

**CUET UG 2024 Computer Science Question Paper
with Solutions**

Total Time Allowed : 60 minutes	Maximum Marks : 200	Total Questions : 50	Questions to be Attempted : 40
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Question 1: Which of the following are used in Python exception handling?

- (A) try
- (B) except
- (C) finally
- (D) seek

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

Correct Answer: 2. (A), (B), and (C) only

Solution:

Python's exception handling involves the use of the keywords 'try', 'except', and 'finally'. The 'try' block allows you to test a block of code for errors. The 'except' block allows you to handle the error, and the 'finally' block lets you execute code, regardless of whether an exception was raised or not. The 'seek' keyword is used for file handling and is not part of exception handling mechanisms.

💡 Quick Tip

Remember: Python's exception handling uses 'try', 'except', and 'finally' to provide a robust mechanism for error detection and handling.

Question 2: Match List-I with List-II:

List-I	List-II
(A) f.seek(-10,1)	(II) From current position, move 10 bytes backward
(B) f.seek(10,1)	(III) From current position, move 10 bytes forward
(C) f.seek(10)	(I) From beginning of file, move 10 bytes forward
(D) f.seek(-10,2)	(IV) From end of the file, move 10 bytes backward

Choose the correct answer from the options given below:

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

Correct Answer: 4. (A) - (II), (B) - (III), (C) - (I), (D) - (IV)

Solution:

The 'f.seek()' function is used to move the file pointer to a specified location. The first parameter indicates the number of bytes to move, while the second parameter specifies the reference point. If it is 0 (default), the movement is relative to the file's start. If it is 1, it is relative to the current position, and if it is 2, it is relative to the file's end.

- (A) f.seek(-10,1): Moves the file pointer 10 bytes backward from the current position.
- (B) f.seek(10,1): Moves the file pointer 10 bytes forward from the current position.
- (C) f.seek(10): Moves the file pointer 10 bytes forward from the beginning of the file.
- (D) f.seek(-10,2): Moves the file pointer 10 bytes backward from the end of the file.

💡 Quick Tip

When working with file pointers in Python, use 'f.seek()' to precisely control the position for reading or writing operations relative to different reference points.

Question 3: Arrange the following in correct order of exception handling in Python:

- (A) Write the code that may raise an exception inside a try block
- (B) Execute some code regardless of whether the exception occurs or not using the finally block
- (C) Handle the specific exception using the except block
- (D) Raise the exception using the raise statement if necessary

Choose the correct answer from the options given below:

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

Correct Answer: 2. (A), (C), (B), (D)

Solution:

The correct order of exception handling involves first placing the potentially problematic code within a 'try' block. The 'except' block follows to catch and handle exceptions that arise. If there is a need to perform cleanup or finalize actions regardless of exceptions, the 'finally' block is used. If there is a requirement to trigger an exception manually, the

‘raise’ statement is employed, typically after handling conditions in ‘try’ or ‘except’.

 Quick Tip

In Python, use the ‘try-except-finally’ structure to effectively manage errors and guarantee the execution of crucial final steps.

Question 4: How many candidate keys are possible with the table below?

RollNo	Name	Mobile	City
1	Arun	91	Delhi
2	Sanjay	92	Mumbai
3	Arun	93	Noida
4	Varun	94	Guwahati
5	Arti	95	Kolkata

1. One
2. Two
3. Three
4. Four

Correct Answer: 2. Two

Solution:

Candidate keys are minimal sets of attributes that uniquely identify records in a table. In the given table: - The ‘RollNo’ column uniquely identifies each record and can serve as one candidate key. - The ‘Mobile’ column also uniquely identifies each record, making it another candidate key. - The ‘Name’ and ‘City’ columns are not candidate keys because they contain duplicate values and do not uniquely identify each record.

Therefore, there are two possible candidate keys: ‘RollNo’ and ‘Mobile’.

 Quick Tip

To identify candidate keys, look for attributes or combinations of attributes that uniquely identify each record in a table without redundancy.

Question 5: Which of the following is not a limitation of file systems?

