

CUET (UG) Exam Paper 2024

National Testing Agency

Section II

COMPUTER SCIENCE

Time Allowed: 45 Mins.

Maximum Marks: 200

General Instructions :

- (i) This paper consists of 50 MCQs, attempt any 40 out of 50 .
- (ii) Correct answer or the most appropriate answer: Five marks (+5) .
- (iii) Any incorrect option marked will be given minus One mark (-1) .
- (iv) Unanswered/Marked for Review will be given No mark (0) .
- (v) If more than one option is found to be correct then Five marks (+5) will be awarded to only those who have marked any of the correct options.
- (vi) If all options are found to be correct then Five marks (+5) will be awarded to all those who have attempted the question.
- (vii) If none of the options is found correct or a Question is found to be wrong or a Question is dropped then all candidates who have appeared will be given five marks (+5).
- (viii) Calculator / any electronic gadgets are not permitted.

Compulsory

1. Match List-I with List-II

LIST-I	LIST-II
A. Candidate Key	I. It is an attribute in a table which is the primary key in linked table
B. Primary Key	II. It refers to any attribute that can uniquely identify a record in a table
C. Alternate Key	III. It refers to designated attribute(s) that uniquely identify a record in the table
D. Foreign Key	IV. It is often used when primary key fails

Choose the correct answer from the options given below:

- (1) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)
- (2) (A)-(I), (B)-(III), (C)-(IV), (D)-(II)
- (3) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
- (4) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

Ans. Option (3) is correct.

Explanation: Primary Key: It refers to the unique attribute in the table. It does not contain null values. For a table, only one attribute can be referred to as the primary key. It can be chosen from the set of candidate keys.

Candidate Key: All the subset of attributes that can uniquely identify a tuple are known as candidate keys. For a table, one or more than one can be available as candidate key.

Alternate Key: All the candidate keys which are not primary keys are referred to as alternate keys.
AK=CK-PK

Foreign Key: A non-key attribute of a table that is primary key in another table and links the two tables is a foreign key.

2. A program is given to read data from the "CUET.TXT" file and display the result on the screen.

- (A) data = fout.read()
- (B) fout.close()
- (C) print (data)
- (D) fout = open ("CUET.TXT","r")

Choose the correct sequence from the options given below:

- (1) (D), (B), (A), (C) (2) (A), (C), (B), (D)
- (3) (B), (A), (D), (C) (4) (D), (A), (C), (B)

Ans. Option (4) is correct.

Explanation: The correct sequence of the program is:

```
fout = open ("CUET.TXT", "r")
data = fout.read ()
print (data)
fout.close ()
```

First, the respective file has to be opened in read mode ("r"). Since, the data present in the file has to be read and displayed. Hence, the read mode has to be used. After reading of the data, the data has to be printed on the screen. After all the processes are over, the file handle has to be closed.

3. ARPANET stands for

- (1) Automatic Research Practical Agency Network
- (2) Advanced Research Project Application Network
- (3) Advanced Research Projects Agency Network
- (4) Automatic Research Practical Application Network

Ans. Option (3) is correct.

Explanation: ARPANET stands for Advanced Research Projects Agency Network. It was a mini version of Internet. It was first funded by US Department of Defense's Advanced Research Projects Agency in the late 1960s and early 1970s. This Project stood as a central pavement for the development of the Internet.

4. In _____ topology, each device is connected to every other device on a network through a dedicated point-to-point link.
- (1) Ring (2) Tree
(3) Bus (4) Mesh

Ans. Option (4) is correct.

Explanation: In Mesh Topology where each device is connected to other device with a dedicated link. It is similar to the peer-to-peer network concept. Mesh topology uses routing and flooding concepts to transfer the packets. It is best for data transmission but the setup cost is very high compared to other topologies.

5. Which of the following command(s) can be used to open a file "c:\cs\ip\cueto.txt" for writing as well as reading in text file format?
- (A) `f = open("c:\cs\ip\cueto.txt", "w+")`
(B) `f = open("c:\cs\ip\cueto.txt", "w+")`
(C) `f = open(r"c:\cs\ip\cueto.txt", "w+")`
(D) `f = open("c:\cs\ip\cueto.txt", "w+")`

Choose the correct answer from the options given below:

- (1) (A) and (C) only (2) (B) and (C) only
(3) (A), (B) and (C) only (4) (A), (C) and (D) only

Ans. Option (1) is correct.

