Series : QR1SP

SET-4

प्रश्न-पत्र कोड
Q.P. Code **91**

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 **32** 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 **32** 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.

कम्प्यूटर साइंस

COMPUTER SCIENCE

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 70*

Time allowed : 3 hours *Maximum Marks : 70*

General Instructions :

(i) *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 **3** questions (**29** to **31**). Each question carries **3** marks.*

(vii) ***Section D** consists of **4** questions (**32** to **35**). Each question carries **4** marks.*

(viii) ***Section E** consists of **2** questions (**36** & **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 (21 × 1 = 21)

1. State True or False : **1**

In Python, data type of `74` is same as the data type of `74.0`.

2. Identify the output of the following code snippet : **1**

```
s = "the Truth"
print(s.capitalize())
```

(A) `The truth` (B) `THE TRUTH`

(C) `The Truth` (D) `the Truth`

3. Which of the following expressions in Python evaluates to True ? **1**

(A) `2>3 and 2<3` (B) `3>1 and 2`

(C) `3>1 and 3>2` (D) `3>1 and 3<2`

4. What is the output of the following code snippet ? **1**

```
s='War and Peace by Leo Tolstoy'
print(s.partition("by"))
```

(A) `('War and Peace ', 'by', ' Leo Tolstoy')`

(B) `['War and Peace ', 'by', ' Leo Tolstoy']`

(C) `('War and Peace ', ' Leo Tolstoy')`

(D) `['War and Peace ', ' Leo Tolstoy']`

5. What will be the output of the following statement ? **1**

```
print("PythonProgram"[-1:2:-2])
```

6. What will be the output of the following code snippet ? **1**

```
t = tuple('tuple')
t2 = t[2],
t += t2
print(t)
```

(A) `('tuple')`

(B) `('tuple','p')`

(C) `('t', 'u', 'p', 'l', 'e', 'p')`

(D) `('t', 'u', 'p', 'l', 'e')`

7. Which of the following statements is true about dictionaries in Python ? **1**

(A) A dictionary is an example of sequence datatype.

(B) A dictionary cannot have two elements with same key.

(C) A dictionary cannot have two elements with same value.

(D) The key and value of an element cannot be the same.

8. If `L` is a list with 6 elements, then which of the following statements will raise an exception ? **1**

(A) `L.pop(1)` (B) `L.pop(6)`

(C) `L.insert(1,6)` (D) `L.insert(6,1)`

9. What will be the output of the following code ? **1**

```
def f1(a,b=1):
    print(a+b,end='-')
c=f1(1,2)
print(c,sep='*')
```

(A) `3-2` (B) `3-2*`

(C) `3-None` (D) `3*None-`

10. Consider the statement given below : **1**

```
f1 = open("pqr.dat","_________")
```

Which of the following is the correct file mode to open the file in read only mode ?

(A) `a` (B) `rb`

(C) `r+` (D) `rb+`

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

In Python, Logical errors can be handled using `try`.....`except`.....`finally` statement.

12. A table has two candidate keys, one of which is chosen as the primary key. How many alternate keys does this table have ? **1**

(A) 0 (B) 1

(C) 2 (D) 3

13. Which of the following SQL command can change the degree of the existing relation ? **1**

(A) `DROP TABLE` (B) `ALTER TABLE`

(C) `UPDATE...SET` (D) `DELETE`

14. What will be the output of the query ? **1**

```
SELECT MACHINE_ID, MACHINE_NAME FROM INVENTORY
    WHERE QUANTITY <= 100;
```

(A) All columns of **INVENTORY** table with quantity greater than 100

(B) ID and name of machines with quantity less than 100 from **INVENTORY** table

(C) All columns of **INVENTORY** table with quantity greater than or equal to 100

(D) ID and name of machines with quantity less than or equal to 100 from **INVENTORY** table.

15. A relation in MySQL database consists of **2** tuples and **3** attributes. If **2** attributes are deleted and **4** tuples are added, what will be the cardinality of the relation ? **1**

(A) 4 (B) 5

(C) 6 (D) 7

16. Which aggregate function in SQL returns the smallest value from a column in a table ? **1**

(A) **MIN()** (B) **MAX()**

(C) **SMALL()** (D) **LOWER()**

17. With respect to computer networks, which of the following is the correct expanded form of RJ 45 ? **1**

(A) Radio Jockey 45 (B) Registered Jockey 45

(C) Radio Jack 45 (D) Registered Jack 45

18. Which network device serves as the entry and exit point of a network, as all data coming in or going out of a network must first pass through it in order to use routing paths ? **1**

(A) Modem (B) Gateway

(C) Switch (D) Repeater

19. Expand the term XML. **1**

Q. Nos. **20** and **21** are Assertion (A) and Reason (R) based questions. Mark the correct choice 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, but Reason (R) is false.

