNT(*)` (B) `MIN()`

(C) `LEFT()` (D) `AVG()`

5. Raheem created a unique computer software and wants to protect his creation from being copied or used without his permission. He is considering to apply for legal protection. Which type of intellectual property protection should Raheem apply for, to safeguard his software ? **1**

(A) Copyright (B) Plagiarism

(C) Trademark (D) Lease

6. What is the default index type for a Pandas Series if not explicitly specified ? **1**

(A) String (B) List

(C) Numeric (D) Boolean

7. In Python which function of `matplotlib` library is used to save a plot ? **1**

(A) `save()` (B) `saveplot()`

(C) `export()` (D) `savefig()`

8. State whether the following statement is True or False :

The `MOD()` function in SQL returns the quotient of division operation between two numbers. **1**

9. Which of the following data structure is used for storing one-dimensional labelled data in Python Pandas ? **1**

(A) Integer (B) Dictionary

(C) Series (D) DataFrame

10. प्रिया को एक email मिला जो उसे लगा कि उसके बैंक से है, जिसमें उसे एक लिंक को click करके अपने खाते की सूचना देने को कहा गया । उसने लिंक click करके अपने विवरण दे दिये परंतु इसके तुरंत बाद उसके खाते से कुछ राशि डेबिट (Debit) हो गई । प्रिया किस प्रकार के साइबर अपराध की शिकार हुई ? 1

(A) साइबर स्टाकिंग (Cyber stalking)
(B) फ़िशिंग (Phishing)
(C) फिशिंग (Fishing)
(D) साइबर बुलिंग (Cyber bullying)

11. कौन सा SQL function a^b की संगणना करता है ? 1

(A) `MOD()`
(B) `POWER()`
(C) `RAISE()`
(D) `ROUND()`

12. इंटरनेट पर वीडियो काल्स के द्वारा संप्रेषण (communication) करते समय किस Protocol का प्रयोग किया जाता है ? 1

(A) Video Over Internet Protocol
(B) Voice Over Internet Protocol
(C) Internet Protocol
(D) Video Audio Over Internet Protocol

13. `ser` नामक Pandas series में से index `points` वाले एक विशिष्ट element को चुनने के लिये निम्नलिखित में से किस Python statement का उपयोग किया जाएगा ? 1

(A) `ser.element(points)`
(B) `ser.select (points)`
(C) `ser[points]`
(D) `ser.show[points]`

14. अत्यधिक स्क्रीन टाइम (screen time) और गलत तरीके से बैठने (poor posture) का यह परिणाम हो सकता है – 1

(A) इंटरनेट की अधिक तेज़ गति
(B) आँखों में तनाव और अन्य स्वास्थ्य समस्यायें
(C) बेहतर दृष्टि और अस्थि घनत्व (bone density)
(D) शारीरिक स्वास्थ्य सुधार

10. Priya received an email that appeared to be from her bank, asking her to update her account information by clicking on a link. She clicked the link to enter her details, but immediately after, some amount was debited from her account. What type of cybercrime did Priya fall victim to ? **1**

(A) Cyber stalking
(B) Phishing
(C) Fishing
(D) Cyber bullying

11. Which SQL function calculates a^b ? **1**

(A) `MOD()`
(B) `POWER()`
(C) `RAISE()`
(D) `ROUND()`

12. Which protocol is used while communicating through video calls on the Internet ? **1**

(A) Video Over Internet Protocol
(B) Voice Over Internet Protocol
(C) Internet Protocol
(D) Video Audio Over Internet Protocol

13. Which of the following Python statements will be used to select a specific element having index as **`points`**, from a Pandas Series named **`ser`** ? **1**

(A) `ser.element(points)`
(B) `ser.select (points)`
(C) `ser[points]`
(D) `ser.show[points]`

14. Excessive screen time and poor posture can lead to : **1**

(A) Faster Internet Speeds
(B) Eye strain and other health issues
(C) Better vision and bone density
(D) Improved physical health

15. निम्नलिखित में से कौन सी लाइब्रेरी Python में ndarray को परिभाषित (define) करती है ? 1

(A) `pandas` (B) `numpy`

(C) `matplotlib` (D) `scipy`

16. SQL के संदर्भ में कॉलम-II में दिये गये function का कॉलम-I में दी गई श्रेणियों (categories) के साथ मिलान कीजिए : 1

	I		II
(i)	Math function	(a)	`COUNT()`
(ii)	Aggregate function	(b)	`ROUND()`
(iii)	Date function	(c)	`RIGHT()`
(iv)	Text function	(d)	`YEAR()`

विकल्प :

(A) (i)-(c), (ii)-(d), (iii)-(a), (iv)-(b)

(B) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)

(C) (i)-(d), (ii)-(b), (iii)-(a), (iv)-(c)

(D) (i)-(b), (ii)-(c), (iii)-(d), (iv)-(a)

17. DataFrame (`df`) में कॉलम लेबल को बदलने के लिये निम्नलिखित में से किस Python statement का प्रयोग किया जाता है ? 1

(A) `df = df.rename({old_name : new_name}, axis='columns')`

(B) `df = df.rename(old_name, new_name), axis='columns'`

(C) `df = df.change_name(old_name, new_name, axis='bar')`

(D) `df = df.update({old_name : new_name}, axis='bar')`

18. Python Pandas में DataFrames के साथ लेबल इंडेक्सिंग (label indexing) के लिये `DataFrame. _____ []` प्रयोग किया जाता है । 1

(A) `label` (B) `index`

(C) `labindex` (D) `loc`

15. Which of the following libraries defines an ndarray in Python ? 1

(A) `pandas` (B) `numpy`

(C) `matplotlib` (D) `scipy`

16. With respect to SQL, match the function given in column-II with categories given in column-I : 1

	I		II
(i)	Math function	(a)	`COUNT()`
(ii)	Aggregate function	(b)	`ROUND()`
(iii)	Date function	(c)	`RIGHT()`
(iv)	Text function	(d)	`YEAR()`

Options :

(A) (i)-(c), (ii)-(d), (iii)-(a), (iv)-(b)

(B) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)

(C) (i)-(d), (ii)-(b), (iii)-(a), (iv)-(c)

(D) (i)-(b), (ii)-(c), (iii)-(d), (iv)-(a)

17. Which of the following Python statements is used to change a column label in a DataFrame, `df` ? 1

(A) `df = df.rename({old_name : new_name}, axis='columns')`

(B) `df = df.rename(old_name, new_name), axis='columns'`

(C) `df = df.change_name(old_name, new_name, axis='bar')`

(D) `df = df.update({old_name : new_name}, axis='bar')`

18. In Python Pandas, `DataFrame._____[]` is used for label indexing with DataFrames. 1

(A) `label` (B) `index`

(C) `labindex` (D) `loc`

19. इंटरनेट पर प्रत्येक वेब पेज (web page) का एक अलग पता होता है । इस पते (address) को कहा जाता है : 1

(A) डोमेन नाम (Domain Name)

(B) प्रोटोकॉल (Protocol)

(C) यूनिफॉर्म रिसोर्स लोकेटर (Uniform Resource Locater)

(D) नेटवर्क टोपोलॉजी (Network Topology)

प्रश्न संख्या **20** और **21** अभिकथन (A) और तर्क (R) किस्म के प्रश्न हैं । निम्नलिखित रूप में उनका सही विकल्प चुनिये :

(A) अभिकथन (A) और तर्क (R) दोनों सही हैं और अभिकथन (A) का सही स्पष्टीकरण तर्क (R) है ।

(B) अभिकथन (A) और तर्क (R) दोनों सही हैं और अभिकथन (A) का सही स्पष्टीकरण तर्क (R) नहीं है ।

(C) अभिकथन (A) सही है और तर्क (R) गलत है ।

(D) अभिकथन (A) गलत है, परंतु तर्क (R) सही है ।

20. **अभिकथन (A) :** Pandas में `drop()` method का प्रयोग DataFrame से rows और columns को हटाने (delete) के लिये किया जा सकता है । 1

तर्क (R) : `drop()` method में axis parameter यह विनिर्दिष्ट करता है कि rows (`axis=0`) को हटाना (delete करना) है या columns (`axis=1`) को हटाना (delete करना) है ।

21. **अभिकथन (A) :** SQL में `ROUND()` function का प्रयोग दशमलव स्थान तक किसी विनिर्दिष्ट संख्या को पूर्णांकित करने के लिये किया जा सकता है । 1

तर्क (R) : `ROUND()` function एक स्ट्रिंग (string) function है जो अक्षर मूल्यों (character values) को इनपुट रूप में लेता है और अंकीय मूल्यों (numeric values) को आउटपुट के रूप में दिखाता है ।

19. Every web page on the Internet has a unique address. This address is known as : **1**

(A) Domain Name (B) Protocol

(C) Uniform Resource Locater (D) Network Topology

Q. **20** and Q. **21** are Assertion (A) and Reason (R) type questions. Choose the correct option as :

(A) Both Assertion (A) and Reason (R) are True and Reason (R) is the correct explanation for Assertion (A).

(B) Both Assertion (A) and Reason (R) are True and Reason (R) is not the correct explanation for Assertion (A).

(C) Assertion (A) is True and Reason (R) is False.

(D) Assertion (A) is False, but Reason (R) is True.

20. **Assertion (A) :** The `drop()` method in Pandas can be used to delete rows and columns from a DataFrame. **1**

Reason (R) : The axis parameter in the `drop()` method specifies whether to delete rows (`axis=0`) or columns (`axis=1`).

21. **Assertion (A) :** The `ROUND()` function in SQL can be used to round off a number to a specified number of decimal places. **1**

Reason (R) : The `ROUND()` function is a string function that accepts character values as input and returns numerical values as output.

खण्ड – ख

22. (a) Python Pandas के Series और DataFrame के बीच अंतर के किन्हीं दो मुख्य बिन्दुओं का उल्लेख कीजिए । **2**

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(b) इस बात को स्पष्ट कीजिए कि slicing का उपयोग करते हुए हम किस प्रकार किसी series के elements को ऐक्सस (access) कर सकते हैं । अपने उत्तर के समर्थन में एक उदाहरण दीजिए ।

23. एक छोटा tech startup, अपने नये परियोजना प्रबंधन टूल (Project Management Tool) को तैयार करने के लिये ओपन सोर्स सॉफ्टवेयर (open source software) के प्रयोग पर विचार कर रहे हैं । वे ओपन सोर्स सोल्युशन्स (open source solutions) को अपनाने के लाभों और संभावित चुनौतियों का मूल्यांकन कर रहे हैं । **2**

(i) परियोजना प्रबंधन टूल (Project Management Tool) को तैयार करने के लिये ओपन सोर्स सॉफ्टवेयर (open source software) का उपयोग करने के एक मुख्य लाभ की पहचान करें ।

(ii) ओपन सोर्स सॉफ्टवेयर (open source software) के कोई दो उदाहरण दीजिए ।

24. **"Informatics Practices"** स्ट्रिंग (string) पर विचार कीजिए । निम्नलिखित के लिये उपयुक्त SQL queries लिखिये : **2**

(i) संपूर्ण स्ट्रिंग (string) को अपरकेस (uppercase) में परिवर्तित करने के लिए ।

(ii) दिये गये स्ट्रिंग (string) में अक्षरों (characters) की कुल संख्या प्रदर्शित करने के लिए ।

25. (a) स्टैटिक वेब पेज (Static web page) और डाइनैमिक वेब पेज (Dynamic web page) के बीच कोई दो अंतर बताइये । **2**

अथवा

(b) नेटवर्क में router की भूमिका का उल्लेख कीजिए ।

SECTION – B

22. (a) Mention any two main points of difference between Series and DataFrame of Python Pandas. **2**

OR

(b) Explain how we can access elements of a series using slicing. Give an example to support your answer.

23. A small tech startup, is considering using open source software to develop their new project management tool. They are evaluating the benefits and potential challenges of adopting open source solutions. **2**

(i) Identify one key benefit of using open source software for the development of project management tool.

(ii) Give any two examples of open source software.

24. Consider the string, **"Informatics Practices"**. Write suitable SQL queries for the following : **2**

(i) To convert the entire string to uppercase.

(ii) To display the total number of characters in the given string.

25. (a) Give any two points of difference between Static web page and Dynamic web page. **2**

OR

(b) Describe the role of a router in a network.

26. आँकड़ा आधार प्रबंधन प्रणाली (Database Management System (DBMS)) क्या है ? DBMS के कोई दो उदाहरण दीजिए । **2**

27. e-waste को लापरवाही से गड्ढे (landfills) या dumping grounds में फेंकने से पर्यावरण पर हो रहे किन्हीं दो प्रभावों को बताइये । **2**

28. (a) रोहित स्केलर वैल्यूज़ (scalar values) से Pandas Series तैयार करने की कोशिश कर रहा है । उसके code में कुछ त्रुटियाँ हैं । सही कोड पुन: लिखिये और किये गये संशोधनों को रेखांकित कीजिए । **2**

```
import pandas
data = [50, 15, 40]
series = pd.series(data, Index=['x', 'y', 'z'])
Print(series)
```

अथवा

(b) निम्नलिखित output प्राप्त करने के लिये दिये गये Python code को पूरा कीजिए :

```
   COLOUR   NAME   QTY
0   Red     Apple   10
1   Blue    Berry   15
2   Green   Guava   20
import ________ as pd
data=[{'COLOUR':'Red','NAME':'Apple', 'QTY':10},
{'COLOUR':'Blue','NAME':'Berry', 'QTY':15},
{________,'NAME' :'Guava','QTY':20}]
df=pd.DataFrame(________)
print(________)
```

26. What is a Database Management System (DBMS) ? Mention any two examples of DBMS. **2**

27. Give any two impacts on environment that are caused when e-waste is carelessly thrown or dumped in landfills or dumping grounds. **2**

28. (a) Rohit is trying to create a Pandas Series from scalar values. His code has some mistakes. Rewrite the correct code and underline the corrections made. **2**

```
import pandas
data = [50, 15, 40]
series = pd.series(data, Index=['x', 'y', 'z'])
Print(series)
```

OR

(b) Complete the given Python code to generate the following output :

```
   COLOUR   NAME   QTY
0   Red     Apple   10
1   Blue    Berry   15
2   Green   Guava   20
import _________ as pd
data=[{'COLOUR':'Red','NAME':'Apple', 'QTY':10},
{'COLOUR':'Blue','NAME':'Berry', 'QTY':15},
{_________,'NAME' :'Guava','QTY':20}]
df=pd.DataFrame(_________)
print(_________)
```

खण्ड – ग

29. रवि 12वीं कक्षा का छात्र है । वह सामाजिक नेटवर्किंग (Social Networking), ऑनलाइन शॉपिंग (Online Shopping) और स्कूल–प्रोजेक्ट्स के लिये अनुसंधान जैसे विभिन्न क्रियाकलापों हेतु बार–बार इंटरनेट का प्रयोग करता है । हाल ही में उसने गौर किया कि उसकी browsing history पर आधारित लक्षित विज्ञापन (targeted advertisement) उसे प्राप्त हो रहे हैं और वह अपने डिजिटल पदचिह्न (digital footprint) के बारे में चिंतित है । इसके अलावा, रवि के सामने cyberbullying की घटनायें भी आई हैं और इनको कैसे निपटाया जाए, इस बारे में वह अनिश्चितता की स्थिति में है । निम्नलिखित प्रश्नों का उत्तर देकर रवि की सहायता कीजिए : **3**

(i) डिजिटल पदचिह्न (Digital footprints) क्या हैं और ये कैसे बनते हैं ?

(ii) कोई दो इंटरनेट शिष्टाचार (Net etiquettes) बताइये ताकि सम्माननीय और जिम्मेदारीपूर्ण ऑनलाइन व्यवहार सुनिश्चित करने के लिये रवि इनका अनुपालन कर सके ।

(iii) साइबर बुलिंग (Cyberbullying) से रवि किस प्रकार अपना बचाव कर सकता है ? कोई एक सुरक्षात्मक सुझाव बताएँ ।

30. (a) Dictionary of Series का उपयोग करते हुए निम्नलिखित DataFrame तैयार करने के लिये Python program लिखिये : **3**

	City	State
0	Mumbai	Maharashtra
1	Dehradun	Uttarakhand
2	Bengaluru	Karnataka
3	Hyderabad	Telangana

अथवा

(b) `'A', 'B', 'C', 'D', 'E'` सूचकांकों (Indices) के साथ संबंधित `10, 20, 30, 40, 50` संख्याओं वाले ndarray से Pandas Series, जैसे कि नीचे दिया गया है, बनाने का Python program लिखिये ।

A	10
B	20
C	30
D	40
E	50

SECTION – C

29. Ravi is a student studying in grade 12. He frequently uses the internet for various activities such as social networking, online shopping, and to research for school projects. Recently, he noticed that he receives targeted advertisements based on his browsing history and is concerned about his digital footprint. Additionally, Ravi has encountered instances of cyberbullying and is unsure how to handle them. Help Ravi by answering the following questions : **3**

(i) What are digital footprints, and how are they created ?

(ii) Write any two net etiquettes that Ravi should follow to ensure respectful and responsible online behavior.

(iii) How can Ravi protect himself from cyberbullying ? Mention any one protective measure.

30. (a) Write a Python program to create the following DataFrame using a Dictionary of Series : **3**

	City	State
0	Mumbai	Maharashtra
1	Dehradun	Uttarakhand
2	Bengaluru	Karnataka
3	Hyderabad	Telangana

OR

(b) Write a Python program to create a Pandas Series as shown below from an ndarray containing the numbers `10, 20, 30, 40, 50` with corresponding indices `'A', 'B', 'C', 'D', 'E'`.