Explanation: w+ is the mode which can be used to read and write in the text files. To open the text file, the syntax is: `f = open("path", "mode")`.

6. Consider an SQL table having the following fields INVOICENO, CARID, CUSTID, SELLDATE, PAYMENTMODE, EMPLOYEEID, SALEPRICE, COMMISSION.

To display the payment mode and number of payments made using that mode more than once, choose the correct sequence of the following

- (A) SELECT (B) HAVING
(C) GROUP BY (D) ORDER BY
(1) (A), (C), (B), (D) (2) (A), (B), (D), (C)
(3) (B), (A), (D), (C) (4) (B), (D), (A), (C)

Ans. Option (1) is correct.

Explanation: The correct sequence of the query to display the payment mode and the number of payments made by that mode is: SELECT, GROUP BY, HAVING, ORDER BY.

SELECT – It is used to select or display data.
GROUP BY – It is a clause on common values in an attribute which can be used to group the data based.

HAVING – It is a clause which can be used instead of WHERE condition. HAVING clause is associated with the aggregate functions. Hence,

it can be used to identify the number of payments made by the user using the same payment mode.
ORDER BY – It is used to sort the records either in ascending or descending order.

7. Match List-I with List-II on the basis of the following statements.

a = "Hello CUET"
b = 10
c = 0

LIST-I (Statement)		LIST-II (Type of Error)	
A.	<code>print(a[20])</code>	I.	NameError
B.	<code>print(a+b)</code>	II.	IndexError
C.	<code>print(b/c)</code>	III.	ZeroDivisionError
D.	<code>print(d)</code>	IV.	TypeError

Choose the correct answer from the options given below:

- (1) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)
(2) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)
(3) (A)-(II), (B)-(I), (C)-(III), (D)-(IV)
(4) (A)-(I), (B)-(IV), (C)-(II), (D)-(III)

Ans. Option (1) is correct.

Explanation:

(A) `print(a[20])` results in IndexError because index 20 is out of range.
(B) `print(a + b)` results in TypeError because you can't concatenate a string (a) with an integer (b).
(C) `print(b / 0)` results in ZeroDivisionError because dividing by zero is not allowed.
(D) `print(d)` results in NameError because d is not defined.

8. Number of tuples in a relation is called:

- (1) Degree of the relation
(2) Cardinality of the relation
(3) Domain of the relation
(4) Foreign key

Ans. Option (2) is correct.

Explanation: The total number of rows or tuples present in a table or relation is called as the Cardinality.

9. If we want to delete all records of a table without deleting its structure, then which SQL command is used?

- (1) drop (2) delete
(3) modify (4) alter

Ans. Option (2) is correct.

Explanation: Delete command is used to delete the contents of the table without deleting its structure or schema. Whereas drop command is used to delete the whole structure along with the contents of the table.

10. The overall design of the database is called:

- (1) Application Program
(2) Data Manipulation Language (DML)
(3) Schema
(4) Relational Algebra

Ans. Option (3) is correct.

Explanation: The overall design or structure of the table which can include attribute names, their datatypes and the constraints is called as Schema.

11. Which of the following SQL statement is used to select distinct subject names from a table "Student"?
- (1) mysql> SELECT distinct subject from Student,
 - (2) mysql> SELECT subject from Student
 - (3) mysql> SELECT new subject from Student,
 - (4) mysql> SELECT unique subject from Student,

Ans. Option (1) is correct.

Explanation: DISTINCT is a keyword which can be used to select the distinct or unique values from the particular attribute or field.

12. Which of the following functions are valid functions for string manipulation in SQL?
- (A) ltrim()
 - (B) lcase()
 - (C) mid()
 - (D) power()

Choose the correct answer from the options given below:

- (1) (A), (B) and (D) only
- (2) (A), (B) and (C) only
- (3) (A), (B), (C) and (D)
- (4) (B), (C) and (D) only

Ans. Option (2) is correct.

Explanation: ltrim() – removes the leading spaces (space that occur before the string or character).
lcase() – It converts the given string into lower case form.
mid() – It extracts the substring from the given string based upon the starting and ending position.
power() – It is used to return the value of number raised to the power of another number.
ltrim(), lcase(), mid() are related to the string functions whereas power() is related to the numerical functions.

13. The result of which join is equivalent to cartesian product?
- (1) Natural Join
 - (2) Cross Join
 - (3) Inner Join
 - (4) Outer Join

Ans. Option (2) is correct.

