# केन्द्रीय विद्यालय संगठन , कोलकाता संभाग

## KENDRIYA VIDYALAYA SANGATHAN , KOLKATA REGION

प्री–बोर्ड परीक्षा / **PRE BOARD EXAMINATION 2024-25**

**कक्षा** / Class - XII **अधिकतम अंक / Maximum Marks : 70**

**विषय / Subject - Computer Science** **समय / Time : 3 Hrs.**

---

**General Instructions:**

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

| Q No. | Section-A (21 x 1 = 21 Marks) | Marks |
|---|---|---|
| 1. | State True or False:<br>The Python statement print('Alpha'+1) is example of `TypeError Error` | (1) |
| 2. | What id the output of following code snippet?<br><br>country = "GlobalNetwork"<br>result = "-".join(country.split("o")).upper()<br>print(result)<br>(A) GL-BALNETW-RK<br>(B) GL-BA-LNET-W-RK<br>(C) GL-BA-LNET-W-RK<br>(D) GL-BA-LNETWORK | (1) |
| 3. | Identify the output of the following code snippet:<br><br>text = "The_quick_brown_fox"<br>index = text.find("quick")<br>result = text[:index].replace("_", "") + text[index:].upper()<br>print(result)<br><br>(A) Thequick_brown_fox<br>(B) TheQUICK_BROWN_FOX | (1) |

| | | |
|---|---|---|
| | (C) TheQUICKBROWNFOX<br>(D) TheQUICKBROWN_FOX | |
| 4. | What will be the output of the following Python expression?<br>x = 5<br>y = 10<br>result = (x ** 2 + y) // x * y - x<br>print(result)<br><br>(A) 0<br>(B) -5<br>(C) 65<br>(D) 265 | (1) |
| 5. | What will be the output of the following code snippet?<br><br>text = "Python Programming"<br>print(text[1 : :3])<br><br>(A) Ph oai<br>(B) yoPgmn<br>(C) yhnPormig<br>(D) Pto rgamn | (1) |
| 6. | What will be the output of the following code?<br>**tuple1 = (1, 2, 3)**<br>**tuple2 = tuple1 + (4,)**<br>**tuple1 += (5,)**<br>**print(tuple1, tuple2)**<br><br>(A) (1, 2, 3) (1, 2, 3, 4)<br>(B) (1, 2, 3, 5) (1, 2, 3)<br>(C) (1, 2, 3, 5) (1, 2, 3, 4)<br>(D) Error | (1) |
| 7. | Dictionary **my_dict** as defined below, identify type of error raised by statement my_dict['grape']?<br>**my_dict = {'apple': 10, 'banana': 20, 'orange': 30}**<br>(A) ValueError<br>(B) TypeError<br>(C) KeyError<br>(D) ValueError | (1) |
| 8. | What does the list.pop(x) method do in Python?<br><br>A. Removes the first element from the list.<br>B. Removes the element at index x from the list and returns it.<br>C. Adds a new element at index x in the list.<br>D. Replaces the element at index x with None. | (1) |

| | | |
|---|---|---|
| 9. | In a relational database table with one primary key and three unique constraints defined on different columns (not primary), how many candidate keys can be derived from this configuration?<br><br>(A) 1<br>(B) 3<br>(C) 4<br>(D) 2 | (1) |
| 10. | Fill in the blanks to complete the following code snippet choosing the correct option:<br><br>with open("sample.txt", "w+") as file:<br>file.write("Hello, World!") # Write a string to the file<br>position_after_write = file._____ # Get the position after writing<br>file.seek(0) # Move the pointer to the beginning<br>content = file.read(5) # Read the first 5 characters<br>print(content)<br><br>(A) tell<br>(B) seek<br>(C) read<br>(D) write | (1) |
| 11. | State whether the following statement is True or False:<br>In Python, if an exception is raised inside a try block and not handled, the program will terminate without executing any remaining code in the finally block. | (1) |
| 12. | What will be the output of the following code?<br>x = 4<br>def reset():<br>global x<br>x = 2<br>print(x, end='&')<br>def update():<br>x += 3<br>print(x, end='@')<br><br>update()<br>x = 6<br>reset()<br>print(x, end='$')<br><br>(A) 7@2&6$<br>(B) 7@6&6$<br>(C) 7@2&2$<br>(D) Error | (1) |

