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**

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(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
```

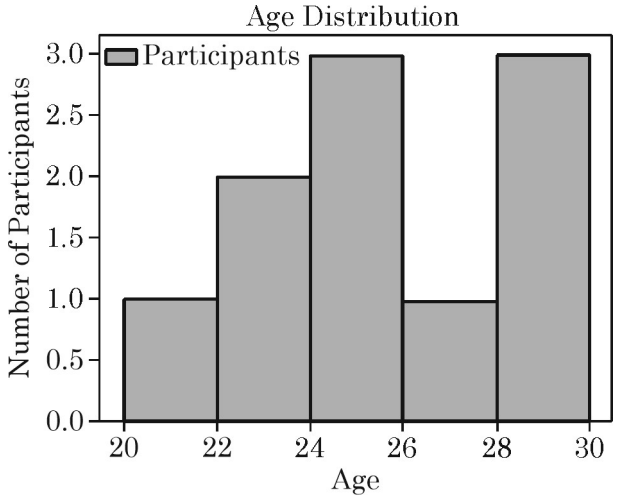
(III) तालिका में एक नया कॉलम **Author** जो Character data type का है और जिसका माप (size) 20 है, जोड़ने के लिए एक SQL क्वेरी लिखें ।

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

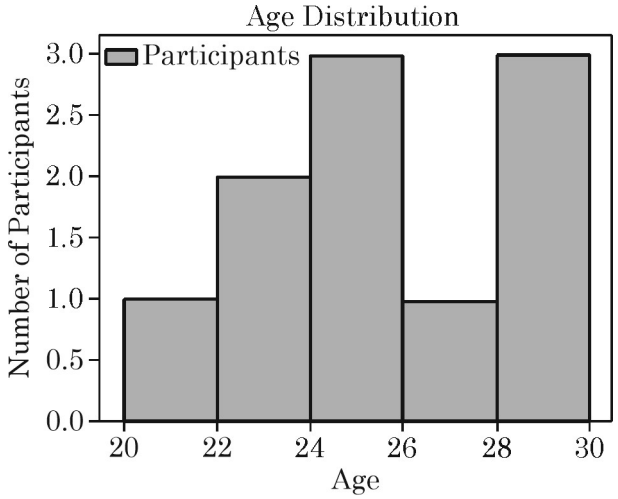
(III) Write an SQL query to add a new column **Author** that is a character data type of size 20.

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;`

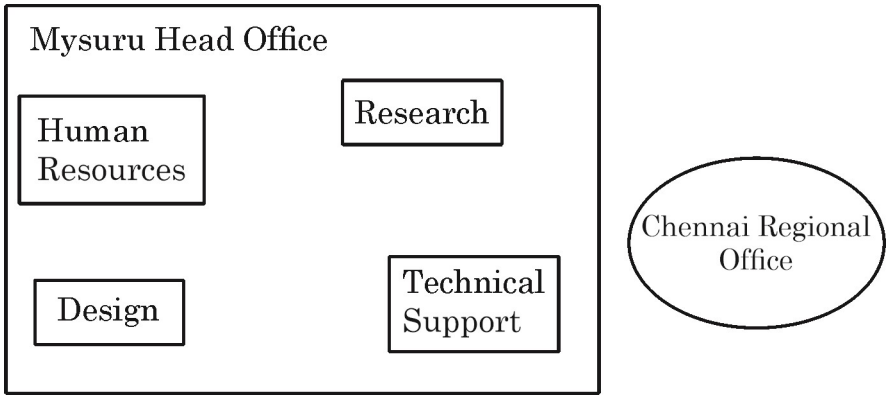
II. `SELECT CUSTOMERNAME, DISCOUNT FROM ORDERS WHERE DISCOUNT BETWEEN 5 AND 10;`

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;`

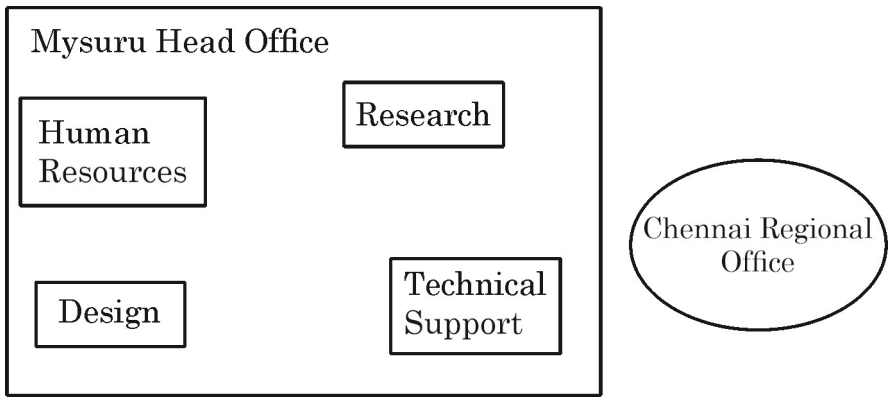
II. `SELECT CUSTOMERNAME, DISCOUNT FROM ORDERS WHERE DISCOUNT BETWEEN 5 AND 10;`