1. Data Redundancy
2. Data Inconsistency
3. Data Dependence

4. Storing Space

Correct Answer: 4. Storing Space**Solution:**

Traditional file systems have several limitations, including: - Data Redundancy: This occurs when the same data is stored in multiple locations, leading to wastage of storage space. - Data Inconsistency: When redundant data is not updated simultaneously across locations, inconsistencies arise, causing data integrity issues. - Data Dependence: Applications and data are tightly coupled, so changes to data structures require modifications in application programs.

Storing space, while potentially limited by physical device capacity, is not a limitation of file systems per se, as it pertains to hardware constraints rather than the architecture or functionality of the file system.

💡 Quick Tip

File systems face challenges like data redundancy and inconsistency. Understanding the limitations helps highlight the advantages of more advanced database systems.

Question 6. Match List-I with List-II:

List-I	List-II
(A) Controlled Data Sharing	(II) Limited Access given to users
(B) Data Isolation	(III) There is no mapping between files
(C) Data Dependence	(IV) If the structure of a file is changed, all the existing programs accessing it need change
(D) Data Inconsistency	(I) Same data maintained in different places or formats

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

Answer: (1) (A) - (II), (B) - (III), (C) - (IV), (D) - (I)

Solution: The correct matches are based on understanding of data concepts:

- Controlled Data Sharing implies limited access to users, corresponding to (II).
- Data Isolation implies there is no mapping between files, corresponding to (III).
- Data Dependence means if file structure changes, programs accessing it need change, corresponding to (IV).

- Data Inconsistency implies same data maintained in different places does not match, corresponding to (I).

 Quick Tip

Understanding basic database concepts like data sharing, inconsistency, and dependence helps ensure efficient data management.

Question 7. Which of the following is called database instance?

- (1) Overall design of the database
- (2) The snapshot of the database at any given time
- (3) Data about the data
- (4) Restriction on the type of data inserted

Answer: (2) The snapshot of the database at any given time

Solution: A database instance is a snapshot or state of the data stored in a database at a given point in time. It represents the actual data and changes dynamically as the database is modified. It differs from the schema, which defines the structure of the database.

 Quick Tip

Database instances change as data is added, modified, or removed, reflecting the current state of data at any given point.

Question 8. What is the output of the following SQL statement?

SQL: SELECT MID('CUET2024',2,5)

- (1) UET2
- (2) UET20
- (3) ET202
- (4) CUET2

Answer: (3) ET202

Solution: The SQL statement extracts a substring starting from the second character with a length of 5 characters. The string 'CUET2024' starts with C, so extracting from position 2 gives 'ET202'.

 Quick Tip

Using string functions like MID() in SQL helps extract specific portions of text for data analysis or transformation.

Question 9: SQL applies conditions on the groups through `HAVING` clause after groups have been formed.

- (1) where
- (2) having
- (3) new
- (4) all

Answer: (2) having

Solution: In SQL, the `HAVING` clause is used to apply conditions on aggregated data, while the `WHERE` clause applies conditions on individual records before aggregation. For example, `HAVING COUNT(*) > 1` filters groups after grouping has occurred.

 Quick Tip

Use the `HAVING` clause for conditions on aggregated data, and `WHERE` for conditions on raw data before aggregation.

Question 10. Consider the following two tables emp1 and emp2:

emp1

Id	Name
1	Amit
2	Punita

emp2

Id	Name
1	Punita
2	Anand

What is the output of the following query?

```
SELECT name from emp1 minus SELECT name from emp2;
```

- (1) Punita
- (2) Amit
- (3) Anand
- (4) Amit, Punita

Answer: (2) Amit

Solution: The MINUS operator in SQL returns rows from the first query that are not present in the second query. In this case, `SELECT name from emp1` produces 'Amit' and 'Punita', while `SELECT name from emp2` produces 'Punita' and 'Anand'. The result is 'Amit' since it does not appear in emp2.

 Quick Tip

The MINUS operator is used to find records present in one table but not in another, useful for comparing data sets.

Question 11: Which of the following statement(s) is/are TRUE regarding computer networks?

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

Correct Answer: (3) (C) and (D) only

Solution:

- Statement (A) is incorrect because Interspace does not function as described.
- Statement (B) is incorrect as IP addresses can be dynamic and change, depending on configurations.
- Statement (C) correctly defines a computer network as an interconnection of computing devices for sharing resources.
- Statement (D) is true as a workstation is often more powerful than standard nodes in a network.