A	10
B	20
C	30
D	40
E	50

31. (i) निम्नलिखित विनिर्देशनों के साथ तालिका (table) **Customer** बनाने के लिये SQL statement लिखिये : **(2+1) 3**

Table:Customer

Column Name	Data Type	Key
CID	Int	Primary Key
FName	Varchar(20)	
LName	Varchar(20)	
Age	Int	

(ii) Table **Customer** में से **LName** के अवरोही क्रम (descending order) में सभी रिकार्ड्स को प्रदर्शित करने के लिये SQL query लिखिये ।

32. (a) निम्न तालिकाएँ (tables) दी गई हैं : **3**

Table: STUDENTS

S_ID	NAME	AGE	CITY
1	Rahul	20	Delhi
2	Priya	22	Mumbai
3	David	21	Delhi
4	Neha	23	Bengaluru
5	Khurshid	22	Delhi

Table: GRADES

S_ID	SUBJECT	GRADE
1	Math	A
2	English	B
3	Math	C
4	English	A
5	Math	B

निम्नलिखित के लिये SQL queries लिखिये :

(i) प्रत्येक शहर से छात्रों की संख्या प्रदर्शित करने के लिए ।

(ii) सभी छात्रों की औसत आयु बताने के लिए ।

(iii) छात्रों के नामों और उनके grades की सूची प्रदर्शित करने के लिए ।

अथवा

31. (i) Write the SQL statement to create a table, **Customer** with the following specifications : **(2+1) 3**

Table:Customer

Column Name	Data Type	Key
CID	Int	Primary Key
FName	Varchar(20)	
LName	Varchar(20)	
Age	Int	

(ii) Write the SQL query to display all records in descending order of **LName** from the Table **Customer**.

32. (a) Given the following tables : **3**

Table: STUDENTS

S_ID	NAME	AGE	CITY
1	Rahul	20	Delhi
2	Priya	22	Mumbai
3	David	21	Delhi
4	Neha	23	Bengaluru
5	Khurshid	22	Delhi

Table: GRADES

S_ID	SUBJECT	GRADE
1	Math	A
2	English	B
3	Math	C
4	English	A
5	Math	B

Write SQL queries for the following :

(i) To display the number of students from each city.

(ii) To find the average age of all students.

(iii) To list the names of students and their grades.

OR

(b) निम्नलिखित तालिकाओं (tables) पर विचार कीजिए : 3

Table 1: PRODUCTS

यह table एक दुकान में उपलब्ध उत्पादों के मूल विवरणों को स्टोर करती है ।

PID	**PName**	**Category**
201	Laptop	Electronics
202	Chair	Furniture
203	Desk	Furniture
204	Smartphone	NULL
205	Tablet	Electronics

Table 2: SALES

यह table प्रत्येक उत्पाद की बिक्री यूनिट की संख्या रिकार्ड करती है ।

SaleID	**PID**	**UnitsSold**
301	201	50
302	202	100
303	203	60
304	204	80
305	205	70

निम्नलिखित के लिये SQL queries लिखिये :

(i) Table **SALES** से उन रिकार्ड्स को हटाने के लिए जिनकी बिक्री यूनिट **(Units sold)** 80 से कम है ।

(ii) उन सभी उत्पादों के नाम (Product names) प्रदर्शित करने के लिए जिनकी श्रेणी (category) ज्ञात नहीं है ।

(iii) उत्पादों के नाम (Product names) और उनसे संबंधित बिक्री यूनिट (units sold) प्रदर्शित करने के लिए ।

(b) Consider the following tables : **3**

Table 1: PRODUCTS

This table stores the basic details of the products available in a shop.

PID	**PName**	**Category**
201	Laptop	Electronics
202	Chair	Furniture
203	Desk	Furniture
204	Smartphone	NULL
205	Tablet	Electronics

Table 2: SALES

This table records the number of units sold for each product.

SaleID	**PID**	**UnitsSold**
301	201	50
302	202	100
303	203	60
304	204	80
305	205	70

Write SQL queries for the following :

(i) To delete those records from table **`SALES`** whose **`UnitsSold`** is less than 80.

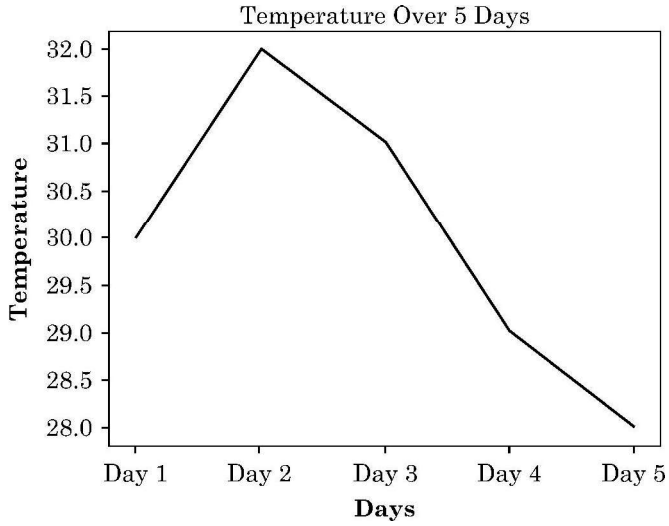
(ii) To display names of all products whose category is not known.

(iii) To display the product names along with their corresponding units sold.

खण्ड – घ

33. गुरकीरत को नीचे दिखाए गए line plot बनाने वाले Python program में रिक्त स्थानों की पूर्ति करनी है । दिया गया Line plot पिछले पाँच दिनों के तापमान (डिग्री सेल्सियस में) को प्रदर्शित करता है जैसा कि तालिका (table) में दिखाया गया है । 4

Days	Temperature
Day 1	30
Day 2	32
Day 3	31
Day 4	29
Day 5	28

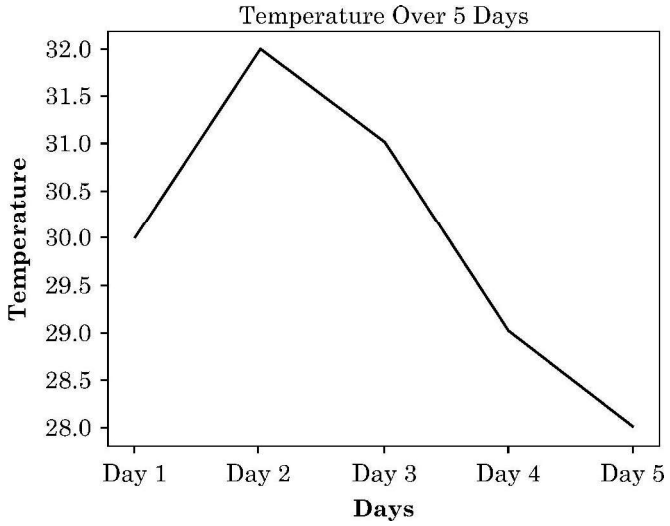



```
import ______ as plt # Statement-1
days = ['Day 1', 'Day 2', 'Day 3', 'Day 4', 'Day 5']
temp = [30, 32, 31, 29, 28]
plt.__(days, temp) # Statement-2
plt.xlabel('______') # Statement-3
plt.ylabel('Temperature')
plt.title('_____') # Statement-4
plt.show()
```

SECTION – D

33. Gurkirat has to fill in the blanks in the given Python program that generates a line plot as shown below. The given line plot represents the temperature (in degree Celcius) over five days as given in the table : **4**

Days	**Temperature**
Day 1	30
Day 2	32
Day 3	31
Day 4	29
Day 5	28




```
import ______ as plt # Statement-1
days = ['Day 1', 'Day 2', 'Day 3', 'Day 4', 'Day 5']
temp = [30, 32, 31, 29, 28]
plt.__(days, temp) # Statement-2
plt.xlabel('______') # Statement-3
plt.ylabel('Temperature')
plt.title('_____') # Statement-4
plt.show()
```

दिये गये विनिर्देशनों के अनुसार missing statements लिखिये :

(i) Statement-1 के रूप में अंकित लाइन के रिक्त स्थान (blank space) में आवश्यक module को import करने के लिये उचित कोड लिखिये ।

(ii) Line Plot बनाने के लिये उचित Python function नाम के साथ Statement-2 में रिक्त स्थान की पूर्ति कीजिये ।

(iii) दिये गये ग्राफ को देखिये और x-axis के लिए उपयुक्त लेबल प्रदर्शित करने के लिए Statement-3 में रिक्त स्थान की पूर्ति कीजिए ।

(iv) दिये गये ग्राफ को देखिये और उचित chart title को प्रदर्शित करने के लिए Statement-4 में रिक्त स्थान की पूर्ति कीजिये ।

34. (a) एक शैक्षणिक संस्था प्रस्तावित पाठ्यक्रमों का विवरण संगृहीत करने के लिये डेटाबेस (database) का रखरखाव कर रही है । डेटाबेस (database) में निम्नलिखित विशेषकों (attributes) के साथ एक table, COURSE शामिल है । **4**

C_ID : प्रत्येक पाठ्यक्रम के लिये अलग ID संगृहीत करता है ।

C_NAME : पाठ्यक्रम का नाम संगृहीत करता है ।

INSTRUCTOR : पाठ्यक्रम के अनुदेशक का नाम संगृहीत करता है ।

DURATION : पाठ्यक्रम की अवधि घंटों में संगृहीत करता है ।

Table : **COURSE**

C_ID	C_NAME	INSTRUCTOR	DURATION
C101	Data Structures	Dr. Alok	40
C102	Machine Learning	Prof. Sunita	60
C103	Web Development	Ms. Sakshi	45
C104	Database Management	Mr. Suresh	50
C105	Python Programming	Dr. Pawan	35

निम्नलिखित के लिये SQL queries लिखिये :

(i) निम्नलिखित विनिर्देशनों के साथ एक नया रिकार्ड जोड़ना :

```
C_ID        : C106
C_NAME      : Introduction to AI
INSTRUCTOR  : Ms. Preeti
DURATION    : 55
```

(ii) सभी पाठ्यक्रमों में से सबसे लंबी अवधि को प्रदर्शित करने के लिए

(iii) संस्था द्वारा चलाये जा रहे पाठ्यक्रमों की कुल संख्या बताने के लिए

(iv) लोअर केस (Lower case) में अनुदेशकों (instructors) के नाम प्रदर्शित करने के लिए

अथवा

Write the missing statements according to the given specifications :

(i) Write the suitable code to import the required module in the blank space in the line marked as Statement-1.

(ii) Fill in the blank in Statement-2 with a suitable Python function name to create a line plot.

(iii) Refer to the graph shown and fill in the blank in Statement-3 to display the appropriate label for x-axis.

(iv) Refer to the graph shown and fill in the blank in Statement-4 to display the suitable chart title.

34. (a) An educational institution is maintaining a database for storing the details of courses being offered. The database includes a table COURSE with the following attributes : 4

C_ID : Stores the unique ID for each course.

C_NAME : Stores the course's name.

INSTRUCTOR : Stores the name of the course instructor.

DURATION : Stores the duration of the course in hours.

Table : **COURSE**

C_ID	C_NAME	INSTRUCTOR	DURATION
C101	Data Structures	Dr. Alok	40
C102	Machine Learning	Prof. Sunita	60
C103	Web Development	Ms. Sakshi	45
C104	Database Management	Mr. Suresh	50
C105	Python Programming	Dr. Pawan	35

Write SQL queries for the following :

(i) To add a new record with following specifications :

```
C_ID        : C106
C_NAME      : Introduction to AI
INSTRUCTOR  : Ms. Preeti
DURATION    : 55
```

(ii) To display the longest duration among all courses.

(iii) To count total number of courses run by the institution.

(iv) To display the instructors' name in lower case.

OR

(b) आशुतोष, जो एक प्रबंधक है, ने कर्मचारियों के रिकार्ड के प्रबंधन के लिये एक डेटाबेस (database) तैयार किया है । इस database में EMPLOYEE नाम का एक टेबल है जिसके attributes (विशेषकों) का उल्लेख नीचे किया गया है : 4

EID : प्रत्येक कर्मचारी के लिये unique ID संगृहीत करता है ।

EMP_NAME : कर्मचारी का नाम संगृहीत करता है ।

DEPT : कर्मचारी के विभाग को संगृहीत करता है ।

SALARY : कर्मचारी का वेतन संगृहीत करता है ।

JOIN_DATE : कर्मचारी की कंपनी ज्वाइन (Join) की तारीख संगृहीत करता है ।

Table : **EMPLOYEE**

EID	EMP_NAME	DEPT	SALARY	JOIN_DATE
E01	ARJUN SINGH	SALES	75000	2019-11-01
E02	PRIYA JAIN	ENGINEERING	85000	2020-05-20
E03	RAVI SHARMA	MARKETING	60000	2018-08-14
E04	AYESHA	NULL	50000	2021-01-10
E05	RAHUL VERMA	FINANCE	40000	2017-06-25

निम्नलिखित SQL queries का output लिखिए :

(i) `Select SUBSTRING(EMP_NAME, 1, 5) from EMPLOYEE where DEPT = 'ENGINEERING';`

(ii) `Select EMP_NAME from EMPLOYEE where month(JOIN_DATE) = 8;`

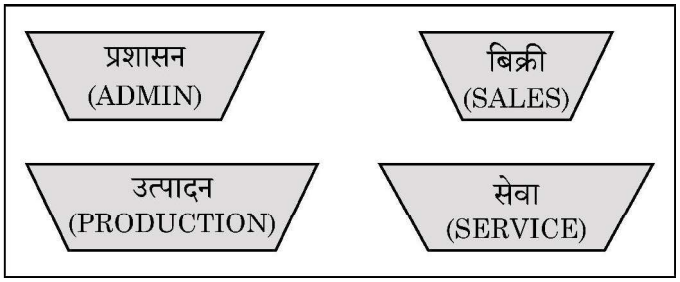
(iii) `Select EMP_NAME from EMPLOYEE where SALARY > 60000;`

(iv) `Select count(DEPT) from EMPLOYEE;`

खण्ड – ङ

35. XYZ Technologies, Hyderabad एक कंपनी है जो data science और AI Projects पर कार्य करती है । उसके अलग-अलग प्रभाग हैं जैसे ADMIN (प्रशासन), SALES (बिक्री), PRODUCTION (उत्पादन) और SERVICE (सेवा) ।

हैदराबाद शाखा का layout (खाका) इस प्रकार है : 5



(b) Ashutosh, who is a manager, has created a database to manage employee records. The database includes a table named EMPLOYEE whose attribute names are mentioned below : **4**

EID : Stores the unique ID for each employee.

EMP_NAME : Stores the name of the employee.

DEPT : Stores the department of the employee.

SALARY : Stores the salary of the employee.

JOIN_DATE : Stores the employee's joining date.

Table : **EMPLOYEE**

EID	EMP_NAME	DEPT	SALARY	JOIN_DATE
E01	ARJUN SINGH	SALES	75000	2019-11-01
E02	PRIYA JAIN	ENGINEERING	85000	2020-05-20
E03	RAVI SHARMA	MARKETING	60000	2018-08-14
E04	AYESHA	NULL	50000	2021-01-10
E05	RAHUL VERMA	FINANCE	40000	2017-06-25

Write the output of the following SQL Queries :

(i) `Select SUBSTRING(EMP_NAME, 1, 5) from EMPLOYEE where DEPT = 'ENGINEERING';`

(ii) `Select EMP_NAME from EMPLOYEE where month(JOIN_DATE) = 8;`

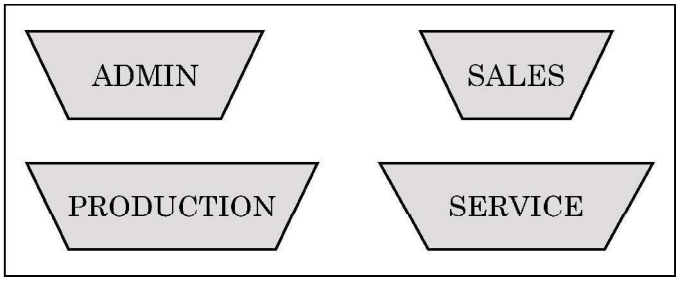
(iii) `Select EMP_NAME from EMPLOYEE where SALARY > 60000;`

(iv) `Select count(DEPT) from EMPLOYEE;`

SECTION – E

35. XYZ Technologies, Hyderabad is a company that deals with data science and AI projects. They have different divisions ADMIN, SALES, PRODUCTION and SERVICE.

The layout of the Hyderabad branch is : **5**



प्रबंधन सभी प्रभागों और प्रत्येक प्रभाग (ADMIN, SALES, PRODUCTION और SERVICE) के कम्प्यूटर्स को आपस में जोड़ना चाहता है ।

प्रभागों (divisions) के बीच की दूरी इस प्रकार है :

ADMIN to SALES	**69m**
ADMIN to PRODUCTION	**84m**
ADMIN to SERVICE	**60m**
SALES to PRODUCTION	**110m**
SALES to SERVICE	**135m**
PRODUCTION to SERVICE	**90m**

प्रत्येक प्रभाग में कम्प्यूटर्स की संख्या :

Division	**Number of Computers**
ADMIN	40
SALES	75
PRODUCTION	120
SERVICE	20

उपर्युक्त विनिर्देशनों के आधार पर निम्नलिखित प्रश्नों का उत्तर दीजिए :

(i) हैदराबाद कार्यालय के सभी प्रभागों को जोड़ने के लिये Topology (सांस्थितिकी) का सुझाव दीजिए और सर्वाधिक उचित केबल नक्शा (Cable Layout) का चित्र बनाइये ।

(ii) XYZ Technologies का प्रधान कार्यालय (head office) अमरीका (USA) में है । अमरीका स्थित कार्यालय के साथ हैदराबाद कार्यालय को जोड़ने के लिये LAN, MAN और WAN में से किस प्रकार का नेटवर्क तैयार किया जाएगा ? अपने उत्तर का औचित्य सिद्ध करें ।

(iii) सर्वर (Server) लगाने के लिये उचित प्रभाग का सुझाव दीजिए । अपने इस सुझाव के कारण को स्पष्ट कीजिये ।

(iv) स्विच/हब (Switch/Hub) के स्थापन (placement) का सुझाव दीजिए और उसका औचित्य भी बताइये ।

(v) सुझाये गये नेटवर्क नक्शे (network layout) में रिपीटर (repeater) को कहाँ लगाया जायेगा ? अपने उत्तर का औचित्य बताइये ।

The management wants to connect all the divisions as well as the computers of each division (ADMIN, SALES, PRODUCTION and SERVICE).

