

Total No. of Printed Pages—16

HS/XII/A.Sc.Com/CSc/26

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COMPUTER SCIENCE

(Theory)

Full Marks : 70

Time : 3 hours

The figures in the margin indicate full marks for the questions

General Instructions :

- (i) This question paper contains **37** questions.
- (ii) All questions are compulsory. However, internal choices have been provided in some questions. Attempt only one of the choices in such questions.
- (iii) The paper is divided into 5 Sections—A, B, C, D, and E.
- (iv) Section—A consists of **21** questions (**1** to **21**). Each question carries 1 mark.
- (v) Section—B consists of **7** questions (**22** to **28**). Each question carries 2 marks.
- (vi) Section—C consists of **3** questions (**29** to **31**). Each question carries 3 marks.

(2)

- (vii) Section—D consists of **4** questions (**32** to **35**). Each question carries 4 marks.
- (viii) Section—E consists of **2** questions (**36** and **37**). Each question carries 5 marks.
- (ix) All programming questions are to be answered using Python programming language only.
- (x) In case of MCQ, text of the correct answer should also be written.

SECTION—A

Answer the following as directed :

1×21=21

1. State if the following statement is True/False :

The expression $2^{**}2^{**}3$ is evaluated as $(2^{**}2)^{**}3$.

2. Which of the following is not a tuple in Python?

- (a) (1, 2, 3)
- (b) ("One", "Two", "Three")
- (c) (10,)
- (d) ("One")

(Choose the correct answer)

(3)

3. What will be the output of the following Python code?

```
S='WELCOME'
def Change (T) :
    T='HELLO'
    print (T, end = '@')
Change (S)
print (S)
```

- (a) WELCOME @ HELLO
- (b) WELCOME @ WELCOME
- (c) HELLO @ HELLO
- (d) HELLO @ WELCOME

(Choose the correct answer)

4. Which of the following is not a correct Python statement to open a text file "Notes.txt" to write data into it?

- (a) F=open ('Notes.txt', 'w')
- (b) F=open ('Notes.txt', 'a')
- (c) F=open ('Notes.txt', 'A')
- (d) F=open ('Notes.txt', 'wt')

(Choose the correct answer)

5. Errors resulting out of violation of programming language's grammar rule are known as

- (a) compile time error
- (b) logical error
- (c) runtime error
- (d) exception

(Choose the correct answer)

(4)

6. What is the correct output for the following sequence of operations (· signifies TOP)?

Push(5), Push(8), POP, Push(2), Push(5), POP,
Push(1)

(a) 8525↓

(b) 8552↓

(c) 255↓

(d) 52↓

(Choose the correct answer)

7. Which of the following statements about Python function is correct?

(a) A function in Python cannot be defined without arguments.

(b) Default argument must be written before non-default arguments.

(c) A Python function can return multiple values.

(d) The return keyword is required in all functions.

(Choose the correct answer)

(5)

8. Which of the following statements is incorrect in the context of binary files?

- (a) CSV module is used for reading and writing objects in binary files.
- (b) Pickle module is used for reading and writing objects in binary file.
- (c) Load() function of the pickle module is used to read the objects.
- (d) Dump() function of this pickle module is used to write the objects.

(Choose the correct answer)

9. When a denominator of a division expression is zero, _____ exception is raised.

(Fill in the blank)

10. What is the function of csv.reader object?

11. How can you access an individual element from a Python list?

12. Rima wants to transfer pictures from her mobile phone to her laptop. She uses Bluetooth technology to connect two devices. Which type of network will be formed in this case?

- (a) PAN
- (b) MAN
- (c) WAN
- (d) LAN

(Choose the correct answer)

(6)

13. _____ is a communication methodology designed to deliver both voice and multimedia communication over Internet protocol.

- | | |
|----------|----------|
| (a) VoIP | (b) PPP |
| (c) SMTP | (d) HTTP |

(Choose the correct answer)

14. What is meant by network topology?

15. Which of the following statements is correct regarding Alternate Key?

An Alternate Key can be defined as—

- (a) an attribute which is a primary key
- (b) an attribute which is not a primary key
- (c) candidate key
- (d) composite key

(Choose the correct answer)

16. Consider the SQL statement. What type of statement is this?

INSERT INTO instructor VALUES
(10211, 'Shreya', 'Biology', 66000);

- | | |
|---------------|---------|
| (a) Procedure | (b) DML |
| (c) DCL | (d) DDL |

(Choose the correct answer)

(7)

17. In equi join, the join condition joins the two tables using _____ operator.

(Fill in the blank)

18. State whether the following statement is True or False.

The cursor.rowcount gives the count of records in the result set.