Explanation: Cross Join is equivalent to cartesian product. Cross join provides the resultant row as the product of the number of rows in the two tables. Cartesian product also provides the same result as cross join. Hence, both are equivalent.

14. _____ is used to physically identify a machine on the network.
- (1) IP address
 - (2) MAC address
 - (3) Port Address
 - (4) URL

Ans. Option (2) is correct.

Explanation: Media Access Control (MAC) address which is used to identify the physical address of a device on the same network. It is a permanent address for each system. Using this address, the system can be easily identified through a network.

15. A network in which every computer is capable of playing the role of a client, or a server, or both, at the same time is called _____.

- (1) Peer-to-Peer Network
- (2) Local Area Network
- (3) Dedicated Server Network
- (4) Wide Area Network

Ans. Option (1) is correct.

Explanation: Peer-to-Peer Network is a type of network which can be used within a small organization or business. In this method, all the computers are connected with each other. Hence, each computer acts as a server or client or sometimes both and it communicates directly with other computers.

Computer Science

1. Worst case time complexity in Sequential Search is _____.

- (1) $O(n)$
- (2) $O(1)$
- (3) $O(\log_2 n)$
- (4) $O(n \log_2 n)$

Ans. Option (1) is correct.

Explanation: Worst case complexity is calculated whenever the element is present at the last position or else the element is not present at the list. This worst-case complexity needs maximum of n searches (n – number of elements present in the list). Hence, $O(n)$ is the worst-case complexity for sequential search algorithm.

2. What possible outputs are expected to be displayed on the screen after execution of the following code?

```
import random
data = [1, 2, 3, 4, 5]
a = random.randint(0, 3)
for i in range(1, a):
    print statement to be indented inside
    print (data[i], end = "$")
```

- (1) 2\$3\$
- (2) 1\$2\$3\$
- (3) 1\$2\$3\$4\$5\$
- (4) 1\$

Ans. Option (1) is correct.

Explanation: randint() method returns an integer within that given range. Hence, it returns any number from 0 to 3.

range() methods return a series of values within the given range but the last number is excluded. It always works as (start range, end range – 1).

The steps of the execution:

$a = 0$

range is (1,0) // Stop range is negative. Hence no output will be produced.

$a = 1$

range is (1,1) // Stop range is less than start range. Hence no output will be produced.

$a = 2$

range is (1,2) // It prints only the data present in the first position alone, 2\$ alone will be printed.

$a = 3$

range is (1,3) // It prints the data present in 1st

and 2nd position, 2\$3\$ will be printed.
Final output is: 2\$3\$.

3. What is the output of the following SQL statement?
SELECT RIGHT("MATHEMATICS",5);
- (1) MATHE (2) ATICS
(3) EMATICS (4) MATICS

Ans. Option (2) is correct.

Explanation: RIGHT () method returns the substring which has been extracted from the right based upon the position entered by the user. Here, MATHEMATICS,5. Hence, the last 5 letters from the right side has been displayed as the output "ATICS".

4. What will be the output of the code given below?
- ```
a = 10
b = 20
try:
 c = b-a-a
 d = c/c
 print("Code Over")
except:
 print("Error Occurred")
finally:
 print("Try Again")
```
- (1) Code Over Error Occurred Try Again
  - (2) Error Occurred Try Again
  - (3) Try Again
  - (4) Code Over Error Occurred

**Ans. Option (2) is correct.**

**Explanation:** First try block will get executed,  
 $c = 20 - 10 - 10$   
 $d = 0/0$   
 It raises zerodivision exception. Hence, the try block does not provide the output. The control gets moved on to the except block.  
 The code in the except block gets printed: output: "Error Occurred"  
 After the execution of try or except block, finally block gets executed automatically. Output: "Try Again"  
 Final output: Error Occurred  
 Try Again

5. In \_\_\_\_\_ topology, data can be transmitted in one direction (clockwise or anti-clockwise) only.
- (1) Ring                      (2) Bus  
(3) Tree                     (4) Star

**Ans. Option (1) is correct.**

**Explanation:** In Ring topology all the devices are connected exactly with their neighboring devices, which means there will be exactly two connections for each device. If a device, wants to send the data, the other has to be wait. After the packet has been received, another one has to send their data. This process can happen in either clockwise or anticlockwise direction. Ring topology allows unidirectional communication either in clockwise or anticlockwise direction.