Distance between the divisions are as follows :

ADMIN to SALES	**69m**
ADMIN to PRODUCTION	**84m**
ADMIN to SERVICE	**60m**
SALES to PRODUCTION	**110m**
SALES to SERVICE	**135m**
PRODUCTION to SERVICE	**90m**

Number of computers in each division :

Division	**Number of Computers**
ADMIN	40
SALES	75
PRODUCTION	120
SERVICE	20

Based on the above specifications, answer the following questions :

(i) Suggest the topology and draw the most suitable cable layout for connecting all the divisions in the Hyderabad office.

(ii) XYZ Technologies is having its head office in USA. Out of LAN, MAN and WAN, which kind of network will be created to connect Hyderabad office with USA Office ? Justify your answer.

(iii) Suggest the division for the placement of server. Explain the reason for your selection.

(iv) Suggest the placement of Switch/Hub with justification.

(v) Where will a repeater be placed in the suggested network layout ? Justify your answer.

36. नीचे दिखाये गये DataFrame **Doctor** पर विचार कीजिए : **5**

	DID	Name	Department	Fee
0	101	Dr. Joe	ENT	1500
1	102	Dr. Salma	UROLOGY	1600
2	103	Dr. Jeet	ORTHO	1550
3	104	Dr. Neha	ENT	1200
4	105	Dr. Vikram	ORTHO	1700

निम्नलिखित के लिये उचित Python statements लिखिये :

(i) DataFrame **Doctor** की अंतिम तीन rows प्रिंट करने के लिये ।

(ii) सभी डाक्टर्स के नाम प्रदर्शित करने के लिये ।

(iii) सभी डाक्टर्स के लिये **'Discount'** का एक नया कॉलम जोड़ने के लिये । सभी की वैल्यू (value) **200** होनी चाहिए ।

(iv) **2** और **3** Index वाली rows दिखाने के लिये ।

(v) **'Department'** कॉलम हटाने के लिये ।

37. (a) निम्नलिखित के लिये SQL query लिखिये : **5**

(i) **STUDENTS** table से **Score** कॉलम के सभी values का योग दिखाने के लिए ।

(ii) **STUDENTS** table से **Name** कॉलम के पहले पाँच कैरेक्टर्स (characters) प्रदर्शित करने के लिए ।

(iii) ट्रेलिंग स्पेसिस (Trailing Spaces) को हटाने के बाद **STUDENTS** table से **Name** कॉलम के values को प्रदर्शित करने के लिए ।

(iv) **GRADES** table के **Score** कॉलम से न्यूनतम स्कोर (Score) को पुन: प्राप्त करने के लिए ।

(v) **STUDENTS** table में सभी छात्रों का शुल्क **100** बढ़ाने के लिए (कॉलम का नाम **FEE** है) ।

अथवा

(b) निम्नलिखित के लिये SQL queries लिखिये :

(i) **15** के वर्ग की गणना करने के लिए ।

(ii) **456.789** संख्या का निकटतम पूर्णांक बनाने के लिए ।

(iii) **'mycommercial.com'** स्ट्रिंग में **'com'** की प्रथम दृष्ट (first occurrence) की स्थिति प्रदर्शित करने के लिए ।

(iv) **'2024-11-07'** तारीख का दिन(वार) का नाम प्रदर्शित करने के लिए ।

(v) वर्तमान तारीख और समय प्रदर्शित करने के लिए ।

36. Consider the DataFrame **`Doctor`** shown below : **5**

	DID	Name	Department	Fee
0	101	Dr. Joe	ENT	1500
1	102	Dr. Salma	UROLOGY	1600
2	103	Dr. Jeet	ORTHO	1550
3	104	Dr. Neha	ENT	1200
4	105	Dr. Vikram	ORTHO	1700

Write suitable Python statements for the following :

(i) To print the last three rows of the DataFrame **`Doctor`**.

(ii) To display the names of all doctors.

(iii) To add a new column **`'Discount'`** with value of **`200`** for all doctors.

(iv) To display rows with index **`2`** and **`3`**.

(v) To delete the column **`'Department'`**.

37. (a) Write SQL query for the following : **5**

(i) To display sum total of all the values of the **`Score`** column, from **`STUDENTS`** table.

(ii) To display the first five characters of the **`Name`** column from **`STUDENTS`** table.

(iii) To display the values of **`Name`** column from the **`STUDENTS`** table, after removing the trailing spaces.

(iv) To retrieve the lowest score from the **`Score`** column of **`GRADES`** table.

(v) To increase the fee of all students by **`100`**, in the **`STUDENTS`** table. (The name of the column is **`FEE`**)

OR

(b) Write SQL queries for the following :

(i) To calculate the square of **`15`**.

(ii) To round the number **`456.789`** to the nearest integer.

(iii) To display the position of first occurrence of **`'com'`** in the string **`'mycommercial.com'`**.

(iv) To display the name of the day for the date **`'2024-11-07'`**.

(v) To display the current date and time.



Marking Scheme

Strictly Confidential

(For internal and restricted use only)

Senior Secondary School Examination, 2025

SUBJECT NAME INFORMATICS PRACTICES (Set 4 Q.P. CODE 90)

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 the 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 the given answer and even if the reply is not from the 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 the answer is correct. For wrong answer CROSS 'X" be marked. Evaluators will not put right (/)while evaluating which gives an impression that the answer is correct and no marks are awarded. This is the 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, the 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 **70 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 the 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 answers.) ● Half or a part of the 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 a 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
INFORMATICS PRACTICES

Max. Marks: 70

General Instructions :

(i) *Please check this question paper contains **37** questions.*

(ii) ***All** questions are compulsory. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.*

(iii) *The paper is divided into 5 sections - A, B, C, D and E.*

(iv) ***Section A** consists of **21** questions (**1** to **21**). Each question carries **1** mark.*

(v) ***Section B** consists of **7** questions (**22** to **28**). Each question carries **2** marks.*

(vi) ***Section C** consists of **4** questions (**29** to **32**). Each question carries **3** marks.*

(vii) ***Section D** consists of **2** case study type questions (**33** & **34**). Each question carries **4** marks.*

(viii) ***Section E** consists of **3** questions (**35** to **37**). Each question carries **5** marks.*

(ix) ***All** programming questions are to be answered using Python language only.*

(x) *In case of MCQs, text of the correct answer should also be written.*

Special Note: Questions (except the code) correctly answered in Hindi language as per the following Marking Scheme are to be accepted.

<table>
<tr><td></td><td colspan="4">SECTION A</td><td></td></tr>
<tr><td>1.</td><td colspan="4">State whether the following statement is True or False:
In Python, we cannot create an empty DataFrame</td><td>1</td></tr>
<tr><td>Ans</td><td colspan="4">False</td><td></td></tr>
<tr><td></td><td colspan="4">(1 Mark for writing the correct answer)</td><td></td></tr>
<tr><td>2.</td><td colspan="4">What will be the output of the following SQL command?
SELECT MONTHNAME('2024-08-02');
(A) 08 (B) 02
(C) February (D) August</td><td>1</td></tr>
<tr><td>Ans</td><td colspan="4">(D) August</td><td></td></tr>
<tr><td></td><td colspan="4">(1 Mark for writing the correct answer)</td><td></td></tr>
<tr><td>3.</td><td colspan="4">Temporary data files stored by websites in our computer can be used to track our online activities and also to personalize browsing experience. These files are known as :
(A) Plug-ins (B) Add-ons
(C) Cookies (D) Bookmarks</td><td>1</td></tr>
<tr><td>Ans</td><td colspan="4">(C) Cookies</td><td></td></tr>
<tr><td></td><td colspan="4">(1 Mark for writing the correct answer)</td><td></td></tr>
<tr><td>4.</td><td colspan="4">Which of the following is not an aggregate function in SQL?
(A) COUNT(*) (B) MIN()
(C) LEFT() (D) AVG()</td><td>1</td></tr>
</table>

Ans	(C) **`LEFT()`**	
	(1 Mark for writing the correct answer)	
5.	Raheem created a unique computer software and wants to protect his creation from being copied or used without his permission. He is considering to apply for legal protection. Which type of intellectual property protection should Raheem apply for, to safeguard his software ? (A) Copyright (B) Plagiarism (C) Trademark (D) Lease	1
Ans	(A) Copyright	
	(1 Mark for writing the correct answer)	
6.	What is the default index type for a Pandas Series if not explicitly specified ? (A) String (B) List (C) Numeric (D) Boolean	1
Ans	(C) Numeric	
	(1 Mark for writing the correct answer)	
7.	In Python which function of **`matplotlib`** library is used to save a plot ? (A) **`save()`** (B) **`saveplot()`** (C) **`export()`** (D) **`savefig()`**	1
Ans	(D) **`savefig()`**	
	(1 Mark for writing the correct answer)	
8.	State whether the following statement is True or False : The **`MOD()`** function in SQL returns the quotient of division operation between two numbers.	1
Ans	False	
	(1 Mark for writing the correct answer)	
9.	Which of the following data structure is used for storing one-dimensional labelled data in Python Pandas ? (A) Integer (B) Dictionary (C) Series (D) DataFrame	1
Ans	(C) Series	
	(1 Mark for writing the correct answer)	
10.	Priya received an email that appeared to be from her bank, asking her to update her account information by clicking on a link. She clicked the link to enter her details, but immediately after, some amount was debited from her account. What type of cybercrime did Priya fall victim to ?	1

	(A) Cyber stalking	(B) Phishing	
	(C) Fishing	(D) Cyber bullying	
Ans	(B) Phishing		
	(1 Mark for writing the correct answer)		
11.	Which SQL function calculates $\mathbf{a^b}$? (A) **MOD()** (B) **POWER()** (C) **RAISE()** (D) **ROUND()**		1
Ans	(B) **POWER()**		
	(1 Mark for writing the correct answer)		
12.	Which protocol is used while communicating through video calls on the Internet ? (A) Video Over Internet Protocol (B) Voice Over Internet Protocol (C) Internet Protocol (D) Video Audio Over Internet Protocol		1
Ans	(B) Voice Over Internet Protocol		
	(1 Mark for writing the correct answer)		
13.	Which of the following Python statements will be used to select a specific element having index as **points**, from a Pandas Series named **ser** ? (A) **ser.element(points)** (B) **ser.select(points)** (C) **ser[points]** (D) **ser.show(points)**		1
Ans	(C) **ser[points]**		
	(1 Mark for writing the correct answer)		
14.	Excessive screen time and poor posture can lead to : (A) Faster Internet Speeds (B) Eye strain and other health issues (C) Better vision and bone density (D) Improved physical health		1
Ans	(B) Eye strain and other health issues		
	(1 Mark for writing the correct answer)		
15.	Which of the following libraries defines an ndarray in Python ? (A) **pandas** (B) **numpy** (C) **matplotlib** (D) **scipy**		1
Ans	(B) **numpy**		
	(1 Mark for writing the correct answer)		
16.	With respect to SQL, match the function given in column-II with categories given		1

in column-I:

	I		II
(i)	Math function	(a)	`COUNT()`
(ii)	Aggregate function	(b)	`ROUND()`
(iii)	Date function	(c)	`RIGHT()`
(iv)	Text function	(d)	`YEAR()`

Options :

(A) (i)-(c), (ii)-(d), (iii)-(a), (iv)-(b)
(B) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)
(C) (i)-(d), (ii)-(b), (iii)-(a), (iv)-(c)
(D) (i)-(b), (ii)-(c), (iii)-(d), (iv)-(a)

Ans (B) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)

(1 Mark for writing the correct answer)

17. Which of the following Python statements is used to change a column label in a DataFrame, **`df`** ? 1

(A) `df = df.rename({old_name : new_name}, axis='columns')`
(B) `df = df.rename(old_name, new_name), axis='columns'`
(C) `df = df.change_name(old_name, new_name, axis='bar')`
(D) `df = df.update({old_name : new_name}, axis='bar')`

Ans (A) `df = df.rename({old_name : new_name}, axis='columns')`

(1 Mark for writing the correct answer)

18. In Python Pandas, **`DataFrame.`** _____ **`[]`** is used for label indexing with DataFrames. 1

(A)	`label`	(B)	`index`
(C)	`labindex`	(D)	`loc`

Ans (D) `loc`

(1 Mark for writing the correct answer)

19. Every web page on the Internet has a unique address. This address is known as : 1

(A)	Domain Name	(B)	Protocol
(C)	Uniform Resource Locater	(D)	Network Topology

Ans (C) Uniform Resource Locater

(1 Mark for writing the correct answer)

Q. 20 and Q. 21 are Assertion (A) and Reason (R) type questions. Choose the correct option as :

(A) Both Assertion (A) and Reason (R) are True and Reason (R) is the

<table>
<tr><td></td><td>correct explanation for Assertion (A).
(B) Both Assertion (A) and Reason (R) are True and Reason (R) is not the correct explanation for Assertion (A).
(C) Assertion (A) is True and Reason (R) is False.
(D) Assertion (A) is False, but Reason (R) is True.</td><td></td></tr>
<tr><td>20.</td><td>Assertion (A) : The <code>drop()</code> method in Pandas can be used to delete rows and columns from a DataFrame.
Reason (R) : The axis parameter in the <code>drop()</code> method specifies whether to delete rows <code>(axis=0)</code> or columns <code>(axis=1)</code>.</td><td>1</td></tr>
<tr><td>Ans</td><td>(A) Both Assertion (A) and Reason (R) are True and Reason (R) is the correct explanation for Assertion (A).</td><td></td></tr>
<tr><td></td><td>(1 Mark for writing the correct answer)
Note: Option (B) also to be accepted as the correct answer.</td><td></td></tr>
<tr><td>21.</td><td>Assertion (A) : The <code>ROUND()</code> function in SQL can be used to round off a number to a specified number of decimal places.
Reason (R) : The <code>ROUND()</code> function is a string function that accepts character values as input and returns numerical values as output.</td><td>1</td></tr>
<tr><td>Ans</td><td>(C) - Assertion (A) is TRUE and Reason (R) is FALSE</td><td></td></tr>
<tr><td></td><td>(1 Mark for writing the correct answer)</td><td></td></tr>
<tr><td></td><td>SECTION B</td><td></td></tr>
<tr><td>22.</td><td>(a) Mention any two main points of difference between Series and DataFrame of Python Pandas.</td><td>2</td></tr>
<tr><td>Ans</td><td>
<table>
<tr><th>Series</th><th>DataFrame</th></tr>
<tr><td>Series is one-dimensional</td><td>DataFrame is two-dimensional</td></tr>
<tr><td>Series is used for storing a single column of data.</td><td>DataFrame is used for storing multiple columns of data.</td></tr>
<tr><td>Elements in Series must be homogeneous</td><td>Elements in DataFrame may be heterogeneous.</td></tr>
<tr><td>Elements in Series are accessed using a single index.</td><td>Elements in DataFrame are accessed using two indices.</td></tr>
<tr><td>Size of Series is immutable</td><td>Size of DataFrame is mutable</td></tr>
</table>
</td><td></td></tr>
<tr><td></td><td>(1 Mark each for writing any two correct differences)
Note: Full 2 marks to be awarded if difference is explained using examples of each.
1 mark to be awarded if only examples of both are written.</td><td></td></tr>
<tr><td></td><td>OR
(b) Explain how we can access elements of a series using slicing. Give an example to support your answer.</td><td></td></tr>
<tr><td>Ans</td><td>Elements of a series can be accessed in any of the following ways using slicing:

Example:</td><td></td></tr>
</table>

	Considering **data** to be a pandas series containing values **[10, 20, 30, 40, 50]** having index as **['a','b','c','d','e']** **Positional Indexing/ Integer-based slicing:** Slice a Series using indices **# Slice the Series from the first to the third element** **data[0:3] OR data.iloc[0:3]** **Label-based slicing:** Slice a Series using its index labels. **data['b':'d'] OR data.loc['b':'d']** **Conditional slicing:** Slice a Series based on condition. **# Slice the Series where values are greater than 30** **#for a pandas series named as data** **data[data > 30]**	
	(1 Mark for explaining any one method of slicing) ***(1 Mark for correct example)*** ***Note:*** ***Full 2 marks to be awarded if accessing using slicing is explained with the help of an example.*** ***(1 mark to be awarded if only example is written)***	
23.	A small tech startup, is considering using open source software to develop their new project management tool. They are evaluating the benefits and potential challenges of adopting open source solutions.	2
	(i) Identify one key benefit of using open source software for the development of project management tool.	
Ans	Using open-source software to develop a new project management tool offers the following benefits: ● Open-source softwares mostly have support of large communities that contribute to the software, documentation, and shared knowledge, which is useful during development. ● Open-source software eliminates dependence on a single vendor. ● Open-source software can be easily integrated with other open-source tools and systems, reducing compatibility issues. ● Open-source software often incorporates the latest technologies, innovations, and best practices, ensuring developers have access to the most advanced tools and techniques. ● As Open-Source software provides access to a variety of existing open-source libraries and frameworks, developers can speed up the development process by building upon existing solutions. ● Open-source software is mostly cost effective.	
	(1 Mark for writing Any one correct benefit)	
	(ii) Give any two examples of open source software.	
Ans	Some Examples of open-source software: MySQL , PostgreSQL, Linux , Ubuntu, LibreOffice , OpenOffice , GIMP, Firefox, Chromium	
	(½ Mark each for writing Any two correct examples of Open-Source software)	