19. Write an SQL statement to display the structure of the table 'student'.

20. What is a column constraint?

21. What is the purpose of CONCAT() function?

SECTION—B

Answer the following questions :

2×7=14

22. Write the output of the following code :

2

```
For i in range (1, 4) :  
    for j in range (i, 4) :  
        if (i%j==0) :  
            print (i, j)
```

23. How can function return multiple values? Explain with example.

2

(8)

- 24.** (a) Differentiate between `readline()` and `readlines()`. 2

Or

- (b) Evaluate the following postfix notation of expression : 2

15, 3, 2, +1, 7, +2, *

- 25.** (a) What is the function of `except` block in exception handling? Where does it appear in a program? 2

Or

- (b) Find and write the output of the following Python code : 2

```
def Status (P, Q=35) :
```

```
    P=P+Q
```

```
    Q=P-Q
```

```
    print (P, "@", Q)
```

```
    return
```

```
R = 300
```

```
S = 150
```

```
Status (R, S)
```

- 26.** (a) Explain underflow and overflow with respect to stack data structure. 2

Or

- (b) Write a user-defined function to count number of words in a text file 'story.txt'. 2

- 27.** (a) What are the types of transmission media? Give one example from each type. 2

(9)

Or

(b) Differentiate between Switch and Hub. 2

28. (a) Write an SQL query to display the name of employee whose name contains 'T' as the last alphabet from a table 'STUDENT' having fields Rollno, Name, Age and Class. 2

Or

(b) Write suitable SQL statements to do the following :

(i) View the table structure of the table named 'Employee'. 1

(ii) Create a database named 'MyDB'. 1

SECTION—C

Answer the following questions : 3×3=9

29. (a) Write a Python program that counts and displays the number of vowels in the text file named 'Poem.txt'. 3

Or

(b) What will be the output of following Python code? 3

```
F=open ('Rhymes.txt')
S=F. read()
L=S. split()
For i in L :
    if len (i)% 3 !=0 :
        print (i, end =" ")
```

(10)

30. (a) When are the following built-in exceptions raised?
Give examples to support your answer : 3

- (i) Import Error
- (ii) Name Error
- (iii) Zero Division Error

Or

(b) Consider the code given below and fill in the blanks : 3

```
print ('Learning Exceptions ...') try :  
    num1=int (input ('enter the first number'))  
    num2=int (input ('enter the second number'))  
    quotient=(num1/num2)  
    print ('Both the numbers entered were correct')  
except ____ : # to enter only integer  
    print ('Please enter only number')  
except ____ : # denominator should not be zero  
    print ('Number 2 should not be zero')  
else :  
    print ('Great ... you are a good programmer')  
    ____ : # to be executed at the end  
    print ("Job over...Go get some rest" )
```

31. (a) Explain the following formal arguments : 3

- (i) Positional argument
- (ii) Keyword argument
- (iii) Default argument

(11)

Or

(b) Trace the flow of execution for the following programs :

3

```
1  def power (b, p) :  
2    r = b**p  
3    return r  
4  def calc square (a) :  
5    a = power (a, 2)  
6    return a  
7  n = 5  
8  result = calcsquare (n)  
9  print (result)
```

SECTION—D

Answer the following questions :

4×4=16

32. Consider the table SALES as given below :

<i>Sales-id</i>	<i>Customer_ name</i>	<i>Product</i>	<i>Quantity_ Sold</i>	<i>Price</i>
S001	John Doe	Laptop	5	50000
S002	Jane Smith	Smart phone	10	30000
S003	Michael Lee	Tablet	3	15000
S004	Sarah Brown	Headphone	7	2000
S005	Emily Davis	Smart watch	8	8000
S006	David	Smart watch	3	16000
S007	Mark	Tablet	5	34000

(12)

Write the following queries :