6. Time complexity of enqueue operation in a queue is \_\_\_\_\_.  
 (1)  $O(n)$  (2)  $O(n^2)$   
 (3)  $O(n \log_2 n)$  (4)  $O(1)$

**Ans. Option (4) is correct.**

**Explanation:** Time complexity for enqueue operation in queue is  $O(1)$ . Enqueue operation means inserting an element into the queue. For each new element, it takes single memory allocation. Hence  $O(1)$  is constant value for the time complexity.

7. What will be the position of front and rear after execution of the following statements? The Queue already had the given elements.

$$\begin{array}{ccccccc} 10 & \rightarrow & 5 & \rightarrow & 9 & \rightarrow & 7 & \rightarrow & 18 & \rightarrow & 27 \\ \uparrow & & & & & & & & & & \uparrow \\ F & & & & & & & & & & R \end{array}$$

```
dequeue()
dequeue()
dequeue ()
enqueue(13)
enqueue(12)
dequeue()
dequeue()
```

- (1) Front-10. Rear-27      (2) Front-27, Rear-12  
(3) Front-18, Rear-13      (4) Front-12. Rear-13

**Ans. Option (2) is correct.**

**Explanation:** enqueue () – inserts the element at the rear end or at the back.  
 dequeue () – deletes the element from the first or front end.

Queue elements:  
 10 → 5 → 9 → 7 → 18 → 27  
 dequeue () → deletes the element at first position.  
 Queue after this operation: 5 → 9 → 7 → 18 → 27  
 dequeue ()  
 Queue after this operation: 9 → 7 → 18 → 27  
 dequeue ()  
 Queue after this operation: 7 → 18 → 27  
 enqueue (13)  
 Queue after this operation: 7 → 18 → 27 → 13  
 enqueue (12)  
 Queue after this operation: 7 → 18 → 27 → 13 → 12  
 dequeue ()  
 Queue after this operation: 18 → 27 → 13 → 12  
 dequeue ()  
 Queue after this operation: 27 → 13 → 12  
 Front: 27, Rear: 12

8. If we want to search an element 56 in an unsorted list and the element 56 is not present in the list, then the time complexity for the search is said to be \_\_\_\_\_ case time complexity.
- (1) Average                      (2) Worst  
(3) Best                         (4) Medium

**Ans. Option (2) is correct.**

**Explanation:** In a search operation, if the array is unsorted or the element is not present in the list, then it takes the  $n$  search operations (i.e., total number of elements). Hence, the time complexity is

proportional to the number of elements. This type of search operation belongs to the worst-case complexity.

9. Consider the following hash function:

$h[i] = L[i] \% \text{size}(\text{hashtable})$  where size of hashtable is 10.

Which of the following elements will cause collision if we apply the above hash function on the elements of list  $L[7, 3, 17, 11, 23, 19, 53, 97, 12]$ ?

- (A) 17 (B) 11  
(C) 19 (D) 23

Choose the correct answer from the options given below:

- (1) (A), (B) and (D) only (2) (A) and (B) only  
(3) (A) and (D) only (4) (B), (C) and (D) only

Ans. Option (3) is correct.

**Explanation:** Collision means when both values have the same hash value or both values occupy the same slot in the hash table.

$$7 \% 10 = 7$$

$$3 \% 10 = 3$$

$$17 \% 10 = 7$$

$$11 \% 10 = 1$$

$$23 \% 10 = 3$$

$$19 \% 10 = 9$$

$$53 \% 10 = 3$$

$$97 \% 10 = 7$$

$$12 \% 10 = 2$$

Hence, the collision elements are 17, 23, 53 and 97.

Final answer: 17 and 23.

10. Consider the following statements:

- (A) Primary key cannot be NULL.  
(B) Primary key is selected from one of the candidate keys.  
(C) In a table, there can be more than one primary key.  
(D) Foreign key is same as alternate key.

Choose the correct statement/statements from the options given below:

- (1) (A) and (B) only  
(2) (A), (B) and (C) only  
(3) All Statements are correct  
(4) Only Statement (B) is correct

Ans. Option (1) is correct.

**Explanation:** Primary key is a key which can be used to identify the record uniquely. Only one attribute can be selected from the subset of candidate keys and kept as a primary key. This primary key is unique and it does not contain null values. Only one attribute can be referred as a primary key for each relation. This primary key can act as a foreign key in another or its derived table.

11. In a stack both insertion and deletion operations are done from one end called

- (1) Rear (2) Front  
(3) Top (4) Bottom

Ans. Option (3) is correct.

**Explanation:** In a stack both insertion and deletion operation is done at the top only. The element which is inserted first that can be deleted at last.