<table>
<tr><td>24.</td><td>Consider the string, "Informatics Practices". Write suitable SQL queries for the following :</td><td>2</td></tr>
<tr><td></td><td>(i) To convert the entire string to uppercase.</td><td></td></tr>
<tr><td>Ans</td><td>SELECT UCASE("Informatics Practices");
OR
SELECT UPPER("Informatics Practices");</td><td></td></tr>
<tr><td></td><td>(ii) To display the total number of characters in the given string.</td><td></td></tr>
<tr><td>Ans</td><td>SELECT LEN("Informatics Practices");
OR
SELECT LENGTH("Informatics Practices");</td><td></td></tr>
<tr><td></td><td>(1 Mark each for both the parts (i) and (ii)</td><td></td></tr>
<tr><td>25.</td><td>(a) Give any two points of difference between Static web page and Dynamic web page.</td><td>2</td></tr>
<tr><td>Ans</td><td>Differences between Static web page and Dynamic web page:
<table>
<tr><th>Static web page</th><th>Dynamic web page</th></tr>
<tr><td>A web page with content that is predefined and static.</td><td>A web page with content that changes dynamically.</td></tr>
<tr><td>Has limited interactivity.</td><td>It is highly interactive.</td></tr>
<tr><td>Requires minimum Server processing.</td><td>Requires server-side processing.</td></tr>
<tr><td>Lower development and hosting cost.</td><td>Higher development and hosting cost.</td></tr>
</table></td><td></td></tr>
<tr><td></td><td>(1 Mark each for writing Any two correct differences)
Note: Difference between static webpage and dynamic webpage explained with the help of an example to be accepted.</td><td></td></tr>
<tr><td></td><td>OR
(b) Describe the role of a router in a network.</td><td></td></tr>
<tr><td>Ans</td><td>Roles of router in a network:
● Interconnecting networks: Router connects multiple networks, such as local area networks (LANs), wide area networks (WANs), and the Internet.
● Routing traffic: Routers direct traffic between networks, ensuring that data packets are delivered to the correct destination.
● Packet forwarding using Best route: Routers forward packets of data between networks, using the destination IP address to determine the best route to the destination.
● Quality of Service: Routers prioritize traffic to ensure that critical applications receive sufficient bandwidth and low latency.
● Firewall functionality: Many routers include built-in firewall capabilities, which block unauthorized access to the network.
● Access control: Routers can restrict access to the network based on user authentication, IP addresses, and other criteria.
(Any one of the above or any other correct equivalent role of a router)</td><td></td></tr>
</table>

	(2 Marks for writing the correct role)	
26.	What is a Database Management System (DBMS) ? Mention any two examples of DBMS.	2
Ans	A Database Management System(DBMS) is software that lets us store, organize, manage, and retrieve data efficiently. **Examples**: MySQL, PostgreSQL, Microsoft Access, Oracle, Microsoft SQL Server, DB2 and Sybase	
	(1 Mark for defining DBMS) ***(½ Mark each for writing Any two correct examples of DBMS)***	
27.	Give any two impacts on environment that are caused when e-waste is carelessly thrown or dumped in landfills or dumping grounds.	2
Ans	Impacts of e-waste: ● **Soil contamination:** E-waste can leach toxic chemicals, such as lead, mercury, and cadmium, into the soil, contaminating it. ● **Air pollution:** Burning e-waste can release toxic fumes contributing to air pollution. ● **Water pollution:** E-waste can contaminate water posing a risk to the environment. **NOTE: Any two from the above or any other correct impacts of e-waste to be accepted**	
	(1 mark each for writing any 2 impacts)	

28.	(a) Rohit is trying to create a Pandas Series from scalar values. His code has some mistakes. Rewrite the correct code and underline the corrections made.
	`import pandas`
	`data = [50, 15, 40]`
	`series = pd.series(data, Index=['x', 'y', 'z'])`
	`Print(series)`
		2

Ans	`import pandas as pd`
	`data=[50,15,40]  #OR data = <any numeric value>`
	`series=pd.Series(data, index=['x', 'y', 'z'])`
	`print(series)`	

	(½ Mark each for identifying and correcting any 4 Errors) ***Note: Only 1 Mark to be awarded for identification (without correction) of all four mistakes***	

	OR
	(b) Complete the given Python code to generate the following output :
	`  COLOUR  NAME  QTY`
	`0  Red  Apple  10`
	`1  Blue  Berry  15`
	`2  Green  Guava  20`
	`import _____ as pd`
	`data=[{'COLOUR':'Red', 'NAME':'Apple', 'QTY':10},`	

	`{'COLOUR':'Blue','NAME':'Berry', 'QTY':15},`
	`{_____, 'NAME' :'Guava','QTY':20}]`
	`df=pd.DataFrame(_____)`
	`print(_____)`	

Ans	`import pandas as pd`
	`data= [{'COLOUR':'Red' , 'NAME': 'Apple' , 'QTY' : 10},`
	`{'COLOUR':'Blue' , 'NAME': 'Berry' , 'QTY' : 15},`
	`{'COLOUR':'Green' , 'NAME': 'Guava' , 'QTY' : 20}]`
	`df=pd.DataFrame(data)`
	`print(df)`	

	(½ Mark each for writing each correct missing part of the given code)	
	SECTION C	
29.	Ravi is a student studying in grade 12. He frequently uses the internet for various activities such as social networking, online shopping, and to research for school projects. Recently, he noticed that he receives targeted advertisements based on his browsing history and is concerned about his digital footprints. Additionally, Ravi has encountered instances of cyberbullying and is unsure how to handle them. Help Ravi by answering the following questions:	3
	(i) What are digital footprints, and how are they created?	
Ans	Digital footprints refer to the trail of data and information that individuals leave behind during online activities. Following are some of the ways digital footprints are created: ● **Browsing history**: Every time a website is visited, the browser records the URL, date, and time of the visit. ● **Search engine queries**: When a search is performed online, the search engine records search term(s) and query. ● **Social media interactions**: Social media activities, such as posts, comments, likes, and shares, are recorded by the platform. ● **Online purchases**: When an online purchase is made, the retailer records transaction details, including name, address, and payment information. ● **Surveillance cameras** in public places can capture images and movements. ● **RFID tags** can capture movements and activities.	
	(½ mark for writing correct definition of Digital Footprint) *(½ mark for writing any one correct way of creation)*	
	(ii) Write any two net etiquettes that Ravi should follow to ensure respectful and responsible online behavior.	
Ans	**To ensure respectful and responsible online behavior, Ravi should follow the following Net etiquettes:** ● Avoid using slang, jargon, or offensive language ● Avoid personal attacks, insults, or inflammatory language ● Consider others' perspectives and feelings	

	• Avoid spamming, trolling, or harassing others • Be sensitive to cultural nuances and differences in online interactions • Protect personal information • Use strong passwords • Be cautious with links and attachments • Be aware of online laws and regulations • Report online harassment or abuse	
	(½ mark each for writing any 2 correct net etiquettes)	
	(iii) How can Ravi protect himself from cyberbullying? Mention any one protective measure.	
Ans	Ravi should adopt following protective measures against cyberbullying: • Avoid sharing personal information in public. • Adopt safe privacy settings on Social Media accounts and Online Platforms • Use strong passwords • Be cautious with links and attachments • Use two-factor authentication • Block or report bullies • Be cautious about accepting friend requests and connections from strangers	
	(1 mark for writing any one protective measure)	
30.	(a) Write a Python program to create the following DataFrame using a Dictionary of Series : **City** **State** **0** Mumbai Maharashtra **1** Dehradun Uttarakhand **2** Bengaluru Karnataka **3** Hyderabad Telangana	3
Ans	**import pandas as pd** **d={** **'City':pd.Series(** **['Mumbai','Dehradun','Bengaluru','Hyderabad']),** **'State': pd.Series(** **['Maharashtra','Uttarakhand' , 'Karnataka' , 'Telangana'])** **}** **df=pd.DataFrame(d)** **print(df)** **OR** **import pandas as pd** **City=pd.Series(['Mumbai','Dehradun','Bengaluru','Hyderabad'])** **State=pd.Series(['Maharashtra','Uttarakhand','Karnataka','Telangana'])** **df=pd.DataFrame({'City':City, 'State':State})** **print(df)**	
	(1 mark for writing correct import statement) ***(1 mark for writing correct dictionary of Series)*** ***(1 mark for writing correct creation of DataFrame)***	

OR

(b) Write a Python program to create a Pandas Series as shown below from an ndarray containing the numbers `10, 20, 30, 40, 50` with corresponding indices `'A', 'B', 'C', 'D', 'E'`.

```
A    10
B    20
C    30
D    40
E    50
```

Ans

```
import pandas as pd
import numpy as np
data = np.array([10,20,30,40,50])   #  np.arange(10,60,10)
s = pd.Series(data,index=['A', 'B', 'C', 'D', 'E'])
print(s)
```

OR

```
import pandas as pd
import numpy as np
L1=np.array([10,20,30,40,50])
L2=np.array(['A','B','C','D','E'])
S1=pd.Series(L1,index=L2)
print(S1)
```

(½ mark each for writing both correct import statements)
(1 mark for writing correct ndarray)
(1 mark for writing correct creation of Series)
Note:
2 Marks to be awarded if the Series is created without using ndarray.

31. (i) Write the SQL statement to create a table, **Customer** with the following specifications : (2+1) 3

Table:Customer

Column Name	Data Type	Key
CID	Int	Primary Key
FName	Varchar(20)	
LName	Varchar(20)	
Age	Int	

Ans

```
CREATE TABLE Customer (
  CID INT PRIMARY KEY,
  FName VARCHAR(20),
  LName VARCHAR(20),
  Age INT
);
```

OR

```
CREATE TABLE Customer (
  CID INT ,
  FName VARCHAR(20),
  LName VARCHAR(20),
  Age INT ,
  PRIMARY KEY (CID)
);
```

OR

```
CREATE TABLE Customer (
  CID INT ,
  FName VARCHAR(20),
  LName VARCHAR(20),
  Age INT ,
  CONSTRAINT PK_CID PRIMARY KEY (CID)
);
```

(½ mark for writing correct CREATE TABLE)
(1 mark for writing correct Field names & Datatype)
(½ mark for writing correct Primary Key constraint)

(ii) Write the SQL query to display all records in descending order of **LName** from the Table **Customer.**

Ans

```
SELECT * FROM Customer ORDER BY LName DESC;
```

(½ mark for writing* `SELECT * FROM Customer`*)
(½ mark for writing* `ORDER BY LName DESC`*)

32. (a) Given the following tables: 3

Table: STUDENTS

S_ID	NAME	AGE	CITY
1	Rahul	20	Delhi
2	Priya	22	Mumbai
3	David	21	Delhi
4	Neha	23	Bengaluru
5	Khurshid	22	Delhi

Table: GRADES

S_ID	SUBJECT	GRADE
1	Math	A
2	English	B
3	Math	C
4	English	A
5	Math	B

Write SQL queries for the following:

(i) To display the number of students from each city.

Ans

```
SELECT CITY, COUNT(*) FROM STUDENTS GROUP BY CITY;
```

Note:

- `SELECT COUNT(*) AS <COLUMN ALIAS NAME> FROM STUDENTS GROUP BY CITY;` **also to be accepted**
- `SELECT COUNT(*) FROM STUDENTS GROUP BY CITY;` **also to be accepted**

(½ mark for writing `SELECT CITY, COUNT(*)FROM STUDENTS`*)*
(½ mark for writing `GROUP BY CITY`*)*

(ii) To find the average age of all students.

Ans

```
SELECT AVG(AGE) FROM STUDENTS;
```

(½ mark for writing `SELECT AVG(AGE)`*)*
(½ mark for writing `FROM STUDENTS`*)*

(iii) To list the names of students and their grades.

Ans

```
SELECT NAME, GRADE FROM STUDENTS S, GRADES G
WHERE  S.S_ID = G.S_ID ;
```

OR

```
SELECT NAME, GRADE FROM STUDENTS, GRADES
WHERE STUDENTS.S_ID = GRADES.S_ID ;
```

OR

```
SELECT NAME, GRADE FROM STUDENTS NATURAL JOIN GRADES ;
```

(½ mark for writing `SELECT NAME, GRADE FROM STUDENTS, GRADES`*)*
(½ mark for writing correct part to join the tables)

OR

(b) Consider the following tables:

Table 1: PRODUCTS

This table stores the basic details of the products available in a shop.

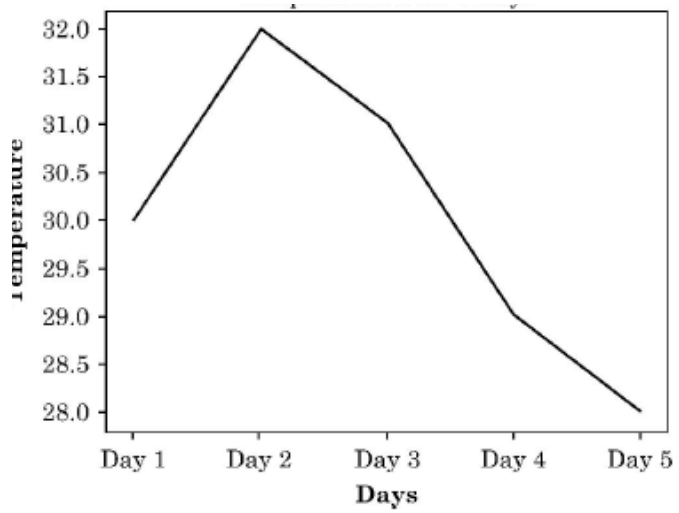
PID	PName	Category
201	Laptop	Electronics
202	Chair	Furniture
203	Desk	Furniture
204	Smartphone	NULL
205	Tablet	Electronics

Table 2: SALES

This table records the number of units sold for each product.

SaleID	PID	UnitsSold
301	201	50
302	202	100
303	203	60
304	204	80

	305 | 205 | 70 Write SQL queries for the following:	
	(i) To delete those records from table **SALES** whose **UnitsSold** is less than 80.	
Ans	**DELETE FROM SALES WHERE UnitsSold < 80;**	
	(½ mark for writing **DELETE FROM SALES*)*** ***(½ mark for writing*** **WHERE UnitsSold < 80*)***	
	(ii) To display the names of all products whose category is not known.	
Ans	**SELECT PName FROM PRODUCTS WHERE Category IS NULL;**	
	(½ mark for writing **SELECT PName FROM PRODUCTS*)*** ***(½ mark for writing*** **WHERE Category IS NULL*)***	
	(iii) To display the product names along with their corresponding units sold.	
Ans	**SELECT PName, UnitsSold FROM PRODUCTS P, SALES S** **WHERE P.PID = S.P_ID ;** **OR** **SELECT PName, UnitsSold FROM PRODUCTS, SALES** **WHERE PRODUCTS.PID = SALES.PID ;** **OR** **SELECT PName, UnitsSold FROM PRODUCTS NATURAL JOIN SALES;**	
	(½ mark for writing **SELECT PName, UnitsSold*)*** ***(½ mark for writing correct part to join the tables)***	
	SECTION D	
33.	Gurkirat has to fill in the blanks in the given Python program that generates a line plot as shown below. The given line plot represents the temperature (in degree Celsius) over five days as given in the table : **Days** | **Temperature** Day 1 | 30 Day 2 | 32 Day 3 | 31 Day 4 | 29 Day 5 | 28	4




```
import ______ as plt # Statement-1
days = ['Day 1', 'Day 2', 'Day 3', 'Day 4', 'Day 5']
temp = [30, 32, 31, 29, 28]
plt.__(days, temp) # Statement-2
plt.xlabel('______') # Statement-3
plt.ylabel('Temperature')
plt.title('_____') # Statement-4
plt.show()
```

Write the missing statements according to the given specifications :

(i) Write the suitable code to import the required module in the blank space in the line marked as Statement-1.

Ans `import matplotlib.pyplot as plt  #Statement 1`

(ii) Fill in the blank in Statement-2 with a suitable Python function name to create a line plot.

Ans `plt.plot(days,temp)  #Statement 2`

(iii) Refer to the graph shown and fill in the blank in Statement-3 to display the appropriate label for x-axis.

Ans `plt.xlabel('Days')  #Statement 3`

(iv) Refer to the graph shown and fill in the blank in Statement-4 to display the suitable chart title.

Ans `plt.title('Temperature over 5 days')  #Statement 4`

(1 mark for writing each correct missing part of statement)

34. (a) An educational institution is maintaining a database for storing the details of courses being offered. The database includes a table COURSE with the following attributes : — 4

C_ID : Stores the unique ID for each course.

C_NAME : Stores the course's name.

INSTRUCTOR : Stores the name of the course instructor.

DURATION : Stores the duration of the course in hours.

Table : **COURSE**

C_ID	C_NAME	INSTRUCTOR	DURATION
C101	Data Structures	Dr. Alok	40
C102	Machine Learning	Prof. Sunita	60
C103	Web Development	Ms. Sakshi	45
C104	Database Management	Mr. Suresh	45
C105	Python Programming	Dr. Pawan	35

Write SQL queries for the following :

(i) To add a new record with following specifications :

```
C_ID          : C106
C_NAME        : Introduction to AI
INSTRUCTOR    : Ms. Preeti
DURATION      : 55
```

Ans

```
INSERT INTO COURSE VALUES('C106','INTRODUCTION TO AI',
    'MS.PREETI',55);
```

OR

```
INSERT INTO COURSE (C_ID, C_NAME, INSTRUCTOR, DURATION)
    VALUES('C106','INTRODUCTION TO AI','MS.PREETI',55);
```

(½ mark for writing **INSERT INTO COURSE***)*
(½ mark for writing
VALUES('C106','INTRODUCTION TO AI','MS.PREETI',55)*)*
Note: **VALUE** *in place of* **VALUES** *is to be accepted*

(ii) To display the longest duration among all courses.

