

Time Allowed: 3 Hrs

Maximum

Marks: 70

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.

QNo.	SECTION A (21 x 1 = 21 Marks)	Marks
1	Which of the following is an invalid identifier in Python? a) <code>_first</code> b) <code>2ndName</code> c) <code>third_name</code> d) <code>FourthName</code>	1
2	What will be the output of the following code? <code>print(15 / 2 * 2 + 1)</code> a) 15.0 b) 16.0 c) 15 d) 16	1
3	What will be the data type of the variable result after the following operation? <code>result = 10 + 15.5</code> a) <code>int</code> b) <code>float</code> c) <code>complex</code> d) <code>NoneType</code>	1
4	The <code>isalnum()</code> method returns True if the string: a) contains only alphabets b) contains only numbers c) contains only alphabets and numbers d) is in lowercase	1
5	Which operator is used to check if a value is present in a sequence? a) <code>==</code> b) <code>in</code> c) <code>=</code> d) <code>contains</code>	1
6	What will be the output of <code>list("55")</code> ? a) 55 b) [55] c) ['5', '5'] d) Error	1
7	Which method is used to add an element at the end of a list? a) <code>insert()</code> b) <code>append()</code> c) <code>extend()</code> d) <code>add()</code>	1

8	Which of the following is a mutable data type? a) Tuple b) String c) Dictionary d) None of the above	1
9	What is the output of the following code? <pre>import math print(math.floor(7.8) + math.ceil(7.2))</pre>	1
10	Which function is used to find the number of elements in a tuple? a) size() b) length() c) len() d) count()	1
11	What will be the output of the following code? <pre>def func(x=1, y=2): return x * y print(func(y=4))</pre> a) 2 b) 4 c) 8 d) Error	1
12	Which device operates at the Network Layer of the OSI model? a) Hub b) Switch c) Router d) Repeater	1
13	Which protocol is used for sending emails? a) HTTP b) FTP c) SMTP d) POP3	1
14	Which cable type offers the highest security and fastest data transmission speed? a) Twisted Pair Cable b) Co-axial Cable c) Fiber-optic Cable d) USB Cable	1
15	In a relational model, a row is also known as a: a) Attribute b) Tuple c) Degree d) Domain	1
16	Which SQL command is used to permanently save a transaction in the database? a) SAVE b) COMMIT c) PUSH d) UPDATE	1
17	The UNIQUE constraint in SQL is used to: a) Ensure a column cannot have NULL values b) Ensure each value in a column is different c) Define the primary key d) Create a link between two tables	1
18	Which function is used to find the average value of a numeric column? a) AVG() b) MEAN() c) SUM() d) AVERAGE()	1

19	Which clause is used to filter groups in an SQL query? a) WHERE b) FILTER c) GROUP BY d) HAVING	1
20	Assertion (A): The finally block in exception handling is always executed. Reason (R): The finally block is used to execute code regardless of whether an exception occurred or not. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	1
21	Assertion (A): A foreign key in a table must always reference a primary key in another table. Reason (R): A foreign key is used to enforce referential integrity between two related tables. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	1
QNo.	SECTION B (7 x 2 = 14 Marks)	Marks
22	Explain the difference between is and == operators in Python with a suitable example. OR Differentiate between list.extend() and list.append() methods with an example.	2
23	Find and correct the errors in the following code to create a list of squares of even numbers from 1 to 10: <pre>squares = [] for i in range(1, 10): if i % 2 = 0 squares.append(i^2) print("Squares:", squares)</pre>	2
24	What will be the output of the following code? Explain the concept of variable scope it demonstrates. <pre>x = 10 def my_func(): x = 20 print("Inside:", x) my_func() print("Outside:", x)</pre>	2

25	Write a function calculate_area() that accepts the radius of a circle and returns its area. Use the value of pi from the math module.	2
26	What is the purpose of the else clause in a try-except block? Give a suitable example.	2
27	Differentiate between a Hub and a Switch. OR Expand the following: (i) SMTP (ii) POP3	2
28	Differentiate between the DELETE and DROP SQL commands. OR What is the use of the DISTINCT keyword in an SQL query? Give an example.	2
QNo.	SECTION C (3 x 3 = 9 Marks)	Marks
29	Write a Python function count_lines() to count the number of lines in a text file named 'poem.txt'. OR Write a Python function vowel_lines() to read a text file 'story.txt' and display only those lines that start with a vowel (a, e, i, o, u, A, E, I, O, U).	3
30	Write a Python function reverse_list() that uses a stack (implemented with a list) to reverse the elements of a given list. Example: Input: [1, 2, 3, 4] Output: [4, 3, 2, 1]	3
31	Predict the output of the following code: <pre>s = "PYTHON123" new_s = "" for char in s: if char.isalpha(): new_s += char.lower() elif char.isdigit(): new_s += str(int(char) * 2) print(new_s)</pre> OR Predict the output of the following code: <pre>L = [5, 1, 8, 3, 2] L.sort(reverse=True) print(L[-1] + L[0])</pre>	3
QNo.	SECTION D (4 x 4 = 16 Marks)	Marks
32	Write a Python program to perform the following operations on a CSV file 'students.csv' with columns [RollNo, Name, Marks]: (i) Display all records where Marks are greater than 90. (ii) Add a new student record to the file.	4

33	<p>Consider the table 'EMPLOYEE' with columns (EmployeeID, Name, Department, Salary). Write SQL queries for the following:</p> <p>a) To display the names of employees in the 'Sales' department. b) To increase the salary of all employees in the 'IT' department by 15%. c) To display the average salary of each department. d) To list the departments having more than 5 employees.</p>	4
34	<p>Consider two tables:</p> <p>CUSTOMER (CustID, Name, City) ORDERS (OrderID, CustID, ProductName, Amount)</p> <p>Write SQL queries for the following:</p> <p>a) To display the names of customers who have placed orders. b) To find the total amount spent by each customer. c) To list all products ordered by customers from 'Mumbai'. d) To count the number of orders for each product.</p>	4
35	<p>Write a Python program to connect to a MySQL database named 'Company'. Display all records from the 'Employees' table where the 'Salary' is greater than 50000. (Assume necessary connection parameters)</p>	4
QNo.	SECTION E (2 x 5 = 10 Marks)	Marks
36	<p>Write a Python program to manage a binary file 'inventory.dat' which stores records of products in the form of a dictionary {ProdID: [PName, Price, Quantity]}. Implement the following functions:</p> <p>a) add_product() to add a new product to the file. b) update_quantity(prod_id, new_qty) to update the quantity of a specific product. c) display_all() to display all product details.</p>	5
37	<p>Global Tech Solutions is setting up a new office with 4 departments: Admin (30 computers), Finance (25), HR (20), and IT (50).</p> <p>The distances between departments are: Admin - Finance (60m), Admin - HR (80m), Admin - IT (110m), Finance - HR (40m), Finance - IT (90m), HR-IT (50m).</p>	5

	<p>As a network architect, answer the following:</p>	
--	--	--

- | | | |
|--|---|--|
| | <ul style="list-style-type: none">a) Suggest the most suitable network topology and justify your choice.b) Suggest the placement of a Switch and a Router in this network.c) Which type of network (LAN, MAN, WAN) is being created?d) Which transmission medium is most appropriate for connecting these buildings? Justify.e) What is the function of a gateway in a network? | |
|--|---|--|

OR

Differentiate between Circuit Switching and Packet Switching.