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

20. **Assertion (A) :** `[1,2,3]+'123'` is an invalid expression in Python. **1**

Reason (R) : In Python, a list cannot be concatenated with a string.

21. **Assertion (A) :** The PRIMARY KEY constraint in SQL ensures that each value in the column(s) is unique and cannot be **`NULL`**. **1**

Reason (R) : Candidate keys are not eligible to become a primary key.

SECTION – B (7 × 2 = 14)

22. What is the difference between default parameters and positional parameters in Python ? Also give an example of a function header which uses both. **2**

23. Write a Python statement to perform the following tasks : (USE BUILT_IN FUNCTIONS / METHODS ONLY) **2**

    (i) To create a new list **L1** containing the elements of list **L** arranged in ascending order, without modifying list **L**.

    (ii) A statement to check whether the given character, **ch** is an alphabet or a number.

24. Assuming that **D1** is a dictionary in Python, **2**

    (i) (a) Write a Python expression to check if the key, **'RNo'** is present in **D1**.

    OR

    (b) Write a Python expression to check if any key in **D1** has a value **12**.

    (ii) (a) Write a single statement using a BUILT_IN function to add the key : value pair **'RNo'** : **12**, if the key **'RNo'** is not present in **D1**. However, if the key **'RNo'** is present, the function should return its value.

    OR

    (b) Write a single statement to delete all the elements from **D1**.

25. What possible output(s) from the given options will NOT be displayed when the following code is executed ? Also, mention, for how many iterations the **for** loop in the given code will run ? **2**

```
import random
a = [1,2,3,4,5,6]
for i in range(4):
    j = random.randrange(i,5)
    print(a[j],end='-')
print()
```

Options :

(A) **3-4-5-4-** (B) **2-2-4-5-**

(C) **4-3-3-5-** (D) **5-1-2-4-**

26. The function given below is written to accept a string **s** as a parameter and return the number of vowels appearing in the string. The code has certain errors. Observe the code carefully and rewrite it after removing all the logical and syntax errors. Underline all the corrections made. **2**

```
def CountVowels(s):
    c=0
    for ch in range(s):
        if 'aeiouAEIOU' in ch:
            c=+1
    return(ch)
```

27. Ms. Zoya is a Production Manager in a factory which packages mineral water. She decides to create a table in a database to keep track of the stock present in the factory. Each record of the table will have the following fields : **2**

W_Code – Code of the item (type – **CHAR(5)**)

W_Description – Description of the item (type – **VARCHAR(20)**)

B_Qty – Balance quantity of the item (type – **INTEGER**)

U_Price – Unit Price of the item (type – **FLOAT**)

The name of the table is **W_STOCK**.

(i) (a) Write an SQL command to create the above table (**W_Code** should be the primary key).

OR

(b) Can **U_Price** be the primary key of the above table ? Justify your answer.

(ii) (a) Assuming that the table **W_STOCK** is already created, write an SQL command to add an attribute **E_Date** (of **DATE** type) to the table.

OR

(b) Assuming that the table **W_STOCK** is already created, write an SQL command to remove the column **B_Qty** from the table.

28. (a) List one advantage and one disadvantage of Bus topology. **2**

OR

(b) What is protocol in the context of computer networks? Which protocol is used to transmit hypertext across the web?

SECTION – C **(3 × 3 = 9)**

29. (a) Write a Python function that counts and returns the number of digits appearing in the text file **"Space.txt"**. For example, if the file contains : **3**

```
Space exploration has unlocked incredible advancements in technology and science. Since the first moon landing in 1969, space agencies have sent probes to Mars, Jupiter and beyond. The ISS, orbiting Earth at about 400 km, serves as a hub for research. With missions planned for 2030, humanity's cosmic journey continues!
```

Then the function should return 11.