| | | |
|---|---|---|
| 13. | Which SQL command can modify the structure of an existing table, such as adding or removing columns?<br><br>(A) ALTER TABLE<br>(B) UPDATE TABLE<br>(C) MODIFY TABLE<br>(D) CHANGE TABLE | (1) |
| 14. | What will be the output of the query?<br>**SELECT * FROM orders WHERE order_date LIKE '2024-10-%';**<br>(A) Details of all orders placed in October 2024<br>(B) Details of all orders placed on October 10th, 2024<br>(C) Details of all orders placed in the year 2024<br>(D) Details of all orders placed on any day in 2024 | (1) |
| 15. | Which of the following statements about the CHAR and VARCHAR datatypes in SQL is false?<br>(A) CHAR is a fixed-length datatype, and it pads extra spaces to match the specified length.<br>(B) VARCHAR is a variable-length datatype and does not pad extra spaces.<br>(C) The maximum length of a VARCHAR column is always less than that of a CHAR column.<br>(D) CHAR is generally used for storing data of a known, fixed length. | (1) |
| 16. | Which of the following aggregate functions can be employed to determine the number of unique entries in a specific column, effectively ignoring duplicates?<br>(A) SUM()<br>(B) COUNT()<br>(C) AVG()<br>(D) COUNT(DISTINCT column_name) | (1) |
| 17. | Which protocol is used to send e-mail over internet?<br>(A) FTP<br>(B) TCP<br>(C) SMTP<br>(D) SNMP | (1) |
| 18. | Which device is primarily used to amplify and regenerate signals in a network, allowing data to travel longer distances?<br>(A) Switch<br>(B) Router<br>(C) Repeater<br>(D) Bridge | (1) |
| 19. | Which communication technique establishes a dedicated communication path between two devices for the entire duration of a transmission, ensuring a continuous and consistent connection? | (1) |

| | | |
|---|---|---|
| | **Q20 and Q21 are Assertion(A) and Reason(R) based questions. Mark the correct choice as:**<br>**(A) Both A and R are true and R is the correct explanation for A**<br>**(B) Both A and R are true and R is not the correct explanation for A**<br>**(C) A is True but R is False**<br>**(D) A is False but R is True** | |
| 20. | Assertion (A): Python functions can accept positional, keyword, and default parameters.<br><br>Reasoning (R): Default parameters allow function arguments to be assigned a default value if no argument is provided during the function call. | (1) |
| 21. | Assertion (A): A GROUP BY clause in SQL can be used without any aggregate functions.<br>Reasoning (R): The GROUP BY clause is used to group rows that have the same values in specified columns and must always be paired with aggregate functions. | (1) |
| **Q No** | **Section-B ( 7 x 2=14 Marks)** | **Marks** |
| 22. | Consider the following Python code snippet:<br>a = [1, 2, 3]<br>b = a<br>a.append(4)<br>c = (5, 6, 7)<br>d = c + (8,)<br>a. Explain the mutability of a and c in the context of this code.<br>b. What will be the values of b and d after the code is executed? | (2) |
| 23. | Give examples for each of the following types of operators in Python:<br>(I) Assignment Operators<br>(II) Identity Operators | (2) |
| 24. | If L1 = [10, 20, 30, 40, 20, 10, ...] and L2 = [5, 15, 25, ...], then:<br><br>*(Answer using builtin functions only)*<br><br>(I) A) Write a statement to count the occurrences of 20 in L1.<br>OR<br>B) Write a statement to find the minimum value in L1.<br><br>(II) A) Write a statement to extend L1 with all elements from L2.<br>OR<br>B) Write a statement to get a new list that contains the unique elements from L1. | (2) |

| | | |
|---|---|---|
| 25. | Identify the correct output(s) of the following code. Also write the minimum and the maximum possible values of the variable b.<br>**import random**<br>**text = "Adventure"**<br>**b = random.randint(1, 5)**<br>**for i in range(0, b):**<br>**print(text[i], end='*')**<br><br>(A) A* (B) A*D*<br>(C) A*d*v* (D) A*d*v*e*n*t*u* | (2) |
| 26. | The code provided below is intended to reverse the order of elements in a given list. However, there are syntax and logical errors in the code. Rewrite it after removing all errors. Underline all the corrections made.<br>def reverse_list(lst)<br>if not lst:<br>return lst<br>reversed_lst = lst[::-1]<br>return reversed_lst<br>print("Reversed list: " reverse_list[1,2,3,4] ) | (2) |
| 27. | (I)<br>A) What constraint should be applied to a table column to ensure that all values in that column must be unique and not NULL?<br>OR<br>B) What constraint should be applied to a table column to ensure that it can have multiple NULL values but cannot have any duplicate non-NULL values? | (2) |
| | (II)<br>A) Write an SQL command to drop the unique constraint named unique_email from a column named email in a table called Users.<br>OR<br>B) Write an SQL command to add a unique constraint to the email column of an existing table named Users, ensuring that all email addresses are unique. | |
| 28. | A) Explain one advantage and one disadvantage of mesh topology in computer networks.<br>OR<br>B) Expand the term DNS. What role does DNS play in the functioning of the Internet? | (2) |