12. In data-based problem statements, arrange the following steps in sequence.

- (A) Problem Statement (B) Output  
(C) Data Processing (D) Input  
(E) Data Preprocessing

Choose the correct answer from the options given below:

- (1) (A), (E), (D), (C), (B) (2) (A), (E), (C), (D), (B)  
(3) (A), (C), (E), (D), (B) (4) (A), (D), (E), (C), (B)

Ans. Option (4) is correct.

**Explanation:** If there is a data-based problem statements, the following sequence has to be followed:

Problem Statement – Clearly understand the problem statement.

Input – Based upon the problem statement, the input has to be selected.

Data Preprocessing – It is important step in this problem. All the input has to be preprocessed using algorithms or methods and extract the region of interest data.

Data Processing – The extracted data has to be processed using the suitable methods or algorithms.

Output – Finally, the output has to be produced in an appropriate form.

13. The steps in Data Processing cycle are:

- (A) Input (B) Output  
(C) Processing (D) Information

Choose the correct answer from the options given below:

- (1) (A), and (B) only (2) (B) and (C) only  
(3) (A), (B), and (C) only (4) (A), (B), (C) and (D)

Ans. Option (3) is correct.

**Explanation:** Data Processing cycle involves three major steps:

Collection of input → Cleans the data → Process the data → Provides output and made interpretations.

14. Which of the following is the correct syntax of using dump() function of pickle module where fout is the file object and variable temp holds the content to be written into the binary file?

- (1) fout.dump(temp)  
(2) dump(fout, temp)  
(3) pickle.dump(fout, temp)  
(4) pickle.dump(temp, fout)

Ans. Option (4) is correct.

**Explanation:** pickle.dump () is a method which can be used to write the data object into the binary file. The syntax for the pickle. dump () is → pickle. dump (data, file object).

**15. Match List-I with List-II**

| LIST-I |                   | LIST-II |                                                                            |
|--------|-------------------|---------|----------------------------------------------------------------------------|
| A.     | Metadata          | I.      | Set of programs used by DBMS to create database and handle various queries |
| B.     | Database Instance | II.     | Design of a database                                                       |
| C.     | Database Schema   | III.    | Snapshot of database at any given time                                     |
| D.     | Database Engine   | IV.     | Data about the data                                                        |

Choose the correct answer from the options given below:

- (1) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)  
 (2) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)  
 (3) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)  
 (4) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

**Ans. Option (2) is correct.**

**Explanation:** Metadata – Data that describes data or self-explanatory of that data.

Database instance – Backup of the database. The backup can be created like an image and it can be used in another system also.

Database Schema – It depicts the design of the database such as row or attribute names, their datatypes and the constraints.

Database Engine – It is a place where all the queries can be executed. It is made up of set of programs in order to create a database.

**16. Due to distance problem, certain nodes are getting weak signals in a network. Which of the following device should be installed to overcome this problem?**

- (1) Repeater (2) Router  
 (3) Gateway (4) Switch

**Ans. Option (1) is correct.**

**Explanation:** Repeater is a device which can be used to carry data over large distances. It has a greatest signal which can avoid the attenuation or weak signal problem and sends the data to the destination address. This will be more secure compared to hubs and switches.

**17. Match List-I with List-II**

| LIST-I |        | LIST-II |                                                               |
|--------|--------|---------|---------------------------------------------------------------|
| A.     | Mean   | I.      | Data value that appears most number of times                  |
| B.     | Median | II.     | Average of given values                                       |
| C.     | Mode   | III.    | Mid value where data are stored in ascending/descending order |
| D.     | Range  | IV.     | Difference between max and min values                         |

Choose the correct answer from the options given below:

- (1) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)  
 (2) (A)-(I), (B)-(III), (C)-(II), (D)-(IV)  
 (3) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)  
 (4) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

**Ans. Option (3) is correct.**

**Explanation:** Mean – It returns the average of given values.

Median – It sorts the list/array in ascending /descending order and then it returns the mid value of the list.

Mode – It returns the most repeated value in the list/array.

Range – It returns the difference between maximum and minimum value.

**18. Which of the following SQL function returns numerical value?**

- (1) mid() (2) lower()  
 (3) substr() (4) instr()

**Ans. Option (4) is correct.**

**Explanation:** mid () – It returns the substring from the position entered by the user.

lower () – It returns the given string in lower case format.

substr () – It returns the substring within the given position values entered by the user.

instr () – It returns the position number of the string; it checks whether the string entered by the user is present in the given string or not. If it is present, then it returns their position number. This function alone returns the numerical value.

