

Total No. of Printed Pages—8

**HS/XII/A.Sc.Com/CSc/22**

**2 0 2 2**

**COMPUTER SCIENCE**

**( Theory )**

*Full Marks : 70*

*Time : 3 hours*

*The figures in the margin indicate full marks for the questions*

*General Instructions :*

- (i) Write all the answers in the Answer Script.
- (ii) Attempt multiple choice questions and very short answer-type questions serially.
- (iii) Attempt *all* parts of a question together at one place.

**1.** Choose the correct option for the following : 1×6=6

(a) The keys of a dictionary must be of \_\_\_\_\_ types.

- (i) integer
- (ii) mutable
- (iii) immutable
- (iv) Any of these

(b) What is the default return value for a function that does not return any value explicitly?

- (i) None
- (ii) Int
- (iii) Double
- (iv) Null

( 2 )

(c) Which function is used to write a list of strings in a file?

- (i) writeline( )
- (ii) writelines( )
- (iii) writestatement( )
- (iv) writefullline( )

(d) Average Case efficiency means that

- (i) the fastest possible case of the algorithm
- (ii) it tells that the algorithm will never be slower than the the worst case
- (iii) most probable cases of the algorithm will perform like this
- (iv) None of the above

(e) The relational model is concerned with

- (i) data structure and data integrity
- (ii) data manipulation
- (iii) Both (i) and (ii)
- (iv) None of the above

(f) In the given query which keyword has to be inserted?

INSERT INTO employee \_\_\_\_\_ (1002, Kausar, 2000);

- (i) table
- (ii) values
- (iii) relation
- (iv) field

( 3 )

2. Answer the following questions in not more than 2 (two) or 3 (three) sentences each : 1×6=6

(a) What is the output of the following expression?

int ("3" + "4")

(b) What all information does a function header give you about the function?

(c) What does **csv.writer** object do?

(d) What is docstring?

(e) What is workstation?

(f) What is equi-join?

3. Answer any six of the following questions : 2×6=12

(a) What is the difference between *formal parameters* and *actual parameters* in the context of user-defined functions?

(b) When do you think *text files* should be preferred over *binary files*?

(c) What is the significance of `newline = ''` argument in the `open()` function of CSV file?

(d) Why is base case so important in a recursive function?

(e) Distinguish between *worst-case* and *best-case complexity* of an algorithm.

( 4 )

- (f) Write the expression to generate and print a random floating-point number between 85 to 100.
- (g) What is the difference between mutable and immutable objects?
- (h) Convert the following infix expression to prefix :

$$A + B * C - D$$

4. Answer any *three* of the following questions : 2×3=6

- (a) What is the difference between Circuit Switching and Packet Switching technique?
- (b) Define Network Topology. Name any two important factors for choosing a Topology of a Network.
- (c) Define broadband and narrowband.
- (d) Differentiate between XML and HTML.
- (e) What is network protocol? Name any two network protocols.

5. Answer any *two* of the following questions : 2×2=4

- (a) What is SQL constraint? Mention any two constraints.
- (b) What are aggregate functions in SQL?
- (c) What is the use of ORDER BY clause? Write a query that sorts the data of a table STUDENT on the basis of MARKS in descending order.
- (d) Differentiate between char and varchar data types.

( 5 )

6. Answer the following questions :

3×4=12

(a) Write a Python program to find the sum of squares of all elements of a list.

*Or*

Write a recursive function to find the factorial value of a number.

(b) What will the following code print?

```
def SME(a, b, c):  
    return (a - b + c)  
def Exp(p, q, r):  
    return p*q - r  
x = SME(5,15,10)  
y = Exp(4,15,2)  
print(x,y)
```

*Or*

Create a module convs-py having two functions :

(i) cmtom() : to convert centimeter to meter

(ii) mtocm() : to convert meter to centimeter

(c) Convert into postfix :

$((A + B) * C / D + E ** F) / G$

*Or*

How can you return multiple values from a function?

Explain with the help of an example.

(d) Write a Python program to read a text file and display number of words in the file.

*Or*

What are the differences between a regular text file and a delimited text file (CSV)? Explain with examples.

( 6 )

7. Answer any *one* of the following questions : 3
- (a) Explain the guided and unguided transmission media.
  - (b) Explain the role of Router and Gateway in the context of networking.
  - (c) Compare 1G, 2G and 3G networks.

8. Answer any *three* of the following questions : 3×3=9
- (a) Write the SQL commands for the following queries (i) to (iii) based on the relations TEACHER and POSTING.

| TEACHER           |
|-------------------|
| TID (Primary Key) |
| Name              |
| Age               |
| Department        |
| DOJ               |
| Salary            |
| Gender            |

| POSTING           |
|-------------------|
| PID (Primary Key) |
| Department        |
| Place             |

- (i) To show all the records from the table POSTING.
  - (ii) To show all information about the *teacher* of History department.
  - (iii) To list the names of all *teachers* with their date of joining in Ascending order.
- (b) How to implement multiple conditions using WHERE clause? Write the queries from the DOCTOR table.
- (i) The male doctors whose age is between 40 to 50
  - (ii) The female doctors whose OPD-Days are on 'Monday' and 'Friday'

( 7 )

- (c) What is the significance of GROUP BY clause in a SQL query? From a table STUDENT having fields Stipend and Class, write a query to display the sum of Stipend of each Class.
- (d) What is ORDER BY clause? Write a query to display Sum, Average, and Highest Salary of employees grouped by department number.
- (e) What is database connectivity? Write the connection statement to connect to a database 'BANK'.

9. Answer the following questions : 4×2=8

- (a) What do you understand by *local* and *global scope* of variables? How can you access a global variable inside the function if function has a variable with same name?

*Or*

Write a program to input following details of sports' performance (sports, competitions, prizes-won) of your school and store into a CSV file.

- (b) Write two functions in Python, **MakePush** (item) and **MakePop** (item) to add a new item and delete an item from the stack data structure.

*Or*

What are the procedures to execute own library in Python?

10. Write a Python script to accept the **rollno** as parameter and find out whether any record present or not in the MySQL table STUDENTS.

4

( 8 )

Or

Consider the following table Carhub. Give the output of the following queries (i) to (iv) :

Table : Carhub

| VCode | Vehicle Name | Make     | Color  | Capacity | Charges |
|-------|--------------|----------|--------|----------|---------|
| 100   | Innova       | Toyota   | WHITE  | 7        | 15      |
| 102   | SX4          | Suzuki   | BLUE   | 4        | 14      |
| 104   | C Class      | Mercedes | RED    | 4        | 35      |
| 105   | A-Star       | Suzuki   | WHITE  | 3        | 14      |
| 108   | Indigo       | Tata     | SILVER | 3        | 12      |

- (i) SELECT COUNT(DISTINCT Make) from Carhub;
- (ii) SELECT MAX(Charges), MIN(Charges) from Carhub;
- (iii) SELECT COUNT(\*), Make from Carhub;
- (iv) SELECT Vehiclename FROM Carhub WHERE CAPACITY = 4;

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