COMMON PRE-BOARD EXAMINATION

COMPUTER SCIENCE - Code No. 083

Class-XII-(2025-26)

SET: 3

Time allowed: 3 Hrs. **Maximum Marks: 70**

General Instructions:

Read the following instructions very carefully and follow them:

1. This question paper contains 37 questions.
2. All questions are compulsory. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.
3. The paper is divided into 5 Sections- A, B, C, D and E.
4. Section A consists of 21 questions (1 to 21). Each question carries 1 Mark.
5. Section B consists of 7 questions (22 to 28). Each question carries 2 Marks.
6. Section C consists of 3 questions (29 to 31). Each question carries 3 Marks.
7. Section D consists of 4 questions (32 to 35). Each question carries 4 Marks.
8. Section E consists of 2 questions (36 to 37). Each question carries 5 Marks.
9. All programming questions are to be answered using Python Language only.
10. In-case of MCQ, text of the correct answer should also be written.

Q.No.	Questions	Marks

Section-A (21 x 1 = 21 Marks)

1. State if the following statement is True or False: **1**
Using the statistics module in Python, the output of the below statements will be 30:

```
import statistics
print(statistics.median([10, 20, 35, 40, 50]))
```

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

```
text = "DeepLearning@2025"
print(text.find("E"))
```

A) False B) 0 C) ValueError D) -1

3. Fill in the blank with the Boolean value (True/False) such that the following expression evaluates to False: **1**

(True and _____) and (not False or True)

4. In SQL, which clause is used to filter records based on a condition? **1**

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

```
s = "Data#Science#Python"
s = s.split('#')
result = s[2] + "@" + s[1] + "@" + s[0]
print(result)
```

A) Science@Data@Python B) Data@Science@Python

C) Python@Science@Data D) Python@Data@Science

6. Write the output of the following Python code: **1**

```
L = [10, 20, (30, 40), 50]
L[2] = (30, 400)
print(L)
```

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

```
print(100 - 2**3**1 + 40/4)
```

8. Consider the given SQL Query: **1**

SELECT course, AVG(fees) AS avg_fees FROM institution ORDER BY avg_fees DESC GROUP BY course;

Anju is executing the above query, but facing an error. Identify and write the corrected SQL query.

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

```
def check():
    try:
        x = 10 / 5
        return "Success"
    except TypeError:
        return "Error"
    finally:
        return "End"
print(check())
```

A) Success B) Error C) TypeError D) End

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

```
stock = {"laptop": 150, "mouse": 220}
print(stock.popitem( ), end='  ')
print(stock)
```

A) ('laptop ', 150) {'mouse ': 220} B) ('mouse ', 220) { 'laptop ': 150}

C) {'mouse ': 220} (' laptop ', 150) D) {'mouse ': 220} {'laptop ', 150}

11. What possible output is not expected to be displayed on the screen at the time of execution of the Python program from the following code? **1**

```
import random
num = random.randint(1, 4)
Technologies = ["Java", "Python", "Ruby", "C", "C++"]
for i in range(0, num):
   print(Technologies[i], end='**')
print()
```

A) Java**
B) Java**Python**Ruby**C**C++**
C) Java**Python**Ruby**
D) Java**Python**Ruby**C**

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

```
p = 10
q = 5
def compute(y):
   global q
   p = y + 2
   q = q + p
   print(p, q, end='$$')
compute(3)
print(p, q)
```

A) 5 10$$10 10 B) 5 10$$10 5 C) 3 8$$10 8 D) 5 12$$10 12

13. Which SQL function is used to return the number of rows in a result set? **1**
A) TOTAL( ) B) SUM( ) C) ADD( ) D) COUNT( )

14. Give the output of the given Python code? **1**

```
phrase = "DEEP learning IN neural NETWORKS"
print(phrase.count("NE"))
```

A) 4 B) 3 C) 2 D) 1

15. Consider a table STUDENT with 12 records and 5 attributes, and another table COURSE with 8 records and 4 attributes. What would be the degree and cardinality of the resultant table after performing a NATURAL JOIN operation, assuming one common attribute with 6 matching records? **1**

16. Which SQL query will display all records without duplicates from the table EMPLOYEE? **1**
A) SELECT ALL * FROM EMPLOYEE;
B) SELECT UNIQUE * FROM EMPLOYEE;
C) SELECT DISTINCT * FROM EMPLOYEE;
D) SELECT * FROM EMPLOYEE WHERE UNIQUE;

17. Which network topology connects all devices to a central device? **1**
A) Bus B) Ring C) Star D) Mesh

18. The modem at the receiver's computer end acts as a _____. **1**
A) Model B) Modulator C) Demodulator D) Convertor

19. In _____ switching, a dedicated communication path is established between sender and receiver for the entire duration of communication. **1**
A) Circuit B) Packet C) Message D) Virtual

Q20 and Q21 are Assertion(A) and Reason(R) based questions. Mark the correct choice as:
A) Both A and R are True and R is the correct explanation for A.
B) Both A and R are True and R is not the correct explanation for A.
C) A is True but R is False.
D) A is False but R is True.