**19. Zenith wants to add new content to the existing file named "CUET.TXT" but he wants to erase all the existing content.**

Let him know the correct syntax for the above problem.

- (1) fout = open("CUET.TXT", "ab")  
 (2) fout = open("CUET.TXT", "r")  
 (3) fout = open("CUET.TXT", "w")  
 (4) fout = open("CUET.TXT", "a")

**Ans. Option (3) is correct.**

**Explanation:** w – This is the write file mode which can be used to open the existing file in a write mode. Once a pre-existing file is opened in write mode, all the previously written data will get deleted and the new contents will be overwritten. In case if the file is not present, it will create a new file and write all the data to that file.

**20. Consider the following table 'Employee':**

| empid | salary |
|-------|--------|
| 1     | 50000  |
| 2     | 50000  |

With reference to the above table, consider following SQL statements:

- (A) SELECT MAX (salary) from Employee  
 (B) SELECT MIN (salary) from Employee  
 (C) SELECT COUNT(salary) from Employee  
 (D) SELECT SUM(salary) from Employee

Choose the correct answer from the options given below:

- (1) (A), (B), (C), (D) give same output  
 (2) Only (A), (B), and (C) give same output

- (3) (A), (B), (C), (D) give different output  
 (4) Only (A) and (B) give same output

Ans. Option (4) is correct.

**Explanation:** MAX () – Returns the maximum value present in the table. Here, it returns 50000.  
 MIN () – Returns the minimum value present in the table. Here it also, returns 50000.  
 COUNT () – Returns the total number of the particular attribute from the table. Here, it returns 2 (only 2 salary values are present).  
 SUM () – Returns the total values of the particular attribute. Here, it returns 100000 as the output.  
 Hence, Function (A) and (B) will produce the same output because both the values are same in the salary attribute.

21. Match List-I with List-II

| LIST-I<br>(Data Structure/<br>Technique) | LIST-II<br>(Definition/Feature)                                                       |
|------------------------------------------|---------------------------------------------------------------------------------------|
| A. Stack                                 | I. Insertion and Deletion can be done from both ends                                  |
| B. Queue                                 | II. Insertion and Deletion, both operations occur at only one end                     |
| C. Deque                                 | III. Uses the principal of "Divide and Conquer"                                       |
| D. Binary Search                         | IV. Insertion can be done from the rear end and Deletion can done from beginning only |

Choose the correct answer from the options given below:

- (1) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)  
 (2) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)  
 (3) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)  
 (4) (A)-(I), (B)-(IV), (C)-(II), (D)-(III)

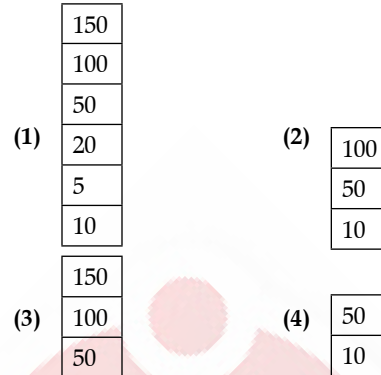
Ans. Option (1) is correct.

**Explanation:** Stack – It is a type of data structure which follows Last in First Out principle. The element which is inserted at first can be deleted at last. All these insertion and deletion operations can be carried out from the top of the stack only.  
 Queue – It is also type of data structure which follows First in First Out principle. The element which enters at the first can be deleted at the first. The insertion can be done at the rear or back end of the queue whereas the deletion process can be carried out from the front end of the queue.  
 Deque – It is similar to queue data structure only but the major difference is insertion and deletion process can be done from both the ends.  
 Binary Search – It is an efficient way of searching an element. It divides the given array into two halves and then it searches the element by recursively dividing the array into smaller parts. Hence, it follows the principle of divide and conquer method.

22. Which elements will remain in stack after performing the following operations?

PUSH(10)

PUSH(5)  
 POP()  
 PUSH(20)  
 POP()  
 PUSH(50)  
 PUSH (100)  
 PUSH(150)  
 POP()



Ans. Option (2) is correct.

**Explanation:** PUSH () – Inserts the elements into the stack.

POP () – Deletes the top element from the stack.