OR

(b) Write a Python function that displays the words in which the lowercase letter **'e'** appears at least twice in the text file **'Space.txt'**. For example, if the file contains :

```
Space exploration has unlocked incredible advancements in technology and science. Since the first moon landing in 1969, space agencies have sent probes to Mars, Jupiter and beyond. The ISS, orbiting Earth at about 400 km, serves as a hub for research. With missions planned for 2030, humanity's cosmic journey continues!
```

Then the function should display :

```
incredible advancements science. agencies serves research.
```

30. (a) A stack named **FruitStack,** implemented using list, contains records of some fruits. Each record is represented as a dictionary with keys '**Name**', '**Origin**', '**Price**', and '**Expiry**'. A sample record is given here : **3**

```
{'Name':'Apple','Origin':'France','Price':120,
'Expiry':'12-08-2025'}
```

Write the following user-defined functions in Python to perform the specified operations on **FruitStack** :

(i) **push_fruit(FruitStack, Fruit):** This function takes the stack **FruitStack** and a new record **Fruit** as arguments and pushes the record stored in **Fruit** onto **FruitStack** if the **Price** is less than 100.

(ii) **pop_fruit(FruitStack)**: This function pops the topmost record from the stack and returns it. If the stack is already empty, the function should display "**UNDERFLOW**".

(iii) **display(FruitStack):** This function displays all the elements of the stack starting from the topmost element. If the stack is empty, the function should display '**EMPTY STACK**'.

OR

(b) Write a Python program to accept 10 integers from the user. If the entered number is a three-digit even integer, push it onto a stack. After all inputs are taken, pop all the three-digit even integers from the stack and display them. For example, if the user enters 12, 31, 320, 457, 6, 92, 924, 220, 1, 218, then the stack should contain :

```
320, 924, 220, 218
```

and the output of the program should be :

```
218 220 924 320
```

31. (a) Write the output of the following code : **3**

```
def Exam2026(given) :
    new=[]
    for ch in given[1:-1]:
        if ch.isupper():
            new.reverse()
        elif ch not in new:
            new.append(ch)
        elif ch in new:
            new.pop()
    print(new)
Exam2026("Gold-24Medals")
```

OR

(b) Write the output of the following code :

```
def Exam2026(given):
    new = 0
    while given:
        if new % 2:
            new += given % 10
        else:
            new += given % 5
        print(new, end='-')
        given //= 10
Exam2026(123456)
```

SECTION – D (4 × 4 = 16)

32. Abhishek has created a table, named **STOCK**, with a set of records to maintain the data of packaged milk in his shop. After creating the table, he entered the data and the table looked as follows : **4 × 1 = 4**

Code	Type	Volume	Qty	Price
AF0.5	F	0.5	300	38.00
MF0.5	F	0.5	250	36.50
MT1.0	T	1.0	150	64.00
AT1.0	T	1.0	100	66.00
PD1.0	D	1.0	50	52.00
PT0.5	T	0.5	78	30.00

(a) Based on the data given above, write the SQL queries for the following tasks :

(i) To display **Type** and the maximum **Price** for each **Type** of milk.

(ii) For each record, increase the **Price** by 0.5 where **Type** is **'F'**.

(iii) To display the total value of the stock (total of **Qty** × **Price**).

(iv) To display the details of all records where **Code** starts with **'A'**.

OR

(b) Considering the table **STOCK** as given above, write the output on execution of the following queries :

(i)
```
SELECT Volume, Qty, Price FROM STOCK
    WHERE Type IN ('F','D');
```

(ii)
```
SELECT Code, Qty FROM STOCK
    WHERE Price BETWEEN 30 AND 50;
```

(iii)
```
SELECT DISTINCT Type FROM STOCK;
```

(iv)
```
SELECT Volume, count(*) FROM STOCK GROUP BY
Volume;
```

33. A csv file **"States.csv"** contains some data about all the states of India. Each record of the file contains the following data : **4**

- Name of the State
- Capital of the State
- Population of the State
- Official Language of the State

For example, a sample record in the file is :

```
['Andhra Pradesh','Amaravati',52221000,'Telugu']
```

Write a Python program which reads the data from this file and appends all those records where population is more than 10000000 into another csv file **'More.csv'**.

Note : **"States.csv"** also contains the Header row. The Header row should NOT be copied to **"More.csv"**.

34. Assume that you are the Manager of the Loans department of a Finance House. To keep track of the loans you have created two tables : **CUSTOMERS** and **LOANS**. The sample data in these tables is given below : **4 × 1 = 4**

Table: CUSTOMERS

C_ID	C_Name	Phone
00001	Raj Malhotra	1234567890
00003	David Xavier	3456789012
00004	Damini Iyer	3156789012
00008	Abdul	2345678901

Table: LOANS

SNo	C_ID	L_Amt	L_Date	Terms	RoI
1	00003	200000	2025-12-06	60	7.80
2	00008	2500000	2023-08-09	60	9.00
3	00001	500000	2025-08-13	48	6.00
4	00003	300000	2026-12-07	36	8.00
5	00004	600000	2026-12-07	60	6.00

Note : The tables may contain more records than shown here.