Ans

```
SELECT MAX(DURATION) FROM COURSE;
```

(½ mark for writing **SELECT MAX(DURATION)***)*
(½ mark for writing **FROM COURSE***)*

(iii) To count total number of courses run by the institution.

Ans

```
SELECT COUNT(DISTINCT C_NAME)FROM COURSE;
```

(½ mark for writing **SELECT COUNT(DISTINCT C_NAME)***)*
(½ mark for writing **FROM COURSE***)*
Note: Instead of COUNT(DISTINCT C_NAME), any of the following to be accepted:
COUNT(C_NAME), COUNT(C_ID), COUNT(*)

(iv) To display the instructors' name in lower case.

Ans

```
SELECT LOWER(INSTRUCTOR) FROM COURSE;
```

OR

```
SELECT LCASE(INSTRUCTOR) FROM COURSE;
```

(½ mark for writing **SELECT LOWER(INSTRUCTOR)***)*
(½ mark for writing **FROM COURSE***)*

OR

(b) Ashutosh, who is a manager, has created a database to manage employee records. The database includes a table named EMPLOYEE whose attribute names are mentioned below :

EID : Stores the unique ID for each employee.
EMP_NAME : Stores the name of the employee.
DEPT : Stores the department of the employee.
SALARY : Stores the salary of the employee.
JOIN_DATE : Stores the employee's joining date.

Table : EMPLOYEE

EID	EMP_NAME	DEPT	SALARY	JOIN_DATE
E01	ARJUN SINGH	SALES	75000	2019-11-01
E02	PRIYA JAIN	ENGINEERING	85000	2020-05-20
E03	RAVI SHARMA	MARKETING	60000	2018-08-14
E04	AYESHA	NULL	50000	2021-01-10
E05	RAHUL VERMA	FINANCE	40000	2017-06-25

Write the output of the following SQL Queries :

(i)
```
Select SUBSTRING(EMP_NAME, 1, 5) from EMPLOYEE
where DEPT = 'ENGINEERING';
```

Ans

```
SUBSTRING(EMP_NAME, 1, 5)
-------------------------
PRIYA
```

(1 mark for writing the correct output)

(ii)
```
Select EMP_NAME from EMPLOYEE where month(JOIN_DATE)
= 8;
```

Ans

```
EMP_NAME
-----------
RAVI SHARMA
```

(1 mark for writing the correct output)

(iii)
```
Select EMP_NAME from EMPLOYEE where SALARY > 60000;
```

Ans

```
EMP_NAME
-----------
ARJUN SINGH
PRIYA JAIN
```

(1 mark for writing the correct output)

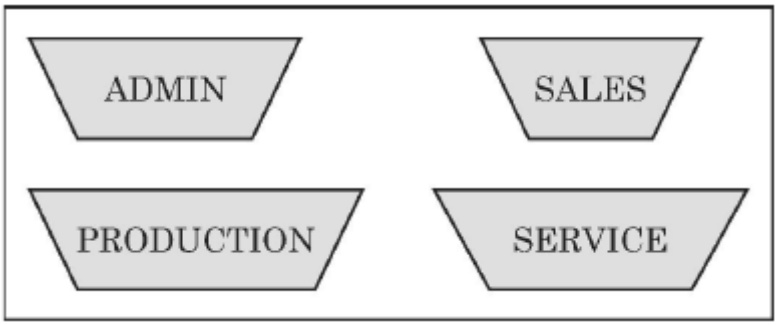
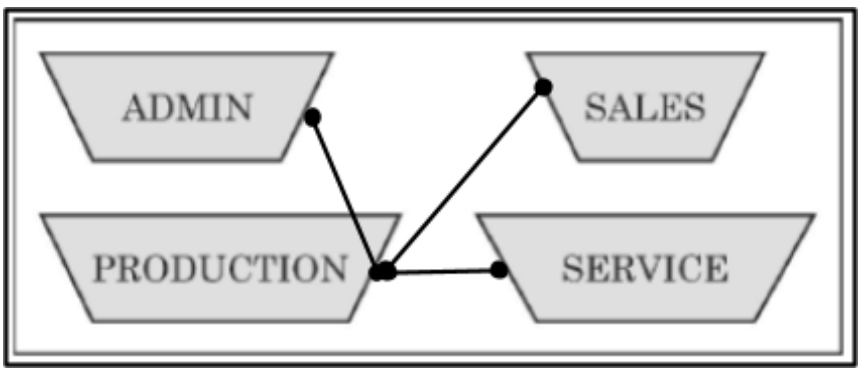
(iv)
```
Select count(DEPT) from EMPLOYEE;
```

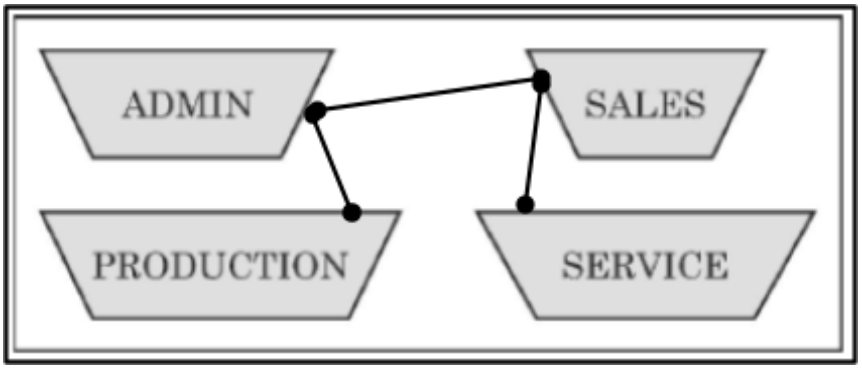
Ans

```
count(DEPT)
-----------
4
```

(1 mark for writing the correct output)

Note: Column headings to be ignored for all the MySQL outputs.

	SECTION E	
35.	XYZ Technologies, Hyderabad is a company that deals with data science and AI projects. They have different divisions ADMIN, SALES, PRODUCTION and SERVICE. The layout of the Hyderabad branch is :  The management wants to connect all the divisions as well as the computers of each division (ADMIN, SALES, PRODUCTION and SERVICE). Distance between the divisions are as follows : **ADMIN to SALES** — **69m** **ADMIN to PRODUCTION** — **84m** **ADMIN to SERVICE** — **60m** **SALES to PRODUCTION** — **110m** **SALES to SERVICE** — **135m** **PRODUCTION to SERVICE** — **90m** Number of computers in each division : **Division** — **Number of Computers** ADMIN — 40 SALES — 75 PRODUCTION — 120 SERVICE — 20 Based on the above specifications, answer the following questions :	5
	(i) Suggest the topology and draw the most suitable cable layout for connecting all the divisions in the Hyderabad office.	
Ans	Star topology  	

	OR Bus topology  	
	(½ mark for writing BUS OR STAR topology) ***(½ mark for drawing the cable layout as per the chosen topology)***	
	(ii) XYZ Technologies is having its head office in USA. Out of LAN, MAN and WAN, which kind of network will be created to connect Hyderabad office with USA Office ? Justify your answer.	
Ans	WAN will be created as the network connection needs to be across different countries.	
	(½ mark for writing the correct network type) ***(½ mark for writing the correct justification)***	
	(iii) Suggest the division for the placement of server. Explain the reason for your selection.	
Ans	Server should be placed in the Production division as it has the maximum number of computers.	
	(½ mark for writing the correct placement) ***(½ mark for writing the correct reason)***	
	(iv) Suggest the placement of Switch/Hub with justification.	
Ans	Switch/Hub should be placed in each of the divisions ADMIN, SALES, PRODUCTION and SERVICE as multiple devices need to be inter-connected.	
	(½ mark for writing the correct placement) ***(½ mark for writing the correct justification)***	
	(v) Where will a repeater be placed in the suggested network layout ? Justify your answer.	
Ans	Repeater will be placed: Between Sales and Production (for first layout - Star Topology) **OR** Between Sales and Service (for second layout - Bus Topology) **OR** Placement of Repeater according to the correct layout drawn in part(i) Because a repeater is required if the distance between the blocks is more and the repeater receives the weak signal, amplifies it, and retransmits it	
	(½ mark for writing the correct placement) ***(½ mark for writing the correct justification)***	
36.	Consider the DataFrame **Doctor** shown below:	5

	DID	NAME	DEPARTMENT	FEE
0	101	Dr. Joe	ENT	1500
1	102	Dr. Salma	UROLOGY	1600
2	103	Dr. Jeet	ORTHO	1550
3	104	Dr. Neha	ENT	1200
4	105	Dr. Vikram	ORTHO	1700

Write suitable Python statements for the following:

(i) To print the last three rows of the DataFrame **Doctor.**

Ans
```
print(doctor.tail(3))
```
OR
```
print(doctor.iloc[-3:])
```

(1 mark for writing the correct statement)

(ii) To display the names of all doctors.

Ans
```
print(doctor['Name'])
```
OR
```
print(doctor.iloc[:,[1]])
```
OR
```
print(doctor.loc[:,['Name']])
```

(1 mark for writing the correct statement)

(iii) To add a new column `'Discount'` with value of `200` for all doctors.

Ans
```
doctor['Discount']=200
```
OR
```
doctor.loc[:, "Discount"] = 200
```

(1 mark for writing the correct statement)

(iv) To display rows with index `2` and `3`.

Ans
```
print(doctor.loc[[2,3]])
```
OR
```
print(doctor.iloc[[2,3]])
```
OR
```
print(doctor[2:4])
```

(1 mark for writing the correct statement)

(v) To delete the column `'Department'`.

Ans
```
doctor.drop(['Department'],axis=1, inplace=True)
```
OR
```
doctor = doctor.drop(['Department'],axis=1)
```

(1 mark for writing the correct statement)
Note: axis=1 can be replaced with axis= 'columns'

37.	(a) Write SQL query for the following:	5
	(i) To display sum total of all the values of the **Score** column, from **STUDENTS** table.	
Ans	`SELECT SUM(Score) FROM STUDENTS;`	
	(½ mark for writing `SELECT SUM(Score)`*)* *(½ mark for writing* `FROM STUDENTS`*)*	
	(ii) To display the first five characters of the **Name** column from **STUDENTS** table.	

Ans	`SELECT LEFT(Name,5) FROM STUDENTS;`
	OR
	`SELECT MID(Name,1,5) FROM STUDENTS;`
	OR
	`SELECT SUBSTRING(Name,1,5) FROM STUDENTS;`
	OR
	`SELECT SUBSTR(Name,1,5) FROM STUDENTS;`	

	(½ mark for writing `SELECT part`*)* *(½ mark for writing* `FROM STUDENTS`*)*	
	(iii) To display the values of **Name** column from the **STUDENTS** table, after removing the trailing spaces.	
Ans	`SELECT RTRIM(Name) FROM STUDENTS;`	
	(½ mark for writing `SELECT RTRIM(Name)`*)* *(½ mark for writing* `FROM STUDENTS`*)*	
	(iv) To retrieve the lowest score from the **Score** column of **GRADES** table.	
Ans	`SELECT MIN(Score) FROM GRADES;`	
	(½ mark for writing `SELECT MIN(Score)`*)* *(½ mark for writing* `FROM GRADES`*)*	
	(v) To increase the fee of all students by **100**, in the **STUDENTS** table. (The name of the column is **FEE**)	
Ans	`UPDATE STUDENTS SET FEE = FEE + 100;`	
	(½ mark for writing `UPDATE STUDENTS`*)* *(½ mark for writing* `SET FEE = FEE + 100`*)*	
	OR (b) Write SQL queries for the following:	
	(i) To calculate the square of **15**.	

Ans	`SELECT POWER(15, 2);`
	OR
	`SELECT POW(15, 2);`	

	(½ mark for writing `SELECT part`*)* *(½ mark for writing* `POWER(15,2) OR POW(15,2)`*)*	
	(ii) To round the number **456.789** to the nearest integer.	
Ans	`SELECT ROUND(456.789);`	
	(½ mark for writing `SELECT part`*)* *(½ mark for writing* `ROUND(456.789)`*)*	

	(iii) To display the position of first occurrence of `'com'` in the string `'mycommercial.com'`.	
Ans	`SELECT INSTR('mycommercial.com','com');`	
	(½ mark for writing `SELECT INSTR`*)* *(½ mark for writing (*`'mycommercial.com','com'`*)*	
	(iv) To display the name of the day for the date `'2024-11-07'`.	
Ans	`SELECT DAYNAME ('2024-11-07');`	
	(½ mark for writing `SELECT`*)* *(½ mark for writing* `DAYNAME ('2024-11-07')`*)*	
	(v) To display the current date and time.	

Ans	`SELECT NOW();`
	OR
	`SELECT SYSDATE();`	

	(½ mark for writing `SELECT`*)* *(½ mark for writing* `NOW()/ SYSDATE()`*)*	

Set-4

Series &RQPS

प्रश्न–पत्र कोड
Q.P. Code **90**

रोल नं.
Roll No.

Candidates must write the Q.P. Code on the title page of the answer-book.

INFORMATICS PRACTICES

*Time allowed : **3** hours* *Maximum Marks : **70***

NOTE

(I) Please check that this question paper contains **15** printed pages.

(II) Please check that this question paper contains **35** questions.

(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) **Please write down the serial number of the question in the answer-book before attempting it.**

(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.

General Instructions :

(i) *This question paper contains five sections,* ***Section A*** *to* ***E****.*

(ii) ***All*** *questions are compulsory.*

(iii) ***Section A*** *has* ***18*** *questions carrying* ***1*** *mark each.*

(iv) ***Section B*** *has* ***7*** *Very Short Answer type questions carrying* ***2*** *marks each.*

(v) ***Section C*** *has* ***5*** *Short Answer type questions carrying* ***3*** *marks each.*

(vi) ***Section D*** *has* ***2*** *questions carrying* ***4*** *marks each.*

(vii) ***Section E*** *has* ***3*** *questions carrying* ***5*** *marks each.*

(viii) ***All*** *programming question are to be answered using Python language only.*

SECTION – A

1. In _____ topology, the devices are arranged in the form of multiple branches in hierarchical manner. **1**

   (i) Star (ii) Tree

   (iii) Mesh (iv) Bus

2. Ridhima purchased a license for a copy of a software and made additional copies without the permission of the copyright owner. This act of hers is known as _____. **1**

   (i) Trademark Infringement (ii) Identity Theft

   (iii) Copyright Infringement (iv) Patent

3. What can an individual do to enhance the privacy of data stored digitally ? **1**

   (i) Share sensitive information on social media platforms.

   (ii) Use your date of birth as your password.

   (iii) Regularly update software installed on your device.

   (iv) Download and install software from unknown sources.

4. What will be the output of the following query ? **1**

```
SELECT POWER(2,MOD(17,3));
```

   (i) 8 (ii) 1

   (iii) 0 (iv) 4

5. Which of the following is not an aggregate function in MYSQL ? **1**

(i) `AVG()` (ii) `MAX()`

(iii) `LCASE()` (iv) `MIN()`

6. _____ is the gaining of unauthorized access to data in a computer system. **1**

(i) Phishing (ii) Plagiarism

(iii) Hacking (iv) Copyright violation

7. Which of the following is NOT true with respect to CSV files ? **1**

(i) Values are separated by commas.

(ii) `to_csv()` can be used to save a dataframe to a CSV file.

(iii) CSV file is created using a word processor.

(iv) CSV file is a type of text file.

8. Which MySQL command helps to add a primary key constraint to any table that has already been created ? **1**

(i) `UPDATE` (ii) `INSERT INTO`

(iii) `ALTER TABLE` (iv) `ORDER BY`

9. What will be the output of the following query ? **1**

```
SELECT SUBSTR("G20 2023 INDIA",5,4);
```

(i) G20 2 (ii) 2023

(iii) INDI (iv) 023

10. What will be the output of the following Python code ? **1**

```
import pandas as pd
dd={'One':1,'Two':2,'Three':3,'Seven':7}
rr=pd.Series(dd)
rr['Four']=4
print(rr)
```

(i)
```
One    1
Two    2
Three  3
Seven  7
dtype: int64
```

(ii)
```
One    1
Two    2
Three  3
Four   4
Seven  7
dtype: int64
```

(iii)
```
Four   4
One    1
Two    2
Three  3
Seven  7
dtype: int64
```

(iv)
```
One    1
Two    2
Three  3
Seven  7
Four   4
dtype: int64
```

11. Which of the following clause cannot work with SELECT statement in MYSQL ? **1**

(i) **`FROM`** (ii) **`INSERT INTO`**

(iii) **`WHERE`** (iv) **`GROUP BY`**

12. Which of the following command will not show first five rows from the Pandas series named **`S1`** ? **1**

(i) **`S1[0:5]`** (ii) **`S1.head()`**

(iii) **`S1.head(5)`** (iv) **`S1.head[0:5]`**

13. Rama was unable to understand how the recruiters were able to know about her digital activity when she has not shared anything with them. The recruiters might have checked _____ of Rama. **1**

(i) Carbon Footprint (ii) Water Footprint

(iii) Online print (iv) Digital Footprint

14. Which MySQL string function is used to extract a substring from a given string based on a specified starting position and length ? **1**

(i) `SUBSTRING_INDEX()` (ii) `LENGTH()`

(iii) `MID()` (iv) `TRIM()`

15. The software that is free for anyone, and its source code is available for access, modification, correction, and improvement is called _____. **1**

(i) Proprietary software (ii) Commercial software

(iii) Free and Open source software (iv) Copyrighted software

16. _____ help in data protection through copyrights, patents and trademarks. **1**

(i) Data Privacy Right (ii) Right to Innovation

(iii) Intellectual Property Rights (IPR)

(iv) Right to Data Protection

17. **Assertion (A) :** Cyber Bullying can have serious, emotional and psychological effects on victims. **1**

Reason (R) : Online Bullying is not a crime while offline bullying is a crime.