PUSH (10)

|    |
|----|
| 10 |
|----|

PUSH (5)

|   |
|---|
| 5 |
|---|

|    |
|----|
| 10 |
|----|

POP ()

|    |
|----|
| 10 |
|----|

PUSH (20)

|    |
|----|
| 20 |
|----|

|    |
|----|
| 10 |
|----|

POP ()

|    |
|----|
| 10 |
|----|

PUSH (50)

|    |
|----|
| 50 |
|----|

|    |
|----|
| 10 |
|----|

PUSH (100)

|     |
|-----|
| 100 |
|-----|

|    |
|----|
| 50 |
|----|

|    |
|----|
| 10 |
|----|

PUSH (150)

|     |
|-----|
| 150 |
|-----|

|     |
|-----|
| 100 |
|-----|

|    |
|----|
| 50 |
|----|

|    |
|----|
| 10 |
|----|

POP ()

|     |
|-----|
| 100 |
| 50  |
| 10  |

23. What will be the output of the following SQL Command?

SELECT TRUNCATE (89.567,1)

- (1) 89.56 (2) 89.5  
(3) 90 (4) 89.567

Ans. Option (2) is correct.

**Explanation:** TRUNCATE () is a function in SQL which returns the value truncated to the specified number of decimal places entered by the user.

TRUNCATE (89.567,1)

Here, 1 is the decimal value so the remaining values after the 1st decimal point has to be truncated, so the output is 89.5.

24. A university is planning to connect its admission office to its campus in a city which is 573 km away from the university. Which of the following types of network will be formed?

- (1) LAN (2) MAN  
(3) WAN (4) PAN

Ans. Option (3) is correct.

**Explanation:** Wide Area Network (WAN) can be used to connect the admission office to its campus in a city. WAN can cover wide range of area even country to country.

25. Match List-I with List-II

| LIST-I<br>(Data Structure/<br>Technique) | LIST-II<br>(Definition/Feature)                  |
|------------------------------------------|--------------------------------------------------|
| A. DDL                                   | I. Duplication of data                           |
| B. Constraint                            | II. Language used for creation of database       |
| C. DML                                   | III. Rules set for data being stored in database |
| D. Data Redundancy                       | IV. Language used for modification of database   |

Choose the correct answer from the options given below:

- (1) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)  
(2) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)  
(3) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)  
(4) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

Ans. Option (1) is correct.

**Explanation:** DDL – Data Definition Language. It can be used to create the database. It has commands like create, alter, drop, etc.

Constraint – This is also called as validation process. Certain rules can be applied to each attribute based upon their values stored on the database (e.g., Setting constraint for the mobile

number attribute as it accepts only integer values).

DML – Data Manipulation Language. It can be used to modify the data present in the relation or table. It has commands like UPDATE, DELETE, etc.

Data Redundancy – Data which is repeated more than once is called as redundant data.

26. The result of evaluating the postfix expression 5, 3, 2, \*, +, 3, -, 1, + is \_\_\_\_.

- (1) 9 (2) 14  
(3) 17 (4) -7

Ans. Option (1) is correct.

**Explanation:** Expression is: (((5 + (3 \* 2)) - 3) + 1)  
Expression has to be evaluated based on BODMAS rule:

(3 \* 2) = 6

→ (((5 + 6) - 3) + 1)

→ ((11 - 3) + 1)

→ 8 + 1

→ 9

27. The Prefix form of the expression (A+B\*C) + (D/E-F) is

- (1) ABC\*+DE/F-+ (2) +A\*B+/-DEF  
(3) +A\*B-/+DEF (4) ++A\*BC-/DEF

Ans. Option (4) is correct.

**Explanation:** Conversion of infix expression to prefix expression:

(A+B\*C) + (D/E - F)

→ ++ A \* BC (D/E - F)

→ ++ A \* BC - / DEF

28. In case of relative path, a dot (.) indicates the current working directory and \_\_\_\_ indicates the parent directory.

- (1) single quote(') (2) double quotes("")  
(3) triple quotes(""") (4) two dots(..)

Ans. Option (4) is correct.

**Explanation:** Double dots (..) can be used to mention the parent directory. These dots can be used to move up in the directory hierarchy.

29. Which of the following devices is used to filter and forward data packets across a network and also keep a record of the MAC addresses of the devices attached to it?

- (1) Hub (2) Bridge  
(3) Router (4) Switch

Ans. Option (4) is correct.

**Explanation:** Switch is a hardware networking device which can be used to transfer the data. It checks each and every packet and identifies the destination MAC address and then it forwards the packets to the devices. Switch transfers the data directly to the devices.