| Q No. | Section-C ( 3 x 3 = 9 Marks) | Marks |
|---|---|---|
| 29. | A) Write a Python function that extracts and displays all the words present in a text file “Vocab.txt” that begins with a vowel.<br>**OR**<br>B) Write a Python function that extracts and displays all the words containing a hyphen ("-") from a text file "HyphenatedWords.txt", which has a three letter word before hypen and four letter word after hypen. For example : “for-them” is such a word. | (3) |
| 30. | (A) You have a stack named MovieStack that contains records of movies. Each movie record is represented as a list containing movie_title, director_name, and release_year. Write the following user-defined functions in Python to perform the specified operations on the stack MovieStack:<br><br>(I) push_movie(MovieStack, new_movie): This function takes the stack MovieStack and a new movie record new_movie as arguments and pushes the new movie record onto the stack.<br><br>(II) pop_movie(MovieStack): This function pops the topmost movie record from the stack and returns it. If the stack is empty, the function should display "Stack is empty".<br><br>(III) peek_movie(MovieStack): This function displays the topmost movie record from the stack without deleting it. If the stack is empty, the function should display "None".<br><br>**OR**<br><br>(B) Write the definition of a user-defined function push_odd(M) which accepts a list of integers in a parameter M and pushes all those integers which are odd from the list M into a Stack named OddNumbers.<br><br>Write the function pop_odd() to pop the topmost number from the stack and return it. If the stack is empty, the function should display "Stack is empty".<br><br>Write the function disp_odd() to display all elements of the stack without deleting them. If the stack is empty, the function should display "None".<br><br>For example:<br><br>If the integers input into the list NUMBERS are: [7, 12, 9, 4, 15]<br><br>Then the stack OddNumbers should store: [7, 9, 15] | (3) |

31. Predict the output of the following code: (3)

```
data = [3, 5, 7, 2]
result = ""
for num in data:
    for i in range(num):
        result += str(i) + "*"
result = result[:-1]
print(result)
```

OR

Predict the output of the following code:

```
numbers = [10, 15, 20]
for num in numbers:
    for j in range(num // 5):
        print(j, "+", end="")
    print()
```

| Q No. | Section-D ( 4 x 4 = 16 Marks) | Marks |
|---|---|---|

32. Consider the table ORDERS as given below (4)

| O_Id | C_Name | Product | Quantity | Price |
|---|---|---|---|---|
| 1001 | Jitendra | Laptop | 1 | 12000 |
| 1002 | Mustafa | Smartphone | 2 | 10000 |
| 1003 | Dhwani | Headphone | 1 | 1500 |
| 1004 | Alice | Smartphone | 1 | 9000 |
| 1005 | David | Tablet | NULL | 7000 |

Note: The table contains many more records than shown here.

A) Write the following queries:

(I) To display the total Quantity for each Product, excluding Products with total Quantity less than 5.

(II) To display the ORDERS table sorted by total price in descending order.

(III) To display the distinct customer names from the ORDERS table.

(IV) To display the sum of the Price of all the orders for which the quantity is NULL.

**OR**

B) Write the output:

(I) SELECT C_Name, SUM(Quantity) AS Total_Quantity FROM ORDERS GROUP BY C_Name;

(II) SELECT * FROM ORDERS WHERE Product LIKE '%phone%';

(III) SELECT O_Id, C_Name, Product, Quantity, Price FROM ORDERS WHERE Price BETWEEN 1500 AND 12000;

(IV) SELECT MAX(Price) FROM ORDERS;

33. A CSV file "HealthData.csv" contains the data of a health survey. Each record of the file contains the following data:

- Name of a country
- Life Expectancy (average number of years a person is expected to live)
- GDP per capita (Gross Domestic Product per person)
- Percentage of population with access to healthcare

For example, a sample record of the file may be: ['Wonderland', 82.5, 40000, 95]. (4)

**Write the following Python functions to perform the specified operations on this file:**

(I) Read all the data from the file in the form of a list and display all those records for which the life expectancy is greater than 75.

(II) Count the number of records in the file.