(i) Both (A) and (R) are true and (R) is the correct explanation for (A).

(ii) Both (A) and (R) are true and (R) is not the correct explanation for (A).

(iii) (A) is true and (R) is false.

(iv) (A) is false but (R) is true.

18. **Assertion (A) :** A Series is a one dimensional array and a DataFrame is a two-dimensional array containing sequence of values of any data type. (int, float, list, string, etc.) **1**

Reason (R) : Both Series and DataFrames have by default numeric indexes starting from zero.

(i) Both (A) and (R) are true and (R) is the correct explanation for (A).

(ii) Both (A) and (R) are true and (R) is not the correct explanation for (A).

(iii) (A) is true and (R) is false.

(iv) (A) is false but (R) is true.

SECTION – B

19. (a) Expand URL. Identify the protocol and domain in the following URL : **2**

https://epathshala.nic.in/topics.php?len=en

OR

(b) Write any one advantage and one disadvantage of Star topology.

20. The Python code written below has syntactical errors. Rewrite the correct code and underline the correction(s) made. **2**

```
import Pandas as pd
stud=['Name':'Ramya','Class':11,'House':'Red']
s=p.Series(s)
print(s)
```

21. What will be the output of the following SQL queries : **2**

(i) `SELECT RIGHT("CHANDRAYAN3",4);`

(ii) `SELECT ROUND(76345.456,2);`

22. Find the output of the following Python code : **2**

```
import pandas as pd
com=pd.Series([45,12,15,200],index=['mouse','printer',
'webcam','keyboard'])
print(com[1:3])
```

23. What is the primary function of a gateway in a computer network ? Explain briefly. **2**

24. Consider the following Python code : **2**

```
import pandas as pd
S1=pd.Series(['Rubina','Jaya','Vaibhav'],index=[10,16,18])
S2=pd.Series(_____, index=[10,16,18])
S3=pd.Series([56,67,86],_____)
xiia={'Name':_____,'Subject':S2,'Marks':S3}
df=pd.DataFrame(_____)
print(df)
```

Complete the above Python code to display the following output :

	Name	Subject	Marks
10	Rubina	IP	56
16	Jaya	HSc	67
18	Vaibhav	IP	86

25. Write any two differences between UPDATE and ALTER TABLE commands of MySQL. **2**

SECTION – C

26. (a) Consider the given table and write the following queries in MySQL : **3**

Table : Sports

Sid	SName	Fees	DateofPlay	CoachId
1	Karate	1200	2024-08-24	S1
2	Football	1800	2024-09-13	S2
3	Cricket	1500	2024-06-14	S3
4	Lawn Tennis	2500	2024-09-25	S4
5	Badminton	1800	2024-10-20	S5

(i) To display Sid and name of those sports which are to be played in the month of September.

(ii) To display all Sports names in lower case.

(iii) To display last two characters of all sports names whose fees is less than 1500.

OR

(b) Predict the output of the following queries based on the **table Sports** given above :

(i)
```
SELECT UCASE(TRIM(SName)) FROM Sports WHERE Sid=5;
```

(ii)
```
SELECT LEFT (SName,3) FROM Sports WHERE DateofPlay>"2024-09-13";
```

(iii)
```
SELECT SUBSTR (CoachId,1) FROM Sports WHERE SName="Cricket" or Fees>=2000;
```

27. Kabir, a data analyst, has stored the voter's name and age in a dictionary. Now, Kabir wants to create a list of dictionaries to store data of multiple voters. He also wants to create a DataFrame from the same list of dictionaries having appropriate row labels as shown below : **3**

```
          Voter_Name    Voter_Age
Ar1001       Arjun          35
Ba3002       Bala           23
Go4002      Govind          25
Dh4007       Dhruv          19
Na6005       Navya          18
```

Help Kabir in writing a Python program to complete the task.

28. Answer the following questions based on the table Salesman given below : **3**

Table : Salesman

salesman_id	name	city	commission
5001	Neil Bhatt	Delhi	0.15
5002	Rohan Malik	Mumbai	0.13
5005	Ravi Mohan	Delhi	0.11
5006	Mehak Rai	Delhi	0.14
5007	Paul Lal	Bangalore	0.13
5003	Raman Sen	Kolkata	0.12

(i) How many tuples does the given table have ?

(ii) Suggest the primary key for the given table.

(iii) Write the MySQL query to display all the records in descending order of commission.

29. (a) Police officials arrested four members of an interstate gang for allegedly duping many people from different states on the pretext of providing them with holiday packages after creating fake websites of Tours and Travels. The cyber criminals sent fraudulent emails containing links to fraudulent websites created by them. **3**

The victim in his complaint told police that he was offered a holiday package to Dubai for a total of 10 times in the next 10 years and was charged ₹ 1.45 lakh through his credit card.

Answer the following questions pertaining to the given news byte :

(i) Identify the type of cybercrime mentioned in above case.

(ii) Which Act deals with such crimes in India ?

(iii) Suggest any one precaution that can be taken to avoid falling prey to such criminals.

OR

(b) ABC Electronics, a popular electronics retail chain, has been a prominent player in the market for years. However, recent concerns over environmental degradation and e-waste have prompted the company to rethink its strategies and practices. As the newly appointed sustainability manager, you've been asked to answer the following questions :

(i) Considering the environmental concerns associated with e-waste, outline any one negative impact of the electronic products on the environment.

(ii) Gopal is a college student who recently bought his new smartphone from ABC electronics. He's excited about the new features and improved performance of his new device. However, he's now left with his old smartphone, which is still functional but considered outdated. Suggest him any one action that he can take for his old smartphone.

(iii) Provide any one recommendation on how ABC Electronics can responsibly manage its e-waste while minimizing harm to the environment.

30. Consider the given DataFrame **'password'** : **3**

	CodeName	Category	Frequency
0	aaaaaa	alpha	6.91
1	dragon	animal	18.52
2	baseball	sport	1.29
3	football	sport	11.11
4	monkey	animal	3.72
5	qwerty	alpha	1.85
6	abcde	alpha	3.19

Write suitable Python statements for the following :

(i) To add a new row with following values :

CodeName – 'abc123'

Category – alphanumeric

Frequency – 12.8

(ii) To delete the row with the row label 2.

(iii) To delete the column having column label as Frequency.

SECTION – D

31. Rupam created a MySQL table to store the details of Nobel prize winners. Help her to write the following MySQL queries : **4**

TABLE : NOBEL

Winner_Id	YEAR	SUBJECT	WINNER	COUNTRY	CATEGORY
1001	1970	Physics	Hannes Alfven	Sweden	Scientist
1002	1970	Physiology	Bernard Katz	NULL	Scientist
1003	1970	Literature	Aleksandr Solzhenitsyn	Russia	Linguist
1004	1971	Chemistry	Gerhard Herzberg	Germany	Scientist
1005	1978	Peace	Menachem Begin	Israel	Prime Minister
1006	1987	Economics	Robert Solow	USA	Economist
1007	1994	Literature	Kenzaburo Oe	Japan	Linguist

(i) Display the names of Nobel Prize winner in 'Literature' for the year 1970.

(ii) Display the subject and category of winners whose country is not known.

(iii) Display the details of all Nobel Prize winners who were Scientists.

(iv) Count total number of winners whose subject is Literature.

32. Ms. Ritika conducted an online assessment and stored the details in a DataFrame **result** as given below : **4**

	Name	Score	Attempts	Qualify
a	Atulya	12.5	1	yes
b	Disha	9.0	3	no
c	Kavita	16.5	2	yes
d	John	15.0	1	no

Answer the following questions :

(i) Predict the output of the following Python statement :

```
print(result.loc [:,'Attempts'] > 1)
```

(ii) Write the Python statement to display the last three records.

(iii) Write Python statement to display records of 'a' and 'd' row labels.

OR

(Option for Part (iii) only)

(iii) Write suitable Python statement to retrieve the data stored in the file, **'registration.csv'** into a DataFrame, **'regis'**.

SECTION – E

33. Excellent Consultancy Pvt. Ltd. maintains two tables for all its employees. **5**

Table : Employee

Employee_ id	First_ name	Last_ name	Salary	Joining_ date	Department
E101	Monika	Das	100000	2019-01-20	Finance
E102	Mehek	Verma	600000	2019-01-15	IT
E103	Manan	Pant	890000	2019-02-05	Banking
E104	Shivam	Agarwal	200000	2019-02-25	Insurance
E105	Alisha	Singh	220000	2019-02-28	Finance
E106	Poonam	Sharma	400000	2019-05-10	IT
E107	Anshuman	Mishra	123000	2019-06-20	Banking

Table : Reward

Employee_id	Date_reward	Amount
E101	2019-05-11	1000
E102	2019-02-15	5000
E103	2019-04-22	2000
E106	2019-06-20	8000

Write suitable SQL queries to perform the following task :

(i) Change the Department of **Shivam** to IT in the table **Employee**.

(ii) Remove the record of **Alisha** from the table **Employee**.

(iii) Add a new column **Experience** of integer type in the table **Employee**.

(iv) Display the first name, last name and amount of reward for all employees from the tables **Employee** and **Reward**.

(v) Display first name and salary of all the employees whose amount is less than 2000 from the tables **Employee** and **Reward**.

OR

Write suitable SQL queries for the following task :

(i) Display the year of joining of all the employees from the table **Employee**.

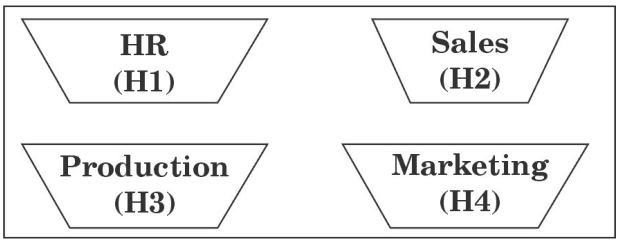
(ii) Display each department name and its corresponding average salary.

(iii) Display the first name and date of reward of those employees who joined on Monday from the tables **Employee** and **Reward**.

(iv) Display sum of salary of those employees whose reward amount is greater than 3000 from the tables **Employee** and **Reward**.

(v) Remove the table **Reward**.

34. FULLMAN Tech, Bengaluru is a company that deals with software development. They have different divisions HR (H1), Sales (H2), Production (H3) and Marketing (H4). The layout of the Bengaluru branch is : **5**



The management wants to connect all the divisions as well as all the computers of each division (H1, H2, H3 and H4).

Distance between the divisions are as follows :

H1 to H2	**76 m**
H1 to H3	**185 m**
H1 to H4	**88 m**
H2 to H3	**140 m**
H2 to H4	**125 m**
H3 to H4	**160 m**

Number of computers in each of the division :

Division	Number of Computers
H1	140
H2	340
H3	180
H4	260

Based on the above specifications, answer the following questions :

(i) Suggest the topology and draw the most efficient cable layout for connecting all the divisions of Bengaluru branch.

(ii) FULLMAN Tech is expanding its reach and therefore it establishes a new office in Delhi. Out of LAN, MAN, and WAN what kind of network will be created to connect Bengaluru office with Delhi Office ?

(iii) Suggest the division for the placement of server in Bengaluru branch. Explain the reason for your selection.

(iv) Suggest the placement of the following devices in Bengaluru branch :

(a) Repeater

(b) Switch/Hub

(v) The company's manager Ms. Ritu is worried as to how she can extend and modify the functionality of the web browser. Help her by giving names of any two tools.

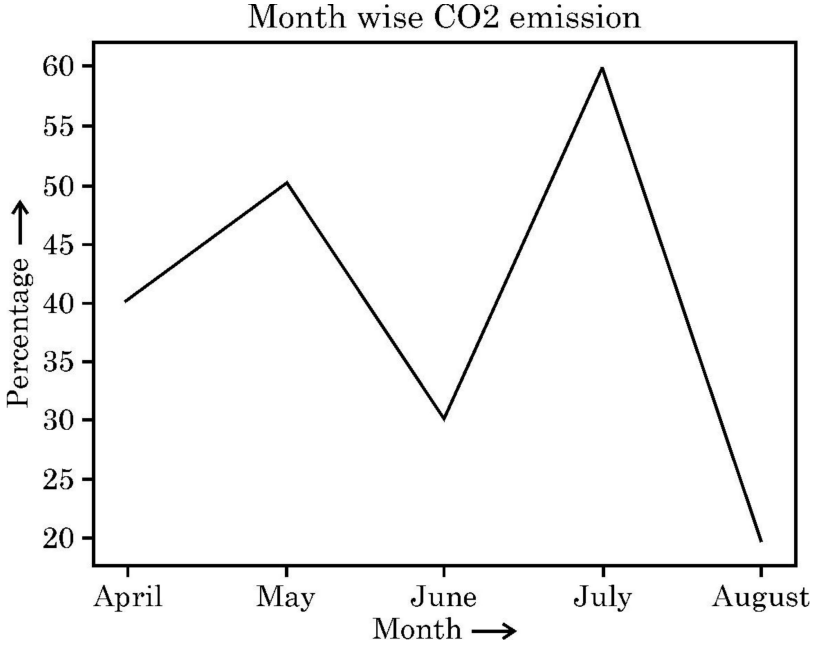
35. (a) The inventory management software of a grocery shop stores the price of all fruits as follows : **5**

```
Fruits=['Apple','Guava','Papaya','Grapes','Mango']
Price=[150,70,50,30,120]
```

Write suitable Python code to generate a Bar Chart on the given data. Also add the chart title and label for X and Y axis. Also add suitable statement to save this chart with the name **`fruits.png`**.

OR

(b) Write suitable Python code to draw the following line chart "CO2 Emission" having title and label for X and Y axis as shown below.



Also give suitable Python statement to save this chart with the name, **emission.png**.

Marking Scheme

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Senior Secondary School Certificate Examination, 2024

SUBJECT NAME INFORMATICS PRACTICES (SUBJECT CODE 065) (PAPER CODE 90)

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-XII, 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 70 (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.

SPECIFIC INSTRUCTIONS FOR INFORMATICS PRACTICES ONLY

1	**In Python, string content is accepted within a pair of single quotes ' ' or within a pair of double quotes " ".**
2	**In MySQL, CHAR/VARCHAR/DATE type content is accepted within a pair of single quotes ' ' or within a pair of double quotes " ".**
3	**In MySQL commands, lowercase/UPPERCASE both are correct.**
4	**In MySQL output questions, column headings to be ignored.**
5	**In MySQL output questions, alignment (left/right) of content to be ignored.**
6	**All answers/codes are suggestive, any other alternative correct answers to be accepted.**

SECTION-A

1.	In _____ topology, the devices are arranged in the form of multiple branches in hierarchical manner.				1
	(i)	Star	(ii)	Tree	
	(iii)	Mesh	(iv)	Bus	
Ans	(ii)	Tree			
	(1 Mark for the correct answer)				
2.	Ridhima purchased a license for a copy of a software and made additional copies without the permission of the copyright owner. This act of hers is known as _____.				1
	(i)	Trademark Infringement	(ii)	Identity Theft	
	(iii)	Copyright Infringement	(iv)	Patent	
Ans	(iii)	Copyright Infringement			
	(1 Mark for the correct answer)				
3.	What can an individual do to enhance the privacy of data stored digitally ?				1
	(i)	Share sensitive information on social media platforms.			
	(ii)	Use your date of birth as your password.			
	(iii)	Regularly update software installed on your device.			
	(iv)	Download and install software from unknown sources.			
Ans	(iii)	Regularly update software installed on your device			
	(1 Mark for the correct answer)				
4.	What will be the output of the following query ? `SELECT POWER(2,MOD(17,3));`				1
	(i)	`8`	(ii)	`1`	
	(iii)	`0`	(iv)	`4`	
Ans	(iv)	`4`			
	(1 Mark for the correct answer)				
5.	Which of the following is not an aggregate function in MYSQL ?				1
	(i)	`AVG()`	(ii)	`MAX()`	
	(iii)	`LCASE()`	(iv)	`MIN()`	
Ans	(iii)	`LCASE()`			
	(1 Mark for the correct answer)				
6.	_____is the gaining of unauthorized access to data in a computer system.				1
	(i)	Phishing	(ii)	Plagiarism	
	(iii)	Hacking	(iv)	Copyright violation	

Ans	(iii)	Hacking			
	(1 Mark for the correct answer)				
7.	Which of the following is NOT true with respect to CSV files ?				1
	(i)	Values are separated by commas.			
	(ii)	`to_csv()` can be used to save a dataframe to a CSV file.			
	(iii)	CSV file is created using a word processor.			
	(iv)	CSV file is a type of text file.			
Ans		All the options are true with respect to CSV files.			
	(Full 1 mark to be awarded for attempt / any one or more options is/are mentioned)				
8.	Which MySQL command helps to add a primary key constraint to any table that has already been created ?				1
	(i)	`UPDATE`	(ii)	`INSERT INTO`	
	(iii)	`ALTER TABLE`	(iv)	`ORDER BY`	
Ans	(iii)	`ALTER TABLE`			
	Note: Full 1 mark to be awarded for attempt / any one or more options is/are mentioned				
9.	What will be the output of the following query ? `SELECT SUBSTR("G20 2023 INDIA", 5, 4);`				1
	(i)	`G20 2`	(ii)	`2023`	
	(iii)	`INDI`	(iv)	`023`	
Ans	(ii)	`2023`			
	(1 Mark for the correct answer)				