30. Worst case time complexity of bubble sort is

- (1) O(n) (2) O(nlog<sub>2</sub>n)  
(3) O(n<sup>2</sup>) (4) O(n<sup>3</sup>)

Ans. Option (3) is correct.

**Explanation:** If the array is completely unsorted or else it is sorted in descending order, then it takes at least square of the  $n$  element comparisons. Hence, the worst-case complexity of the bubble sort is  $O(n^2)$ .

- 31.** The following integers are needed to be sorted in ascending order using bubble sort 1, 7, 19, 13, -3

Following are the results of various passes during the sorting process.

- (A) 1, -3, 7, 13, 19      (B) -3, 1, 7, 13, 19  
(C) 1, 7, 13, -3, 19      (D) 1, 7, -3, 13, 19

Choose the correct sequence of passes from the options given below:

- (1) (B), (A), (C), (D)      (2) (A), (C), (D), (B)  
(3) (B), (D), (A), (C)      (4) (C), (D), (A), (B)

**Ans. Option (4) is correct.**

**Explanation:** To determine the correct sequence of passes for the bubble sort algorithm, let's sort the list [1, 7, 19, 13, -3] step by step using bubble sort.

1. Initial List: [1, 7, 19, 13, -3]

2. First Pass:

- Compare 1 and 7 → No swap needed.
- Compare 7 and 19 → No swap needed.
- Compare 19 and 13 → Swap to get [1, 7, 13, 19, -3].
- Compare 19 and -3 → Swap to get [1, 7, 13, -3, 19].

3. Second Pass:

- Compare 1 and 7 → No swap needed.
- Compare 7 and 13 → No swap needed.
- Compare 13 and -3 → Swap to get [1, 7, -3, 13, 19].
- 19 is already in its correct position, so no further swaps needed.

4. Third Pass:

- Compare 1 and 7 → No swap needed.
- Compare 7 and -3 → Swap to get [-3, 1, 7, 13, 19].

5. Fourth Pass:

- Compare 1 and -3 → Swap to get [-3, 1, 7, 13, 19].

Final Sorted List: [-3, 1, 7, 13, 19]

(4) (C), (D), (A), (B)

- 32.** Which of the following communication media ensures the minimum impairment of transmission?

- (1) Twisted Pair Cable      (2) Optical Fibre Cable  
(3) Radiowaves      (4) Coaxial Cable

**Ans. Option (2) is correct.**

**Explanation:** Optical fibre cable is used to carry the data over a large distance. It has a very less signal attenuation. Since it has light waves inside the core, so it can travel at a higher speed and respond less to the noise or any other interferences.

- 33.** Two broad categories in which data can be classified on the basis of their format are:

- (1) Organised and Non-organised  
(2) Structured and Unstructured  
(3) Primary and Secondary  
(4) Small and Big

**Ans. Option (2) is correct.**

**Explanation:** Structured and Unstructured data. Structured data means the data which is organised in a proper format such as table or relation. Unstructured data means it does not follow a proper standard and it can be available in any format.

- 34.** Arrange the following time complexities in increasing order of their execution time.

- (A)  $O(n \log_2 n)$       (B)  $O(1)$   
(C)  $O(n^n)$       (D)  $O(n!)$

Choose the correct sequence from the options given below:

- (1) (D), (C), (B), (A)      (2) (B), (A), (C), (D)  
(3) (B), (C), (A), (D)      (4) (B), (A), (D), (C)

**Ans. Option (2) is correct.**

**Explanation:** Ascending order of the time complexities based on their execution time is  
 $O(1)$  – constant time  
 $O(n \log_2 n)$  – logarithmic functions  
 $O(n^n)$  – Exponential functions  
 $O(n!)$  – Factorial functions

- 35.** Vinay wants to be familiar with SQL. One of his friends, Adarsh suggests him to execute the following SQL commands:

- (A) Create Table Employee  
(B) Use DB  
(C) Select\* from Employee  
(D) Insert Into Employee

In which order does Vinay need to run the above commands?

- (1) (B), (A), (D), (C)      (2) (A), (B), (D), (C)  
(3) (B), (C), (D), (A)      (4) (A), (B), (C), (D)

**Ans. Option (1) is correct.**

**Explanation:** Use – It is used to select a particular database where we want to perform operations like create, alter, drop.

Create – It is used to create a table name called "Employee" in the particular database name DB.

Insert – It is used to insert the records into the newly created table named Employee.

Select – It is used to retrieve the results from the Employee table.