20. Assertion (A): In Python, a function cannot return multiple values at the same time. **1**
Reason (R): Python allows functions to return multiple values as a tuple by separating them with commas.

21. Assertion (A): A primary key uniquely identifies each record in a table. **1**
Reason (R): A primary key can contain NULL values.

Section-B (7 x 2=14 Marks)

22. A) Differentiate between Differentiate between syntax error and runtime error with suitable example of each. **2**

OR

B) Explain the difference between mutable and immutable data types in Python with suitable examples.

23. The code given below has been programmed to accept a number as an argument and check whether the given number is Perfect Number or not. Observe the following code carefully and rewrite it after removing all syntax and logical errors. Underline all the corrections made. **2**

```
def perfectNum(num):
   sum = 0
   for i in range(1, num):
      if num / i == 0:
         s = sum + i
   if sum == num:
      print("The number is a Perfect number")
   else
      print("The number is not a Perfect number")
num =input("Enter the number")
perfectNum(num)
```

24. A) Consider the following List, Colors = ['Red', 'Blue', 'Green', 'Yellow', 'Orange'] **2**
(Answer using Python built-in methods/functions only):
I) Write a Python statement to insert the element "Purple" at index 2 in the List 'Colors'.
II) Write a Python statement to reverse the List 'Colors'.

OR

B) Predict the Output for following Python code:

```
def Process(x, y):
    if x < y:
        print('smaller', end=' ')
        return x, y
    else:
        print('larger', end=' ')
        return y, x
numbers = [5, 15, 8, 25, 12]
for i in range(0, 4, 2):
    print(Process(numbers[i], numbers[i+1]))
```

25. A) Write a function CUBE_LIST(L), where L is the List of elements passed as argument to the function. The function returns another list named 'CList' that stores the Cubes of all Even Elements of L. **2**

For example:
If L contains [2, 5, 8, 3, 6, 7, 10]
The CList will have [8, 512, 216, 1000]

OR

B) Write a function MAX_MARKS() that creates a Dictionary of students and their marks and returns the name of the student with the maximum marks.

For example:
If Dictionary students contains {"Rahul": 85, "Priya": 92, "Amit": 78}
Then output is: Top Student - Priya with 92 marks

26. Predict the output of the Python code given below: **2**

```
products = [("Laptop", 45000), ("Mouse", 500)]
inventory = {}
for item in products:
    if item[1] > 1000:
        inventory[item[0]] = "Expensive-" + str(item[1])
    else:
        inventory[item[0]] = "Cheap-" + str(item[1])
print(inventory)
```

27. A) Write suitable commands to do the following in MySQL. **2**

I) Display all tables present in the current database.
II) Remove a column named 'phone' from a table named EMPLOYEES.

OR

B) Differentiate between INSERT and UPDATE query in SQL with suitable examples.

28. A) Define the following terms: **2**

I) Protocol
II) Gateway

OR

B)

I) Expand the following terms: HTTP and SMTP
II) Bring out the difference between Circuit Switching and Packet Switching.

Section-C (3 x 3 = 9 Marks)

29. A) Write a function VC_COUNT() in Python, which should read each character of a Text File "THEORY.TXT" and then count and display all the vowels and consonants separately (including upper cases and small cases. Also, digits and other special characters should not be counted). **3**

For example:
If the file "THEORY.TXT" content is as follows:
Artificial intelligence is a constellation of more than 100 to 200 different technologies working together to enable machines to sense, comprehend, act, and learn with human-like levels of intelligence.
The VC_COUNT() function should display the output as:
Total vowels are: 65
Total consonants are: 98

OR

B) Write a Python function REVERSELINE( ) that copies the reverse of each line from the Text File "Input.txt" to another Text File "Output.txt".