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)

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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'`)***	

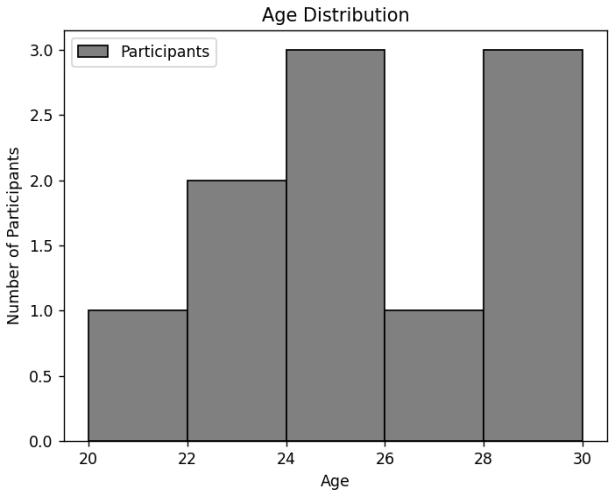
32.	(a) Consider the following tables :
	Table 1 : `TEACHER`, which stores Teacher ID **`(TID)`**, Teacher Name **`(TName)`**, Experience **`(Experience)`** and City **`(City)`** that they live in.
	`TID` | `TName` | `Experience` | `City`
	`1` | `Kartik` | `5` | `Bhopal`
	`2` | `Shahnaz` | `6` | `Nagpur`
	`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:
		3

	(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;`

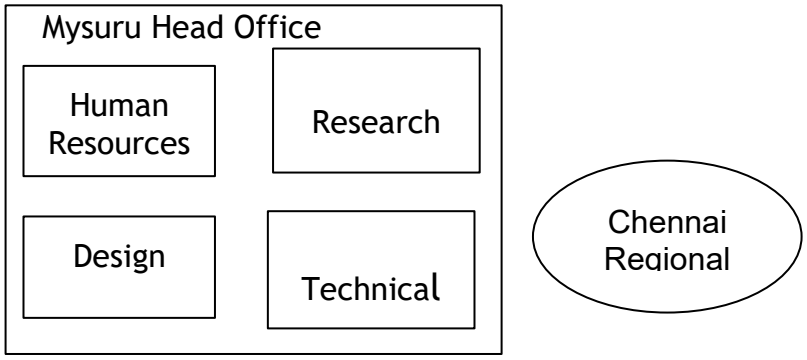
Ans

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**



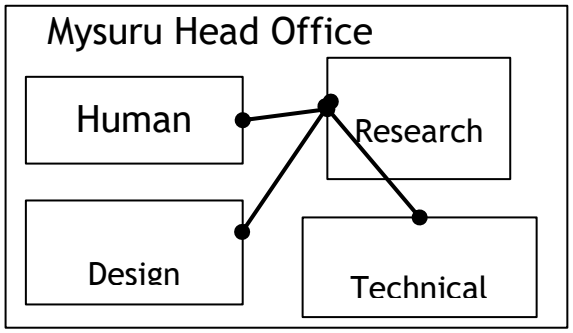
The distances between these departments and between Mysuru and Chennai are as follows :

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)***	