 Quick Tip

When evaluating network-related statements, consider key terms like connectivity, resource sharing, and unique device functions.

Question 12: Communication over a mobile phone is an example of which type of communication mode?

- (1) Simplex
- (2) Half-Duplex
- (3) Full-Duplex
- (4) Double-Duplex

Correct Answer: (3) Full-Duplex

Solution: Mobile phone communication is an example of full-duplex communication, which allows simultaneous transmission and reception of data in both directions, unlike half-duplex (where only one direction is active at a time) or simplex (one-way communication).

 Quick Tip

Full-duplex communication enables real-time conversations and data exchange in both directions.

Question 13: Which of the following devices provides the necessary translation of data received from the network into a format or protocol recognized by devices within the internal network?

- (1) Bridge
- (2) Gateway
- (3) Router
- (4) Modem

Correct Answer: (2) Gateway

Solution: A gateway acts as a translator between different network protocols or formats, allowing communication between devices using different protocols. Bridges and routers do not perform the same translation functions; they mainly handle data flow and routing.

💡 Quick Tip

Gateways ensure seamless communication across different networks by translating data formats or protocols.

Question 14: A long cable that helps to connect several devices in bus topology having terminators at both ends to prevent signal bounce is known as ____.

- (1) Drop Line
- (2) Taps
- (3) Analog Cable
- (4) Backbone

Correct Answer: (4) Backbone

Solution: In a bus topology, a backbone is the main cable that connects multiple devices. Terminators at both ends prevent signal reflection or bounce, ensuring proper data transmission.

💡 Quick Tip

Backbones play a crucial role in network topologies to prevent signal degradation and ensure efficient communication.

Question 15: Match List-I with List-II:

List-I	List-II
(A) <code>readline()</code>	(II) Reads a single line from the file
(B) <code>writelines()</code>	(I) Writes a sequence of strings to the file
(C) <code>seek()</code>	(IV) Moves the file pointer to the specified position
(D) <code>flush()</code>	(III) Force any buffered output to be written to the file

Choose the correct answer from the options given below:

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

Correct Answer: (4) (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Solution:

- `readline()` reads a single line from a file, corresponding to option II.
- `writelines()` writes a sequence of strings to the file without newline characters, aligning with option I.

- `seek()` changes the file pointer position, fitting option IV.
- `flush()` writes any buffered output to the file, making it option III.

💡 Quick Tip

For file operations, understanding the specific function of each method ensures efficient file handling and data manipulation.

Question 16. What is pickling?

- (1) It is used to deserialize objects, i.e., converting the byte stream to object hierarchy.
- (2) It is used to serialize objects, i.e., to convert Python object hierarchy to byte stream.
- (3) It is used to move the file pointer to a specific location.
- (4) It is used in exception handling.

Answer: (2) It is used to serialize objects, i.e., to convert Python object hierarchy to byte stream.

Solution:

Pickling is a process in Python where a Python object is converted into a byte stream to save it to a file or database, or to transmit it over a network. This process is also known as serialization. The opposite process, known as unpickling, involves converting the byte stream back into the original Python object.

💡 Quick Tip

Serialization (pickling) is useful for saving Python objects to disk or for transferring them over a network.

Question 17. Consider the following code and specify the correct order of the statements to be written:

Code:

- (A) `f.write("CUET EXAMINATION")`
- (B) `f=open("CUET.TXT", "w")`
- (C) `print("Data is Written Successfully")`
- (D) `f.close()`

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

(3) (B), (D), (C), (A)

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

Answer: (2) (B), (A), (C), (D)

Solution:

The correct sequence for file operations in Python involves first opening the file using the `open()` function. Next, data is written using the `write()` method. After writing, we can print a confirmation message. Finally, the file is closed using the `close()` method.

 Quick Tip

Always ensure files are properly opened before writing or reading and closed afterward to avoid data loss or corruption.

Question 18. Which method from below will take a file pointer to nth character with respect to r position?

(1) `fp.seek(r)`

(2) `fp.seek(n)`

(3) `fp.seek(n,r)`

(4) `seek(n,r).fp`

Answer: (3) `fp.seek(n,r)`

Solution:

The `fp.seek(n, r)` method moves the file pointer to the nth character from the position specified by r. The second argument, r, specifies the reference point (0 for the beginning of the file, 1 for the current position, and 2 for the end of the file).