- (a) To display the total quantity sold for each product whose total quantity sold exceeds 12 1
- (b) To display the records of SALES table sorted by product name in descending order 1
- (c) To display the distinct product names from the SALES table 1
- (d) To display the records of customers whose names end with the letter 'e' 1

33. (a) Given the following table :

No.	Name	Stipend	Avg Mark	Grade	Class
1	Karan	400	78.5	B	12B
2	Divakar	450	89.2	A	11C
3	Divya	300	68.6	C	12C
4	Arun	350	73.1	B	12C
5	Sabina	500	90.6	A	11A

Give the output of the following :

- (i) Select MIN (Avg Mark) from student where Avg Mark<75; 1
- (ii) Select SUM (Stipend) from student where Grade = 'B'; 1
- (iii) Select AVG (Stipend) from student where class = '12C'; 1
- (iv) Select count (Distinct Grade) from student; 1

(13)

Or

- (b) MySQL database named warehouseDB has a product_inventory table in MySQL which contains the following attributes :

Item_code : Item code (integer)

Product_name : Name of product (string)

Quantity : Quantity of product (integer)

Cost : Cost of product (integer)

Consider the following details to establish Python-MySQL connectivity :

Username : Admin

Password : Root2025

Host : Localhost

Write a Python program to change the quantity of the product to 91 whose item_code is 105 in the product_inventory table.

4

34. Answer the following questions :

- (a) Differentiate between WHERE clause and HAVING clause of SQL Select Statement. 2
- (b) What is the purpose of ORDER BY clause of SQL Select Statement? 1
- (c) What is SQL join? 1

(14)

35. (a) Convert X : $A + (B * C - (D / E ** F) * G) * H$ into postfix form showing stack status after every step in tabular form. 4

Or

- (b) Write Addnew (Book) and Remove (Book) methods in Python to add a new book and remove a book from a list of books, considering them to act as PUSH and POP operations of the data structure stack. 4

SECTION—E

Answer the following questions : 5×2=10

36. (a) A binary file 'STUDENT.DAT' has structure (ad_no, Name, Percent). Write a function countrec() in Python that would read contents of the file 'STUDENT.DAT' and display the details of those students whose percentage is above 75. Also display the number of students scoring above 75%. 5

Or

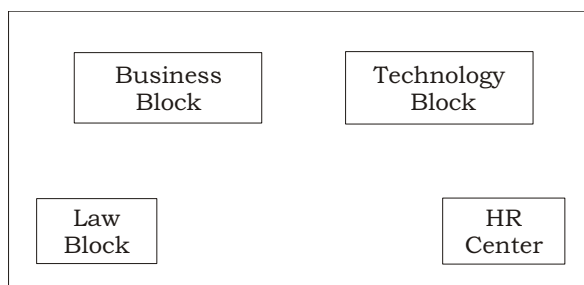
- (b) Write a program in Python that defines and calls the following user defined functions : 5
- (i) ADD(): To accept and add data of an employee to a CSV file 'Record.csv'. Each record consists of a list with field elements as empid, name and mobile to store employeeID, employeename and employee mobile number respectively.
- (ii) COUNTER() : To count the number of records present in the CSV file named 'Record.csv'.

(15)

37. (a) Differentiate between Bus and Star topologies of networks. Mention three advantages and three disadvantages of each of these topologies. 5

Or

- (b) ABC University is setting up its academic blocks at New Delhi and is planning to set up a network. The University has three academic blocks and one Human Resource Centre as shown in the diagram below :



Center-to-center distance between various blocks/ centers is as follows :

Law block to business block	40 m
Law block to technology block	80 m
Law block to HR center	105 m
Business block to technology block	30 m
Business block to HR center	35 m
Technology block to HR center	

(16)

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

Law block	15
Technology block	40
HR center	115
Business block	25

- (i) Suggest the most suitable place (in block/center) to install the server of this university with a suitable reason.
- (ii) Suggest an ideal layout for connecting these blocks/centers for a wired connectivity.
- (iii) Which device will you suggest to be placed/installed in each of these blocks/centers to efficiently connect all the computers within these blocks/centers?
- (iv) Suggest the placement of a Repeater in the network with justification.
- (v) The university is planning to connect its admission office in Mumbai which is more than 1390 km from university. Which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

5

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