10.	What will be the output of the following Python code ?
	`import pandas as pd`
	`dd= { 'One':1, 'Two':2, 'Three':3, 'Seven':7}`
	`rr=pd.Series(dd)`
	`rr['Four']=4`
	`print(rr)`
					1

	(i)	`One 1`
		`Two 2`
		`Three 3`
		`Seven 7`
		`dtype: int64`			

	(ii)	`One 1`
		`Two 2`
		`Three 3`
		`Four 4`
		`Seven 7`
		`dtype: int64`			

	(iii)	**Four 4 One 1 Two 2 Three 3 Seven 7 dtype: int64**			
	(iv)	**One 1 Two 2 Three 3 Seven 7 Four 4 dtype: int64**			
Ans	(iv)	**One 1 Two 2 Three 3 Seven 7 Four 4 dtype: int64**			
	Note: Full 1 mark to be awarded for attempt / any one or more options is/are mentioned				
11.	Which of the following clause cannot work with **SELECT** statement in MYSQL ?				1
	(i)	**FROM**	(ii)	**INSERT INTO**	
	(iii)	**WHERE**	(iv)	**GROUP BY**	
Ans	(ii)	**INSERT INTO**			
	(1 Mark for the correct answer)				
12.	Which of the following command will not show first five rows from the Pandas series named **S1** ?				1
	(i)	**S1[0:5]**	(ii)	**S1.head()**	
	(iii)	**S1.head(5)**	(iv)	**S1.head[0:5]**	
Ans	(iv)	**S1.head[0:5]**			
	(1 Mark for the correct answer)				
13.	Rama was unable to understand how the recruiters were able to know about her digital activity when she has not shared anything with them. The recruiters might have checked _____of Rama.				1
	(i)	Carbon Footprint	(ii)	Water Footprint	
	(iii)	Online print	(iv)	Digital Footprint	
Ans	(iv)	Digital Footprint			
	(1 Mark for the correct answer)				
14.	Which MySQL string function is used to extract a substring from a given string based on a specified starting position and length ?				1
	(i)	**SUBSTRING_INDEX()**	(ii)	**LENGTH()**	
	(iii)	**MID()**	(iv)	**TRIM()**	

Ans	(iii)	`MID()`			
	(1 Mark for the correct answer)				
15.	The software that is free for anyone, and its source code is available for access, modification, correction, and improvement is called _____.				1
	(i)	Proprietary software	(ii)	Commercial software	
	(iii)	Free and Open source software	(iv)	Copyrighted software	
Ans	(iii)	Free and Open source software			
	(1 Mark for the correct answer)				
16.	_____help in data protection through copyrights, patents and trademarks.				1
	(i)	Data Privacy Right	(ii)	Right to Innovation	
	(iii)	Intellectual Property Rights (IPR)	(iv)	Right to Data Protection	
Ans	(iii)	Intellectual Property Rights (IPR)			
	(1 Mark for the correct answer)				
17.	**Assertion (A) :** Cyber Bullying can have serious, emotional and psychological effects on victims. **Reason (R) :** Online Bullying is not a crime while offline bullying is a crime.				1
	(i)	Both (A) and (R) are true and (R) is the correct explanation for (A).			
	(ii)	Both (A) and (R) are true and (R) is not the correct explanation for (A).			
	(iii)	(A) is true and (R) is false.			
	(iv)	(A) is false but (R) is true.			
Ans	(iii)	(A) Is true and (R) is false			
	(1 Mark for the correct answer)				
18.	**Assertion (A) :** A Series is a one dimensional array and a DataFrame is a two-dimensional array containing sequence of values of any data type. (int, float, list, string, etc.) **Reason (R) :** Both Series and DataFrames have by default numeric indexes starting from zero.				1
	(i)	Both (A) and (R) are true and (R) is the correct explanation for (A).			
	(ii)	Both (A) and (R) are true and (R) is not the correct explanation for (A).			
	(iii)	(A) is true and (R) is false.			
	(iv)	(A) is false but (R) is true.			
Ans	(ii)	Both (A) and (R) are true and (R) is not the correct explanation for (A).			
	(1 Mark for the correct answer) ***Note: Option (i) also to be accepted.***				

SECTION-B

19.	**(a)**	Expand URL. Identify the protocol and domain in the following URL : **`https://epathshala.nic.in/topics.php?len=en`**	2
Ans	(a)	URL : **Uniform Resource Locator** Protocol - **`https`** Domain - **`epathshala.nic.in`**	
	(1 Mark for writing the correct expansion of URL) ***(½ Mark for writing the correct Protocol)*** ***(½ Mark for writing the correct Domain)***		
	(b)	**OR** Write any one advantage and one disadvantage of Star topology.	
Ans	(b)	**Advantage of Star Topology:** Centralized control and management makes it easy to monitor, troubleshoot, and scale the network. ***Other points to be accepted:*** ● reliable – if one cable or device fails then all the others still work ● high-performing as no data collisions can occur ● Easier to install ● Easy fault detection ● No disruption to the network when connecting or removing devices **Or Any other valid point.** **Disadvantage of Star Topology :** Dependence on the central device (hub or switch). If the central device fails, the entire network becomes inaccessible. ***Other points to be accepted:*** ● More Cable required ● More expensive **Or Any other valid point**	
	(1 Mark for writing any one correct* Advantage of Star Topology*) ***(1 Mark for writing any one correct Disa*dvantage of Star Topology*)***		
20.	The Python code written below has syntactical errors. Rewrite the correct code and underline the correction(s) made. **`import Pandas as pd`** **`stud=['Name':'Ramya','Class':11,'House':'Red']`** **`s=p.Series(s)`** **`print(s)`**		2
Ans	**`import pandas as pd`** **`stud = {'Name':'Ramya', 'Class':11, 'House':'Red'}`** **`s = pd.Series(stud)`** **`print(s)`**		
	(½ Mark for correcting each syntactical error) ***Note: Only 1 mark to be awarded if all the errors are correctly identified but correct code not written.***		

21.	What will be the output of the following SQL queries :		2
	(i)	`SELECT RIGHT ("CHANDRAYAN3",4);`	
	(ii)	`SELECT ROUND(76345.456,2);`	
Ans	(i)	`YAN3`	
	(ii)	`76345.46`	
	(1 Mark each for writing each correct output)		

22.	Find the output of the following Python code :
	
	`import pandas as pd`
	`com=pd.Series([45,12,15,200],index=['mouse','printer',`
	`'webcam','keyboard'])`
	`print(com[1:3])`
			2

Ans	`printer 12`
	`webcam 15`
	`dtype: int64`		

	(1 Mark for each row of correct output) ***Note:*** • *Ignore* `dtype: int64` • `Ignore order of columns in the output` • `Only 1 mark to be awarded if an extra row is mentioned in the output`		
23.	What is the primary function of a gateway in a computer network ? Explain briefly.		2
Ans	Gateway is used to connect two networks or applications that use different protocols.		
	(1 Mark for writing: connect two networks***)*** ***(1 mark for writing:*** use different protocols***)*** ***Note: Full 2 marks to be awarded if the function of gateway is explained with the help of only a diagram.***		

24.	Consider the following Python code :
	`import pandas as pd`
	`S1=pd.Series(['Rubina','Jaya','Vaibhav'],index=[10,16,18])`
	`S2=pd.Series(_____, index=[10,16,18])`
	`S3=pd.Series([56,67,86], _____ )`
	`xiia={'Name':_____,'Subject':S2,'Marks':S3}`
	`df=pd.DataFrame(_____)`
	`print(df)`
	
	Complete the above Python code to display the following output :
	
	`Name Subject Marks`
	`10 Rubina IP 56`
	`16 Jaya HSc 67`
	`18 Vaibhav IP 86`
			2

Ans
```
import pandas as pd
S1=pd.Series(['Rubina','Jaya','Vaibhav'], index=[10,16,18])
S2=pd.Series(['IP','HSc','IP'], index=[10,16,18])
S3=pd.Series([56,67,86], index=[10,16,18])
xiia={'Name':S1, 'Subject':S2, 'Marks':S3}
df=pd.DataFrame(xiia)
print(df)
```

(½ Mark each for writing each correct missing part of the given code)

25. Write any two differences between UPDATE and ALTER TABLE commands of MySQL. **2**

Ans

UPDATE	**ALTER TABLE**

• UPDATE command is used to modify value(s) stored in row(s) in a relation.
• It is a DML (Data Manipulation Language) command / UPDATE command performs action on data in a table.
• Example
`UPDATE Student`
`SET Marks=30`
`WHERE RollNo = 1;`
	• ALTER TABLE command is used to add, delete, modify, rename attribute(s) in a relation
	• It is a DDL(Data Definition Language) command / ALTER TABLE command performs action on the structure of the table.
	• Example
	`ALTER TABLE Student`
	`ADD Email varchar(255);`

Note: Full 2 marks to be awarded for attempting OR if Any part of question no 21 is attempted correctly.

SECTION-C

26. (a) Consider the given table and write the following queries in MySQL : **3**

Table: Sports

Sid	SName	Fees	DateofPlay	CoachId
1	Karate	1200	2024-08-24	S1
2	Football	1800	2024-09-13	S2
3	Cricket	1500	2024-06-14	S3
4	Lawn Tennis	2500	2024-09-25	S4
5	Badminton	1800	2024-10-20	S5

(i) To display Sid and name of those sports which are to be played in the month of September.

Ans
```
SELECT Sid, SName FROM Sports WHERE Monthname(DateofPlay)=
"September";
```
OR
```
SELECT Sid, SName FROM Sports WHERE Month(DateofPlay)= 9;
```

		OR **SELECT Sid, SName FROM Sports WHERE Month(DateofPlay)= '9';** **OR** **SELECT Sid, SName FROM Sports WHERE DateofPlay LIKE "%-09-%";** **OR** **SELECT Sid, SName FROM Sports WHERE DateofPlay>='2024-09-01' AND DateofPlay<='2024-09-30';** **OR** **SELECT Sid, SName FROM Sports WHERE DateofPlay BETWEEN '2024-09-01' AND '2024-09-30';**	
	(½ Mark for writing the correct SELECT part) ***(½ Mark for writing the correct WHERE part)***		
	(ii)	To display all Sports names in lower case.	
Ans		**SELECT LCASE(SName) FROM Sports;** **OR** **SELECT LOWER(SName) FROM Sports;**	
	(½ Mark for writing* `SELECT part`*) ***(½ Mark for writing* `FROM Sports`*)***		
	(iii)	To display last two characters of all sports names whose fees is less than 1500.	
Ans		**SELECT RIGHT(SName, 2) FROM Sports WHERE Fees<1500;** **OR** **SELECT MID(SName,LENGTH(SName)-1,2) FROM Sports WHERE Fees<1500;** **OR** **SELECT SUBSTR(SName,-2) FROM Sports WHERE Fees<1500;** **OR** **SELECT SUBSTR(SName,LENGTH(SName)-1,2) FROM Sports WHERE Fees<1500;** **OR** **SELECT SUBSTRING(SName,LENGTH(SName)-1,2) FROM Sports WHERE Fees<1500;**	
	(½ Mark for writing correct SELECT part) ***(½ Mark for writing correct WHERE part)***		
	(b)	**OR** Predict the output of the following queries based on the **table Sports** given above :	
	(i)	**SELECT UCASE(TRIM(SName)) FROM Sports WHERE Sid=5 ;**	
Ans	(i)	**BADMINTON**	
	(1 Mark for writing the correct output) ***Note: ½ mark to be awarded if the output is not in uppercase***		
	(ii)	**SELECT LEFT (SName,3) FROM Sports WHERE DateofPlay>"2024-09-13";**	

Ans	(ii)	**Law** **Bad**	
	(½ Mark each for writing correct line of the output)		
	(iii)	**SELECT SUBSTR (CoachId,1) FROM Sports WHERE SName="Cricket" or Fees>=2000;**	
Ans		**S3** **S4**	
	(½ Mark each for writing correct line of the output)		
27.	Kabir, a data analyst, has stored the voter's name and age in a dictionary. Now, Kabir wants to create a list of dictionaries to store data of multiple voters. He also wants to create a DataFrame from the same list of dictionaries having appropriate row labels as shown below : **Voter Name Voter_Age** **Ar1001 Arjun 35** **Ba3002 Bala 23** **Go4002 Govind 25** **Dh4007 Dhruv 19** **Na6005 Navya 18** Help Kabir in writing a Python program to complete the task.	3
Ans	**import pandas as pd** **voters=[{"Voter_Name":"Arjun", "Voter_Age":35}, {"Voter_Name":"Bala", "Voter_Age":23}, {"Voter_Name":"Govind", "Voter_Age":25}, {"Voter_Name":"Dhruv", "Voter_Age":19}, {"Voter_Name":"Navya", "Voter_Age":18}]** **dfVoters=pd.DataFrame(voters, index=["Ar1001","Ba3002","Go4002","Dh4007","Na6005"])** **print(dfVoters)** **OR** **Any other correct equivalent code**	
	(½ Mark for import statement) *(1 Mark for creating the list of dictionaries to store data of multiple voters)* *(½ Mark for creating DataFrame)* *(½ Mark for creating index)* *(½ Mark for displaying DataFrame)*	
28.	Answer the following questions based on the table Salesman given below :	3

Table: Salesman

salesman_id	name	city	commission
5001	Neil Bhatt	Delhi	0.15
5002	Rohan Malik	Mumbai	0.13
5005	Ravi Mohan	Delhi	0.11
5006	Mehak Rai	Delhi	0.14

	5007	Paul Lal	Bangalore	0.13
	5003	Raman Sen	Kolkata	0.12

	(i)	How many tuples does the given table have ?	
Ans	(i)	**6**	
	(1 Mark for writing the correct value)		
	(ii)	Suggest the primary key for the given table.	
Ans	(ii)	**salesman_id**	
	(1 Mark for writing the correct primary key) ***Note: No mark to be awarded if any other column name is also mentioned along with the primary key.***		
	(iii)	Write the MySQL query to display all the records in descending order of commission.	
Ans	(iii)	**SELECT * FROM Salesman order by commission desc;**	
	(½ Mark for writing the correct SELECT part) ***(½ Mark for writing the correct ORDER BY clause)***		
29.	(a)	Police officials arrested four members of an interstate gang for allegedly duping many people from different states on the pretext of providing them with holiday packages after creating fake websites of Tours and Travels. The cyber criminals sent fraudulent emails containing links to fraudulent websites created by them. The victim in his complaint told police that he was offered a holiday package to Dubai for a total of 10 times in the next 10 years and was charged ₹ 1.45 lakh through his credit card. Answer the following questions pertaining to the given news byte :	3
	(i)	Identify the type of cybercrime mentioned in above case.	
Ans	(i)	• Phishing • Internet Fraud	
	(1 Mark for writing any one correct type of cybercrime)		
	(ii)	Which Act deals with such crimes in India ?	
Ans	(ii)	IT Act 2000 **OR** Information Technology Act 2000	
	(1 Mark for writing the correct Act Name) ***Note: The correct act without year 2000 also to be accepted***		
	(iii)	Suggest any one precaution that can be taken to avoid falling prey to such criminals.	
Ans	(iii)	• Ensure the website used is a trustworthy • Provide your personal/sensitive information only to reliable sources • Keep your browser up to date	

		• Use firewalls • Use Antivirus Software • Avoid installing pirated software • Always download software from known and secure websites • Always update software • Use strong password(s) and change it periodically • Do not use cookies from unknown sites • Perform online transactions from known and secure sites • Always secure wireless network(s) with strong password(s) and regularly change it/them	
	(1 Mark for suggesting any one correct precaution)		
	(b)	**OR** ABC Electronics, a popular electronics retail chain, has been a prominent player in the market for years. However, recent concerns over environmental degradation and e-waste have prompted the company to rethink its strategies and practices. As the newly appointed sustainability manager, you've been asked to answer the following questions :	
	(i)	Considering the environmental concerns associated with e-waste, outline any one negative impact of the electronic products on the environment.	
Ans	(i)	• Release toxic pollutants • Health hazards • Degradation of environment • Soil pollution • Water pollution • Air pollution OR Any other correct negative impact	
	(1 Mark for writing any one correct negative impact)		
	(ii)	Gopal is a college student who recently bought his new smartphone from ABC electronics. He's excited about the new features and improved performance of his new device. However, he's now left with his old smart phone, which is still functional but considered outdated. Suggest him any one action that he can take for his old smartphone.	
Ans	(ii)	Donate the old phone OR Sell the old phone OR Reuse the old phone OR Refurbish the old phone OR (Any other correct action)	
	(1 Mark for writing any one correct action)		
	(iii)	Provide any one recommendation on how ABC Electronics can responsibly manage its e-waste while minimizing harm to the environment.	