 Quick Tip

When working with files, use `fp.seek()` with care to ensure you are accessing or modifying the intended part of the file.

Question 19. Evaluate the given postfix expression:

Expression: $3\ 5\ *\ 6\ +\ 2\ 3\ * -$

(1) 39

(2) 15

- (3) -9
(4) -17

Answer: (4) -17

Solution:

To evaluate a postfix expression, we use a stack to store and perform operations as they appear: 1. Push 3 and 5 onto the stack. 2. Perform multiplication ($3 * 5 = 15$). Push 15. 3. Push 6 and add ($15 + 6 = 21$). Push 21. 4. Push 2 and 3 onto the stack. 5. Perform multiplication ($2 * 3 = 6$). Push 6. 6. Subtract the top two elements ($21 - 6 = -17$).

 Quick Tip

When evaluating postfix expressions, remember to use a stack and apply operators to the topmost elements.

Question 20. Stack works on the principle of ____.

- (1) Mid Element First
(2) First In First Out
(3) Last In First Out
(4) Last In Last Out

Answer: (3) Last In First Out

Solution:

A stack is a linear data structure that works on the Last In First Out (LIFO) principle. This means that the last element added to the stack is the first to be removed.

 Quick Tip

Stack operations like push and pop follow the LIFO principle, making it suitable for reversing data or managing function calls.

Question 21: Match List-I with List-II:

List-I (Term)	List-II (Description)
(A) Prefix	(I) In this, the element entered first will be removed last
(B) Postfix	(II) In this, the element entered first will be removed first
(C) Queue	(III) In this, the operator is placed before the operands
(D) Stack	(IV) In this, the operator is placed after the operands

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

Answer: (3) (A) - (IV), (B) - (III), (C) - (II), (D) - (I)

Solution: - Prefix notation places operators before their operands. - Postfix notation places operators after their operands. - A Queue is a FIFO (First In, First Out) structure where the first element entered is the first to be removed. - A Stack is a LIFO (Last In, First Out) structure where the last element entered is the first to be removed.

 Quick Tip

Understand the basic definitions and properties of data structures and their corresponding behaviors, such as order of operation and element access.

Question 22: What will be the sequence of elements removed from the stack after performing the following operations?

Operations:

- PUSH(10)
- PUSH(20)
- POP()
- POP()
- PUSH(30)
- PUSH(40)
- POP()
- POP()

- (1) 10
 (2) 20
 (3) 30
 (4) 40

Answer: (3) (A), (B), (D), (C)

Solution: - Initially, 10 and 20 are pushed onto the stack. When two POP() operations are performed, 20 and 10 are removed. - Next, 30 and 40 are pushed. Two more POP() operations remove 40 and then 30. - Thus, the sequence of elements removed is: 20, 10, 40, 30.

💡 Quick Tip

Stacks operate on a Last-In, First-Out (LIFO) principle where elements are removed in reverse order of their insertion.

Question 23: In Python, — module needs to be imported for implementing Double Ended Queue.

- (1) counter
- (2) collections
- (3) random
- (4) numpy

Answer: (2) collections

Solution: The ‘collections’ module in Python provides a ‘deque’ (double-ended queue) class which allows appending and popping elements from both ends efficiently.

💡 Quick Tip

The ‘collections’ module provides specialized container datatypes in Python, such as ‘deque’, which is optimized for fast fixed-size operations on both ends.

Question 24: What will be the position of front and rear after execution of the following statements, the Queue already had the given elements in FIFO order:

Queue (Initial Elements): $F \rightarrow 50 \rightarrow 90 \rightarrow 7 \rightarrow 21 \rightarrow 73 \rightarrow 77 \rightarrow R$

Operations:

- dequeue()
- dequeue()
- dequeue()
- dequeue()
- dequeue()
- enqueue(100)
- dequeue()

- (1) Front 50, Rear 77
- (2) Front 100, Rear 100

(3) Front 77, Rear 100

(4) Front 73, Rear 77

Answer: (3) Front 77, Rear 100

Solution: - The initial elements are dequeued in order: 50, 90, 7, 21, and 73. - The remaining elements in the queue are 77 (front) and 100 (rear) after the enqueue operation. - The final dequeue operation removes 77, leaving 100 as both the front and rear.