For example:
If the content of Input.txt is:
The plates will still shift
and the clouds will still spew.
The sun will slowly rise
and the moon will follow too.
The content of "Output.txt" should be:
tfihs llits lliw setalp ehT
.weps llits lliw sduolc eht dna
esir ylwols lliw nus ehT
.oot wollof lliw noom eht dna

30. A List containing records of Gadgets as: **3**

L = [("SmartWatch", 5000), ("Earbuds", 2500), ("Charger", 800), ("PowerBank", 3500)]
Write the following User-Defined Functions to perform operations on a Stack named Product to:

I) Push_gadget() – To push an item containing gadget name and price of gadgets costing more than 2000 into the Stack.
Output: [('SmartWatch', 5000), ('Earbuds', 2500), ('PowerBank', 3500)]

II) Pop_gadget() – To pop the items from the Stack and display them. Also, display "Stack Empty" when there are no elements in the Stack.
Output:
('PowerBank', 3500)
('Earbuds', 2500)
('SmartWatch', 5000)
Stack Empty

31. A) Predict the output of the following Python code: **3**

```
grades = {"Math": 85, "Science": 92, "English": 78}
display = [ ]
for subject, marks in grades.items():
    display.append(subject.lower() + " : " + str(marks + 5) + " marks\n")
final = "#".join(display)
print(final)
```

OR

B) Predict the output of the following Python code:

```
value = 100
def process(word, factor=2):
    global value
    for letter in word:
        if letter in 'BCDFGbcdfg':
            value = value - 5
            print(letter.lower(), '&', factor + value)
        else:
            value *= 2
            print(letter.upper(), '*', factor * value)
text = 'CS'
process(text, 3)
print(value, '%', text)
```

Section-D (4 x 4 = 16 Marks)

32. Consider the table ADMISSIONS as given below: **4**

Table: ADMISSIONS

AdmissionID	PatientID	AdmissionDate	Department	TotalBill
1	101	2023-01-15	Surgery	1500.00
2	102	2023-02-01	Neurology	2000.00
3	103	2023-02-15	Physiotherapy	1000.00
4	104	2023-03-01	Surgery	3000.00
5	105	2023-03-15	Neurology	2500.00
6	106	2023-04-01	Neurology	1800.00
7	107	2023-04-15	Surgery	NULL
8	108	2023-05-01	Neurology	2200.00
9	109	2023-05-15	Physiotherapy	1700.00
10	110	2023-06-01	Surgery	2800.00

A) Write the following SQL queries:

I) To display the patients' admissions details, sorted by their total bill in descending order.

II) To display names of the department, having an average total bill amount greater than ₹2000.

III) To display the admission details of patients who do not belong to the Surgery department.

IV) To display the ID of the patient, total bill and tax amount (10% of the TotalBill and column name should be TAX) for each patient.

OR

B) Write the output for the SQL queries:

I) SELECT ADMISSIONID, PATIENTID, ADMISSIONDATE FROM ADMISSIONS WHERE ADMISSIONDATE LIKE '2023-03%';

II) SELECT DEPARTMENT, COUNT(TOTALBILL) BILLCOUNT FROM ADMISSIONS GROUP BY DEPARTMENT;

III) SELECT ADMISSIONID, PATIENTID, ADMISSIONDATE FROM ADMISSIONS WHERE DEPARTMENT = 'NEUROLOGY' AND TOTALBILL > 2000;

IV) SELECT PATIENTID, ADMISSIONDATE FROM ADMISSIONS WHERE DEPARTMENT NOT IN ('NEUROLOGY', 'SURGERY');

33. Mr. Jaisan is a sports coordinator for a college who maintains data about athletes in a CSV file named Athletes.csv, which stores details of each athlete. **4**

The columns of the CSV file are: Athlete_ID, Name, Sport and MedalCount

Help him efficiently manage the data by writing User-Defined Functions in Python to:

I) AddAthlete() – to accept athlete details from the user and add them to the file.

II) DisplayTopPerformers() – to display the names and sports of athletes who have won more than 3 medals.

34. Ms. Sheethal is the trusted employee at a highly reputed Airport Agency. She needs to access some information from AIRCRAFT and FLIGHT tables for a board meeting scheduled for performance analysis. Help her extract the following information by writing the desired SQL queries as mentioned below: **4**

Table: AIRCRAFT

AircraftID	Manufacturer	Model	TotalSeats	ManufactureYear	MCost
VT-ANL	Boeing	787-8	256	2023-01-15	200000
VT-TTA	Airbus	A320neo3	180	2024-09-20	150000
VT-IFP	Airbus	A321	222	2024-01-25	210000
VT-SXA	Boeing	737 MAX	189	2023-05-18	160000
VT-WGC	Airbus	A320neo	180	2024-07-22	155000

Table: FLIGHT

FlightID	FlightNumber	AircraftID	Airline
AI107	107	VT-TTA	Air India
UK910	910	VT-SXA	Vistara
6E505	505	VT-ANL	IndiGo
G8202	202	VT-SXA	Go First

I) To display the FlightID and Airline name having seat capacity less than 200.