The management of the Finance House needs certain reports from you. Write the queries to extract the following data to create the reports :

(i) Number of records from **LOANS** table where Rate of Interest (**RoI**) is above 7.0.

(ii) Names of the customers whose loan amount (**L_Amt**) is above 1000000.

(iii) **C_ID**, **C_Name** and **Terms** of all those records where Loan Date (**L_Date**) is after 31st December, 2024.

(iv) (a) Details of all the loans in the descending order of **RoI**.

OR

(b) **C_ID** and average term for each **C_ID** from the **LOANS** table.

35. Peter has created a table named **Account** in MySQL database, **SCHOOL**, having following structure : 4

- **Stud_id –** integer
- **Sname –** string
- **Class –** string
- **Fees –** float

Help him in writing a Python program to display records of those students whose fees is less than 5000.

Note the following to establish connectivity between Python and MySQL :

- Username **– admin**
- Password **– root**
- Host **– localhost**

SECTION – E (2 × 5 = 10)

36. NextStep is an organization which has a pool of resource persons to conduct training workshops on various topics related to ICT. The data of all its Resource Persons is stored in a binary file **RESOURCES.DAT** using the following record structure (each record is a tuple) : **2 + 3 = 5**

```
(R_ID, R_Name, R_Expertise, Charges)
```

where :

R_ID – Resource Person's ID (An integer)

R_Name – Resource Person's Name (A string)

R_Expertise – Area of expertise of the Resource Person

Charges – Charges (in rupees) per hour to conduct a workshop

For example, a record in the file is :

```
(12, 'P. Velusami','Machine Learning',5000)
```

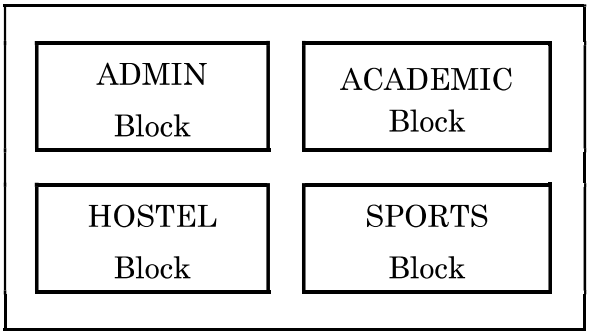
In this context, write the following user defined functions in Python :

(i) **Append()** – To input the data of a Resource Person and write it in the file **RESOURCES.DAT**.

(ii) **Update()** – To increase the **Charges** of each resource person by 500.

37. Sanjeevani is a big group of educational institutions with its head office in Hyderabad. It is planning to set up a new University in Amritsar. The Amritsar University Campus will have four blocks/buildings – ADMIN, ACADEMIC, HOSTEL, SPORTS. You, as a network expert, need to suggest the best network-related solutions for them to resolve the issues/problems mentioned in points (i) to (v), keeping in mind the distances between various blocks / buildings and other given parameters. **5 × 1 = 5**

Amritsar University Campus



Block to Block distances (in Mtrs.)

FROM	TO	DISTANCE
ADMIN	ACADEMIC	60 M
ADMIN	HOSTEL	160 M
ADMIN	SPORTS	80 M
ACADEMIC	HOSTEL	40 M
ACADEMIC	SPORTS	120 M
HOSTEL	SPORTS	150 M

Distance of Hyderabad Head Office from Amritsar University Campus = 2000 km.

Number of computers in each block is as follows :

ADMIN	25
ACADEMIC	600
HOSTEL	120
SPORTS	50

(i) Suggest the most appropriate location of the server inside the Amritsar University Campus. Justify your choice.

(ii) Draw the cable layout to efficiently connect various blocks within the Amritsar University Campus.

(iii) Name any two wired media that can be used to connect various computers of a block inside Amritsar Campus.

(iv) For the academic purpose, the University will provide its own 24 × 7 FM channel within the University Campus. Which communication medium, out of the following, is used by FM ?

(A) Radio Waves

(B) Micro Waves

(C) Infrared Waves

(v) (a) The students will be attending a lot of online academic sessions and workshops. These will involve audio-visual communication. Write the full name of the protocol which will be used for such a communication through the internet.

OR

(b) Where should a repeater be installed in Amritsar University campus to boost the signal between blocks ? Justify your answer.