 Quick Tip

A queue follows the First-In, First-Out (FIFO) principle, with elements dequeued from the front and enqueued at the rear.

Question 25: — data type is used to implement Queue data structure in Python.

(1) Sets

(2) Dictionary

(3) Tuple

(4) List

Answer: (4) List

Solution:

In Python, the list data type can be used to implement a queue using ‘append()’ for enqueue and ‘pop(0)’ for dequeue operations. However, for better performance, the ‘collections.deque’ class is preferred.

 Quick Tip

Lists in Python can be used to simulate a queue, but for efficient queue operations, consider using the ‘collections.deque’ class.

Question 26: Choose the statements that are correct.

(A) For Binary Search, all the elements have to be sorted.

(B) For Linear Search, all the elements have to be sorted.

(C) Linear Search takes less time for searching in worst case than binary search’s worst case.

(D) Linear Search always gives fast result whether elements are sorted or not.

(1) (A) only

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

Answer: (2) (A) and (C) only

Solution: - Binary Search requires the elements to be sorted for efficient searching. Hence, statement (A) is correct. - Linear Search works regardless of whether elements are sorted or not, and does not require sorting, making statement (B) incorrect. - Linear Search can take less time in certain cases (e.g., if the element is found early) compared to Binary Search's worst case, making statement (C) correct. - Statement (D) is incorrect as Linear Search is not always faster than Binary Search.

 Quick Tip

Binary Search operates in $O(\log n)$ complexity, while Linear Search works in $O(n)$. Binary Search requires sorting but is faster for large datasets compared to Linear Search.

Question 27: Arrange the following in the ascending order of their time complexity.

- (A) Worst Case of Linear Search
- (B) Best Case of Binary Search
- (C) Worst Case of Binary Search
- (D) Worst Case of Bubble Sort

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

Answer: (3) (B), (A), (C), (D)

Solution: - The best case of Binary Search has a time complexity of $O(1)$. - The worst case of Linear Search has a time complexity of $O(n)$. - The worst case of Binary Search has a time complexity of $O(\log n)$. - The worst case of Bubble Sort has a time complexity of $O(n^2)$. - Therefore, the ascending order is: (B), (A), (C), (D).

 Quick Tip

Understanding time complexity helps optimize algorithms by analyzing their efficiency in best, average, and worst cases.

Question 28: How many minimum number of comparison(s) can be required to search an element from n elements, in case of Linear Search?

- (1) 1
- (2) $n - 1$
- (3) n
- (4) $n + 1$

Answer: (1) 1

Solution: The minimum number of comparisons in Linear Search is 1, which occurs when the target element is found on the first attempt.

 Quick Tip

Linear Search provides a simple search mechanism but is generally inefficient for large datasets, where Binary Search performs better.

Question 29: Which of the statement(s) is/are True for the given question?

Data elements are: 7, 5, 17, 13, 9, 27, 31, 25, 35.

Hash Table Size: 7

Hash Function: $H(I) = (\text{Data element}) \bmod (\text{Hash Table Size})$

- (A) Element 27 will create collision.
- (B) Element 25 will create collision.
- (C) Element 35 will create collision.
- (D) Element 31 will create collision.

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

Answer: (2) (A), (C), and (D) only

Solution: - Applying the hash function $H(I) = (\text{Data element}) \bmod 7$: - $27 \bmod 7 = 6$ - $25 \bmod 7 = 4$ - $35 \bmod 7 = 0$ - $31 \bmod 7 = 3$ - Elements 27, 35, and 31 create collisions with other elements.

 Quick Tip

Collision handling is critical in hash tables to maintain efficient data storage and retrieval.

Question 30: If a list contains n number of elements and all the elements are by default sorted in ascending order, how many comparisons will be required during the 1st pass of Bubble Sort to arrange the list in ascending order?

- (1) 0
- (2) 1
- (3) $n - 1$
- (4) n

Answer: (3) $n - 1$

Solution: - During the first pass of Bubble Sort, $n - 1$ comparisons are made, even if no swaps are necessary since the list is already sorted.

 Quick Tip

Bubble Sort compares adjacent elements in each pass, even if the list is already sorted. Optimized versions can reduce unnecessary passes.

Question 31: What will be the result after pass 2 using Bubble Sort, if we are sorting elements in ascending order?