34. Alex has been tasked with managing the Student Database for a High School. He needs to access some information from the STUDENTS and SUBJECTS tables for a performance evaluation. Help him extract the following information by writing the desired SQL queries as mentioned below. (4)

**Table: STUDENTS**

| S_ID | FName | LName | Enrollment_Date | Marks |
|---|---|---|---|---|
| 201 | John | Doe | 15-09-2020 | 85 |
| 202 | Jane | Smith | 10-05-2019 | 90 |
| 203 | Alex | Johnson | 22-11-2021 | 75 |
| 204 | Emily | Davis | 30-01-2022 | 60 |
| 205 | Michael | Brown | 17-08-2018 | 95 |

**Table: SUBJECTS**

| Sub_ID | S_ID | SubName | Credits |
|---|---|---|---|
| 301 | 201 | Mathematics | 3 |
| 302 | 202 | Science | 4 |
| 303 | 203 | History | 2 |
| 304 | 204 | Literature | 3 |
| 305 | 205 | Physics | 4 |
| 306 | 201 | Computer Science | 3 |

Write the following SQL queries:
(I) To display complete details (from both the tables) of those students whose marks are greater than 70.
(II) To display the details of subjects whose credits are in the range of 2 to 4 (both values included).
(III) To increase the credits of all subjects by 1 which have "Science" in their subject names.
(IV) (A) To display names (FName and LName) of students enrolled in the

| | | |
|---|---|---|
| | "Mathematics" subject.<br>(OR)<br>(B) To display the Cartesian Product of these two tables. | |
| 35. | A table, named ELECTRONICS, in the PRODUCTDB database, has the following structure:<br><br>Field / Type<br>productID / int(11)<br>productName / varchar(20)<br>price / float<br>stockQty / int(11)<br><br>**Write the following Python function to perform the specified operation:**<br><br>AddAndDisplay(): To input details of a product and store it in the table ELECTRONICS. The function should then retrieve and display all records from the ELECTRONICS table where the price is greater than 150.<br>Assume the following for Python-Database connectivity:<br>Host: localhost<br>User: root<br>Password: Electro123 | (4) |
| **Q.No.** | **SECTION E (2 X 5 = 10 Marks)** | **Marks** |
| 36. | Raj is a supervisor at a software development company. He needs to manage the records of various employees. For this, he wants the following information of each employee to be stored:<br>Employee_ID – integer<br>Employee_Name – string<br>Position – string<br>Salary – float<br>You, as a programmer of the company, have been assigned to do this job for Raj.<br>(I) Write a function to input the data of an employee and append it to a binary file.<br>(II) Write a function to update the data of employees whose salary is greater than 50000 and change their position to "Team Lead".<br>(III) Write a function to read the data from the binary file and display the data of all those employees who are not "Team Lead". | (5) |
| 37 | Interstellar Logistics Ltd. is an international shipping company. They are planning to establish a new logistics hub in Chennai, with the head office in Bangalore. The Chennai hub will have four buildings - OPERATIONS, WAREHOUSE, CUSTOMER_SUPPORT, and MAINTENANCE. As a network specialist, your task is to propose the best networking solutions to address the challenges mentioned in points (I) to (V), considering the distances between the various buildings and the given requirements.<br><br>Building-to-Building Distances (in meters): | |

| From | To | Distance |
|---|---|---|
| OPERATIONS | WAREHOUSE | 40 m |
| OPERATIONS | CUSTOMER_SUPPORT | 90 m |
| OPERATIONS | MAINTENANCE | 50 m |
| WAREHOUSE | CUSTOMER_SUPPORT | 60 m |
| WAREHOUSE | MAINTENANCE | 45 m |
| CUSTOMER_SUPPORT | MAINTENANCE | 55 m |

**Distance of Bangalore Head Office from Chennai Hub: 1300 km**

Number of Computers in Each Building/Office:

| Location | Computers |
|---|---|
| OPERATIONS | 40 |
| WAREHOUSE | 20 |
| CUSTOMER_SUPPORT | 25 |
| MAINTENANCE | 22 |
| BANGALORE HEAD OFFICE | 15 |

(I) Suggest the most suitable location for the server within the Chennai hub. Justify your decision.
(II) Recommend the hardware device to connect all computers within each building efficiently.
(III) Draw a cable layout to interconnect the buildings at the Chennai hub efficiently. Which type of cable would you recommend for the fastest and most reliable data transfer?
(IV) Is there a need for a repeater in the proposed cable layout? Justify your answer.
(V) A) Recommend the best option for live video communication between the Operations Office in the Chennai hub and the Bangalore Head Office from the following choices:

- a) Video Conferencing
- b) Email
- c) Telephony
- d) Instant Messaging

OR

(V) B) What type of network (PAN, LAN, MAN, or WAN) would be set up among the computers within the Chennai hub?

(5)