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

**2022**

# 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

*(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

**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.

*(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.

**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 SMEm(a, b, c):
  return (a – b + c)
def Exp(p, q, r):
  return p*q – r
x = SMEm(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.

**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'

*(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

*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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