Initial List: 7, 19, 18, 9, 23, 51, 12, 54, 73

- (1) 7, 18, 19, 9, 23, 12, 51, 54, 73
- (2) 7, 9, 18, 19, 12, 23, 51, 54, 73
- (3) 7, 9, 18, 19, 12, 23, 51, 54, 73
- (4) 7, 9, 18, 19, 23, 51, 12, 54, 73

Answer: (4) 7, 9, 18, 19, 23, 51, 12, 54, 73

Solution: - Pass 1 of Bubble Sort: - Compare and swap 19 and 18 $\rightarrow$ 7, 18, 19, 9, 23, 51, 12, 54, 73 - Compare and swap 19 and 9 $\rightarrow$ 7, 18, 9, 19, 23, 51, 12, 54, 73 - Continue comparing and swapping adjacent elements, resulting in: - 7, 18, 9, 19, 23, 12, 51, 54, 73 - Pass 2 of Bubble Sort: - Compare and swap 18 and 9 $\rightarrow$ 7, 9, 18, 19, 23, 12, 51, 54, 73 - No further swaps are necessary for this pass.

 Quick Tip

In Bubble Sort, each pass moves the largest unsorted element to its correct position, reducing the range of comparisons in subsequent passes.

Question 32: — compares neighbouring elements only and swaps them when necessary.

- (1) Selection Sort
- (2) Bubble Sort

- (3) Insertion Sort
- (4) Quick Sort

Answer: (2) Bubble Sort

Solution: - Bubble Sort is a simple sorting algorithm that repeatedly steps through the list, compares adjacent elements, and swaps them if they are in the wrong order. This process is repeated until the list is sorted.

 Quick Tip

Bubble Sort is efficient for small datasets but performs poorly on large lists due to its $O(n^2)$ complexity.

Question 33: — are the unorganized facts that can be processed to generate meaningful information.

- (1) Information
- (2) Data
- (3) Blog
- (4) Contexts

Answer: (2) Data

Solution: - Data refers to raw facts and figures that can be processed or analyzed to produce meaningful information. When organized and interpreted, data transforms into information.

 Quick Tip

Data becomes valuable when processed, providing insights, trends, and decision-making capabilities.

Question 34: — is the positive square root of the average of squared differences of each value from the mean.

- (1) Mode
- (2) Variance
- (3) Median
- (4) Standard Deviation

Answer: (4) Standard Deviation

Solution: - The standard deviation is a measure of the amount of variation or dispersion

in a set of values. It is calculated as the positive square root of the variance.

 Quick Tip

Standard deviation helps in understanding data variability and is widely used in statistics to measure the spread of data points.

Question 35: Consider the stock prices for shares of a company A for a week. To find the difference of maximum and minimum value of the share price which statistical technique can be used:

- (1) Range
- (2) Mode
- (3) Mean
- (4) Median

Answer: (1) Range

Solution: - The range is the simplest measure of dispersion in statistics and represents the difference between the maximum and minimum values in a dataset.

 Quick Tip

Range gives a quick sense of the spread of data but does not reflect data distribution within the dataset.

Question 36: What is the primary difference between a database and a file system?

- (1) Databases are slower than file systems for retrieving data.
- (2) Databases offer structured data and relationships, while file systems do not.
- (3) File systems can support complex queries, unlike databases.
- (4) Both databases and file systems handle data in the same way.

Answer: (2) Databases offer structured data and relationships, while file systems do not.

Solution: Databases provide an organized structure for storing data, including defining relationships among data elements, which allows for complex querying and management capabilities. File systems mainly provide methods for storing and retrieving data without any inherent relational structure.

 Quick Tip

Understanding the differences between databases and file systems is essential for selecting the right storage solution for different applications.

Question 37: A domain in a relational database refers to:

- (1) The overall database structure
- (2) A specific set of valid values for an attribute
- (3) A table containing multiple records
- (4) A relationship between two tables

Answer: (2) A specific set of valid values for an attribute.

Solution: In a relational database, a domain is a defined set of values that an attribute (or column) can take. It helps maintain data consistency by specifying the type and range of values allowed for a particular attribute.

 Quick Tip

Domains are crucial for enforcing data integrity rules within relational databases.