Ans	(iii)	Reduce the e-waste by extending the lifespan of devices through proper maintenance. OR Reuse the devices whenever possible. OR Recycle the e-waste components. OR Any other correct recommendation	
		(1 Mark for writing any one correct recommendation to manage e-waste)	
30.	Consider the given DataFrame 'password': **CodeName Category Frequency** **0 aaaaaa alpha 6.91** **1 dragon animal 18.52** **2 baseball sport 1.29** **3 football sport 11.11** **4 monkey animal 3.72** **5 qwerty alpha 1.85** **6 abcde alpha 3.19** Write suitable Python statements for the following :		3
	(i)	To add a new row with following values : **CodeName - 'abc123'** **Category - alphanumeric** **Frequency - 12.8**	
Ans	(i)	**password.loc[7]=['abc123','alphanumeric',12.8]** **OR** **password.at[7]=['abc123','alphanumeric',12.8]** **OR** **password.loc[len(password)] = ['abc123','alphanumeric',12.8]** **OR** **password.at[len(password)] = ['abc123','alphanumeric',12.8]** **OR** **password.loc[len(password.index)] = ['abc123','alphanumeric',12.8]** **OR** **password.at[len(password.index)] = ['abc123','alphanumeric',12.8]** **OR** **password.loc[7,:]=['abc123','alphanumeric',12.8]** **OR** **password.at[7,:]=['abc123','alphanumeric',12.8]** **OR** **password=password.append({"CodeName":"abc123","Category":"alphanumeric","Frequency":12.8}, ignore_index=True)**	

		OR
		`df1=pd.DataFrame({"CodeName":["abc123"],"Category":["alphanumeric"],"Frequency":[12.8]})`
		OR
		`password=pd.concat([password,df1], ignore_index=True)`	

	(1 Mark for writing any correct Python statement)		
	(ii)	To delete the row with the row label 2.	

Ans	(ii)	`password.drop(2, inplace=True)`
		OR
		`password.drop(2, inplace=True, axis=0)`
		OR
		`password.drop(labels=2, inplace=True)`
		OR
		`password.drop(labels=2, axis=0, inplace=True)`
		OR
		`password.drop([2], inplace=True)`
		OR
		`password.drop([2], axis=0, inplace=True)`
		OR
		`password=password.drop([2])`
		OR
		`password=password.drop([2], axis=0)`
		OR
		`password.drop([password.index[2]], inplace=True)`
		OR
		`password.drop(password.index[2:3], inplace=True)`	

	(1 Mark for writing any correct Python statement)		
	(iii)	To delete the column having column label as Frequency.	

Ans	(iii)	`password.drop("Frequency", axis=1, inplace=True)`
		OR
		`password.drop(columns=['Frequency'], inplace=True)`
		OR
		`password.drop(password.columns[2], axis=1, inplace=True)`
		OR
		`password.drop(password.iloc[:, 2:], inplace=True, axis=1)`
		OR
		`password.drop(password.loc[:, "Frequency":].columns, inplace=True, axis=1)`	

	(1 Mark for writing any correct Python statement)		

SECTION-D

31.	Rupam created a MySQL table to store the details of Nobel prize winners. Help her to write the following MySQL queries :	4

Table: NOBEL

Winner_id	YEAR	SUBJECT	WINNER	COUNTRY	CATEGORY
1001	1970	Physics	Hannes Alfven	Sweden	Scientist
1002	1970	Physiology	Bernard Katz	NULL	Scientist
1003	1970	Literature	Aleksandr Solzhenitsyn	Russia	Linguist
1004	1971	Chemistry	Gerhard Herzberg	Germany	Scientist
1005	1978	Peace	Menachem Begin	Israel	Prime Minister
1006	1987	Economics	Robert Solow	USA	Economist
1007	1994	Literature	Kenzaburo Oe	Japan	Linguist

(i) Display the names of Nobel Prize winner in 'Literature' for the year 1970.

Ans (i)
```
SELECT WINNER FROM NOBEL WHERE SUBJECT="Literature" AND YEAR = 1970;
```

(½ Mark for writing the correct SELECT part)
(½ Mark for writing the correct WHERE part)

(ii) Display the subject and category of winners whose country is not known.

Ans (ii)
```
SELECT SUBJECT,CATEGORY FROM NOBEL WHERE COUNTRY IS NULL;
```

(½ Mark for writing the correct SELECT part)
(½ Mark for writing the correct WHERE part)

(iii) Display the details of all Nobel Prize winners who were Scientists.

Ans (iii)
```
SELECT * FROM NOBEL WHERE CATEGORY="Scientist";
```

(½ Mark for writing the correct SELECT part)
(½ Mark for writing the correct WHERE part)

(iv) Count total number of winners whose subject is Literature.

Ans (iv)
```
SELECT COUNT(*) FROM NOBEL WHERE SUBJECT="Literature";
```

(½ Mark for writing the correct SELECT part)
(½ Mark for writing the correct WHERE part)

32. Ms. Ritika conducted an online assessment and stored the details in a DataFrame **result** as given below : 4

	Name	Score	Attempts	Qualify
a	Atulya	12.5	1	yes
b	Disha	9.0	3	no
c	Kavita	16.5	2	yes
d	John	15.0	1	no

Answer the following questions :

(i) Predict the output of the following Python statement:
```
print(result.loc [:,'Attempts'] > 1)
```

Ans	(i)	`a False`
		`b True`
		`c True`
		`d False`
		`Name: Attempts, dtype: bool`	

	(1 Mark for writing the correct output) *Name: Attempts, dtype: bool to be ignored* *Note: Full 1 Mark to be awarded if rows b and c are mentioned*		
	(ii)	Write the Python statement to display the last three records.	

Ans	(ii)	`print(result.tail(3))`
		OR
		`print(result.iloc[1:])`
		OR
		`print(result.iloc[1:4])`
		OR
		`print(result.iloc[[1,2,3],:])`
		OR
		`print(result.loc[["b","c","d"]])`	

	(1 Mark for writing the correct Python Statement)		
	(iii)	Write Python statement to display records of 'a ' and 'd' row labels.	

Ans	(iii)	`print(result.loc[["a","d"]])`
		OR
		`print(result.iloc[[0,3],:])`	

	(2 Marks for writing the correct Python Statement)		
	(iii)	OR (Option for Part (iii) only) Write suitable Python statement to retrieve the data stored in the file, `'registration.csv'` into a DataFrame, `'regis'`.	
Ans	(iii)	`regis=pd.read_csv("registration.csv")`	
	(2 Marks for writing the correct Python Statement)		

SECTION-E

33. Excellent Consultancy Pvt. Ltd. maintains two tables for all its employees. 5

Table: Employee

Employee_id	First_name	Last_name	Salary	Joining_date	Department
E101	Monika	Das	100000	2019-01-20	Finance
E102	Mehek	Verma	600000	2019-01-15	IT
E103	Manan	Pant	890000	2019-02-05	Banking

E104	**Shivam**	**Agarwal**	**200000**	**2019-02-25**	**Insurance**	
E105	**Alisha**	**Singh**	**220000**	**2019-02-28**	**Finance**	
E106	**Poonam**	**Sharma**	**400000**	**2019-05-10**	**IT**	
E107	**Anshuman**	**Mishra**	**123000**	**2019-06-20**	**Banking**	

Table: Reward

Employee_id	Date_reward	Amount
E101	2019-05-11	1000
E102	2019-02-15	5000
E103	2019-04-22	2000
E106	2019-06-20	8000

Write suitable SQL queries to perform the following task :

(i) Change the Department of Shivam to IT in the table Employee.

Ans (i)
```
UPDATE Employee SET Department="IT" WHERE First_name="Shivam";
```

Note: Full 1 mark to be awarded for attempting OR if Any part of question no 33 is attempted correctly.

(ii) Remove the record of **Alisha** from the table **Employee**.

Ans (ii)
```
DELETE FROM Employee WHERE First_name="Alisha";
```

(½ Mark for writing the correct DELETE part)
(½ Mark for writing the correct WHERE part)

(iii) Add a new column **Experience** of integer type in the table **Employee**.

Ans (iii)
```
ALTER TABLE Employee ADD Experience int;
```
OR
```
ALTER TABLE Employee ADD COLUMN Experience int;
```

Note: Full 1 mark to be awarded for attempting OR if Any part of question no 33 is attempted correctly.

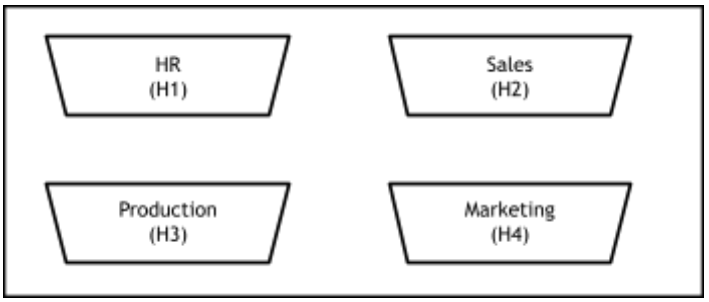
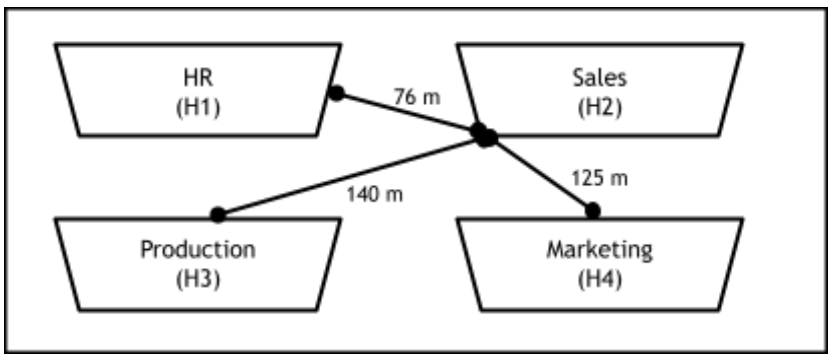
(iv) Display the first name, last name and amount of reward for all employees from the tables **Employee** and **Reward**.

Ans (iv)
```
SELECT First_name, Last_name, Amount FROM Employee NATURAL JOIN
Reward;
```
OR
```
SELECT First_name, Last_name, Amount FROM Employee E, Reward R
WHERE E.Employee_id=R.Employee_id;
```

(½ Mark for writing correct SELECT part)
(½ Mark for writing the correct part to join)

(v) Display first name and salary of all the employees whose amount is less than 2000 from the tables **Employee** and **Reward**.

Ans	(v)	**SELECT First_name, Salary FROM Employee NATURAL JOIN Reward WHERE Amount<2000;** **OR** **SELECT First_name, Salary FROM Employee E, Reward R WHERE E.Employee_id=R.Employee_id AND Amount<2000;**	
	(½ Mark for writing correct SELECT part) *(½ Mark for writing the correct part to join)*		
	OR Write suitable SQL queries for the following task:		
	(i)	Display the year of joining of all the employees from the table **Employee.**	
Ans	(i)	**SELECT YEAR(Joining_date) FROM Employee;**	
	(½ Mark for writing correctly **SELECT YEAR(Joining_date)** *)* *(½ Mark for writing correctly* **FROM Employee***)*		
	(ii)	Display each department name and its corresponding average salary.	
Ans	(ii)	**SELECT Department, AVG(Salary) FROM Employee GROUP BY Department;**	
	(½ Mark for writing correct SELECT part) *(½ Mark for writing the correct GROUP BY part)*		
	(iii)	Display the first name and date of reward of those employees who joined on Monday from the tables **Employee** and **Reward.**	
Ans	(iii)	**SELECT First_name, Date_reward FROM Employee NATURAL JOIN Reward WHERE DAYNAME(Joining_date)="Monday";** **OR** **SELECT First_name, Date_reward FROM Employee E, Reward R WHERE E.Employee_id=R.Employee_id AND DAYNAME(Joining_date)="Monday";**	
	(½ Mark for writing correct SELECT part) *(½ Mark for writing correct WHERE part)*		
	(iv)	Display sum of salary of those employees whose reward amount is greater than 3000 from the tables **Employee** and **Reward.**	
Ans	(iv)	**SELECT SUM(Salary) FROM Employee NATURAL JOIN Reward WHERE Amount>3000;** **OR** **SELECT SUM(Salary) FROM Employee E, Reward R WHERE E.Employee_id=R.Employee_id AND Amount>3000;**	
	(½ Mark for writing correct SELECT part) *(½ Mark for writing the correct WHERE part)*		
	(v)	Remove the table **Reward.**	
Ans	(v)	**DROP TABLE Reward;**	

	Note: Full 1 mark to be awarded for attempting OR if Any part of question no 33 is attempted correctly.		
34.	FULLMAN Tech, Bengaluru is a company that deals with software development. They have different divisions HR (H1), Sales (H2), Production (H3) and Marketing (H4). The layout of the Bengaluru branch is :  The management wants to connect all the divisions as well as all the computers of each division (H1, H2, H3 and H4). Distance between the divisions are as follows : **H1 to H2** — **76 m** **H1 to H3** — **185 m** **H1 to H4** — **88 m** **H2 to H3** — **140 m** **H2 to H4** — **125 m** **H3 to H4** — **160 m** Number of computers in each of the division : Division / Number of Computers H1 — 140 H2 — 340 H3 — 180 H4 — 260 Based on the above specifications, answer the following questions :		5
	(i)	Suggest the topology and draw the most efficient cable layout for connecting all the divisions of Bengaluru branch.	
Ans	(i)	Star Topology  	

		(½ Mark for writing correct topology) ***(½ Mark for drawing correct cable layout)***	
	(ii)	FULLMAN Tech is expanding its reach and therefore it establishes a new office in Delhi. Out of LAN, MAN, and WAN what kind of network will be created to connect Bengaluru office with Delhi Office ?	
Ans	(ii)	WAN	
		(1 Mark for writing the correct answer)	
	(iii)	Suggest the division for the placement of server in Bengaluru branch. Explain the reason for your selection.	
Ans	(iii)	Sales (H2). Maximum number of computers in Sales division	
		(½ Mark for writing correct division for server placement) ***(½ Mark for writing the correct reason for selection)***	
	(iv)	Suggest the placement of the following devices in Bengaluru branch: (a) Repeater (b) Switch/Hub	
Ans	(iv)	(a) Between Sales (H2) and Production (H3), Between Sales(H2) and Marketing(H4) (b) One in each of the divisions HR(H1), Sales(H2), Production(H3), Marketing(H4)	
		(½ Mark for writing correct placement of Repeater) ***(½ Mark for writing the correct placement of Switch/Hub)***	
	(v)	The company's manager Ms. Ritu is worried as to how she can extend and modify the functionality of the web browser. Help her by giving names of any two tools.	
Ans	(v)	Extensions Plug-ins Add-Ons	
		(½ Marks each for writing name of Any 2 correct tools / method) Note: ● Names of tools like Grammarly /AdBlock to be accepted. ● Mentioning of any 2 correct methods like Updation of browser/Change to faster browser/reinstalling browser to be accepted.	

35.	(a)	The inventory management software of a grocery shop stores the price of all fruits as follows:
		`Fruits=['Apple','Guava','Papaya','Grapes','Mango']`
		`Price=[150,70,50,30,120]`
		Write suitable Python code to generate a Bar Chart on the given data. Also add the chart title and label for X and Y axis. Also add suitable statement to save this chart with the name `fruits.png`.
			5

Ans	(a)	`import matplotlib.pyplot as plt` `#Statement 1`
		`Fruits=['Apple','Guava','Papaya','Grapes','Mango']` `#Statement 2`
		`Price=[150,70,50,30,120]` `#Statement 3`
		`plt.bar(Fruits,Price)` `#Statement 4`
		`plt.title("Fruits Prices")` `#Statement 5`
		`plt.xlabel("Fruits")` `#Statement 6`
		`plt.ylabel("Price")` `#Statement 7`
		`plt.savefig("fruits.png")` `#Statement 8`	

```
plt.show()                                                    #Statement 9
```

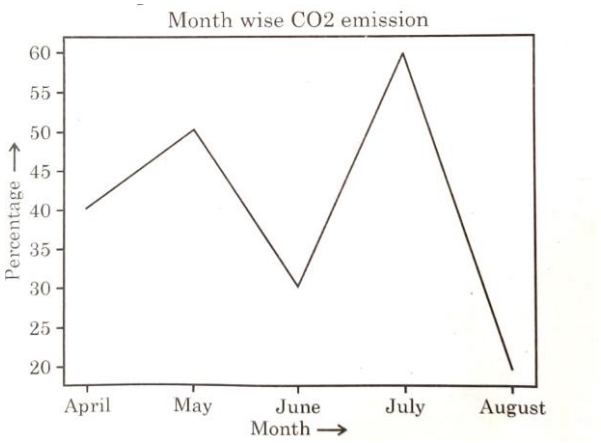
OR

Any other equivalent code

(½ Mark for writing correct `Statement 1`*)*
(½ Mark for writing correct `Statement 2`*)*
(½ Mark for writing correct `Statement 3`*)*
(1 Mark for writing correct `Statement 4`*)*
(½ Mark for writing correct `Statement 5`*)*
(½ Mark for writing correct `Statement 6`*)*
(½ Mark for writing correct `Statement 7`*)*
(½ Mark for writing correct `Statement 8`*)*
(½ Mark for writing correct `Statement 9`*)*

OR

(b) Write suitable Python code to draw the following line chart "CO2 Emission" having title and label for X and Y axis as shown below.



Also give suitable Python statement to save this chart with the name, **emission.png.**

Ans (b)

```
import matplotlib.pyplot as plt                          #Statement 1
month=["April", "May", "June", "July", "August"]         #Statement 2
percent=[40,50,30,60,20]                                 #Statement 3
plt.plot(month, percent)                                 #Statement 4
plt.title("Month wise CO2 emission")                     #Statement 5
plt.xlabel("Month")                                      #Statement 6
plt.ylabel("Percentage")                                 #Statement 7
plt.savefig("emission.png")                              #Statement 8
plt.show()                                               #Statement 9
```

OR

Any other equivalent code

(½ Mark for writing correct `Statement 1`*)*
(½ Mark for writing correct `Statement 2`*)*
(½ Mark for writing correct `Statement 3`*)*
(1 Mark for writing correct `Statement 4`*)*
(½ Mark for writing correct `Statement 5`*)*

	(½ Mark for writing correct `Statement 6`*)* *(½ Mark for writing correct* `Statement 7`*)* *(½ Mark for writing correct* `Statement 8`*)* *(½ Mark for writing correct* `Statement 9`*)*	