II) To display the details of AIRCRAFT that have the string 'neo' anywhere in the name of the model.

III) To delete details of the flight from the table FLIGHT flying in 'IndiGo' airlines.

IV) A) To display the count of distinct manufactures from the table AIRCRAFT.

OR

B) To display each manufacturer's, maximum and minimum manufacturing costs of aircraft.

35. Mr. Jithesh has created a table named RESTAURANTS in MySQL. **4**
The fields of the table are:

Rest_ID – ID of the Restaurant (String)
Name – Name of the Restaurant (String)
City – City of the Restaurant (String)
Average_Cost – Average cost for two people (Float)

Consider the following details to establish Python-MySQL connectivity:

UserName – admin
Password – admin@123
Host – localhost

The table RESTAURANTS exists in a MySQL database named FOOD_GUIDE.
Rahul wants to display all records of the RESTAURANTS table where City is 'Delhi' and Average_Cost is less than 800. Help Rahul to write the program in Python.

Section-E (2 X 5 = 10 Marks)

36. Ms. Pooja is working as an Inventory Manager at a Sports Equipment Store. She needs to manage the records of various sports items at the shop. For this, she wants the following information of each sports item to be stored: **2+3**

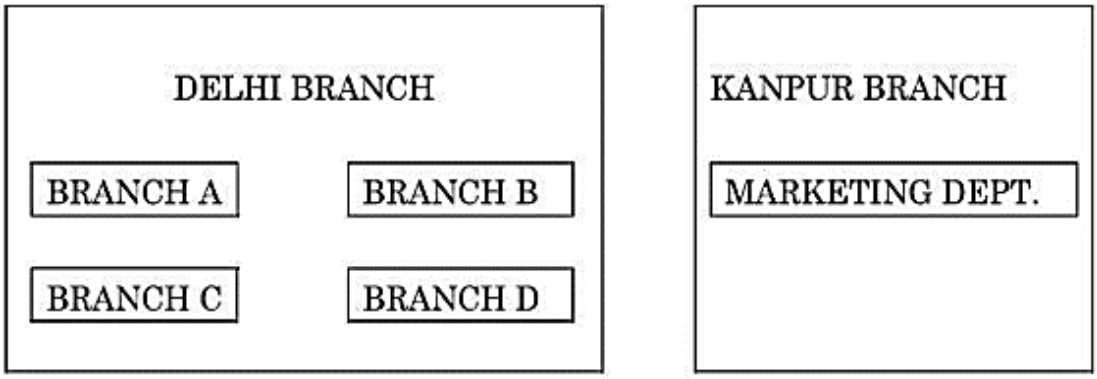
- Item_ID – Integer
- Sport_Type – String (e.g., 'Cricket', 'Football', 'Tennis', 'Badminton')
- Item_Cost – Float
- Quantity – Integer

You, as a programmer of the shop, have been assigned to do this job for Pooja on a Binary file named SPORTS.DAT

I) Write a function DISP_ITEMS() to read the data from the Binary file and display the Item IDs of all 'Cricket' and 'Football' type sports items.

II) Write a function UPDATE_QUANTITY() to update the quantity by adding 10 units to all items whose current quantity is less than 5 in the Binary file.

37. Tiska Inc., an IT-based firm, located in Delhi is planning to setup a network for its four branches – BRANCH A, BRANCH B, BRANCH C AND BRANCH D within a city with its Marketing department in Kanpur. 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**



Distance between various branches is as follows:

Branch	Distance
Branch A to Branch B	40 m
Branch A to Branch C	80 m
Branch A to Branch D	65 m
Branch B to Branch C	30 m
Branch B to Branch D	35 m
Branch C to Branch D	15 m
Delhi Branch to Kanpur	300 km

Number of computers in each of the blocks/Center is as follows:

Branch	Number of Computers
Branch A	15
Branch B	25
Branch C	40
Branch D	115

I) Suggest the most suitable place to install the server for the Delhi branch with a suitable reason.

II) Suggest and draw an ideal cable layout for connecting all these branches within Delhi.

III) Which device will you suggest that should be placed in each of these branches to efficiently connect all the computers within these branches?

IV) Is there a requirement of a repeater in the given cable layout? Why/ Why not?

V) A) Delhi firm is planning to connect to its Marketing department in Kanpur which is approximately 300 km away. Which type of network of LAN, MAN or WAN will be formed?

OR

B) Suggest a protocol that shall be needed to provide help for transferring files between the Delhi and Kanpur branches.