Question 38: A relation in a relational database is also known as:

- (1) A data type
- (2) An attribute
- (3) A schema
- (4) A table

Answer: (4) A table.

Solution: In relational database terminology, a relation is commonly referred to as a table. It represents a set of tuples (rows) sharing the same attributes (columns), and it stores data in a structured format.

 Quick Tip

A table is the basic unit of data storage in a relational database, holding rows and columns.

hrulefill

Question 39: The primary key is chosen from:

- (1) The most complex candidate key available.
- (2) All available candidate keys for a table.
- (3) The simplest candidate key available.
- (4) Any attribute within the table.

Answer: (3) The simplest candidate key available.

Solution: A primary key is selected from the candidate keys of a table and is typically chosen to be the simplest key capable of uniquely identifying each record in the table.

 Quick Tip

Choosing a simple primary key ensures efficient indexing and faster data retrieval.

Question 40: An alternate key is:

- (1) Another name for the primary key
- (2) A unique identifier besides the primary key
- (3) A relationship between two tables
- (4) A synonym for a tuple

Answer: (2) A unique identifier besides the primary key.

Solution: An alternate key is any candidate key that was not selected as the primary key for a table but can still uniquely identify rows within the table.

 Quick Tip

Alternate keys offer additional unique access paths to data in relational tables.

Question 41: Consider the following SQL functions:

- (A) CURDATE()
- (B) CURRENT_DATE()
- (C) CURRENT_DATE
- (D) TODAY()

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

Answer: (2) (A), (B), and (C) only.

Solution: The SQL functions CURDATE(), CURRENT_DATE(), and CURRENT_DATE are valid for fetching the current date in various database systems. TODAY() is not a standard SQL function for date retrieval.

 Quick Tip

Always check database documentation for supported functions, as some are system-specific.

Question 42: Which of the following is correct syntax for inserting foreign key constraint in a relation?

- (1) ALTER TABLE table_name ADD FOREIGN KEY(attribute name) REFERENCES referenced_table_name(attribute name)
- (2) ADD TABLE table_name ADD FOREIGN KEY(attribute name) REFERENCES referenced_table_name(attribute name)
- (3) ALTER TABLE table_name REFERENCES referenced_table_name(attribute name) ADD FOREIGN KEY(attribute name)
- (4) MODIFY TABLE table_name ADD FOREIGN KEY(attribute name) REFERENCES

referenced_table_name(attribute name)

Answer: (1) ALTER TABLE table_name ADD FOREIGN KEY(attribute name) REFERENCES referenced_table_name(attribute name).

Solution: To add a foreign key constraint, the ALTER TABLE statement is used with the ADD FOREIGN KEY clause, followed by specifying the referenced table and column.

 Quick Tip

Foreign keys maintain referential integrity by linking two tables together.

Question 43: What is the result of the following arithmetic operation in SQL?
SELECT 5 + NULL AS RESULT

- (1) 5
- (2) NULL
- (3) 0
- (4) 5NULL

Answer: (2) NULL.

Solution: In SQL, any arithmetic operation involving NULL results in NULL. This is because NULL represents an unknown value, and combining it with other values results in an unknown result.

 Quick Tip

Be cautious when performing operations with NULL values to avoid unexpected results.

Question 44: Which of the following expressions in SQL would calculate the square root of 16?

- (1) POWER(16,2)
- (2) POWER(16,0.5)

- (3) POWER(16,1)
- (4) MOD(16)

Answer: (2) POWER(16,0.5).

Solution: The POWER function raises a number to a specified power. Using POWER(16, 0.5) calculates the square root of 16, as raising a number to the power of 0.5 is equivalent to finding its square root.

 Quick Tip

The POWER function is useful for mathematical operations in SQL.

Question 45: Which of the following statement(s) is/are TRUE in respect of Media Access Control (MAC) Address?

- (A) It can be changed if a node is removed from one network and connected to another network.
- (B) Each MAC address is a 12-digit hexadecimal number.
- (C) It is a unique value associated with a network adapter called NIC.
- (D) It is provided by the Internet Service Provider to locate computers connected to the internet.

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

Answer: (1) (B) and (C) only.

Solution: A MAC address is a unique identifier assigned to a network adapter by the manufacturer and is a 12-digit hexadecimal number. It is not assigned by the ISP and does not change based on network connections.

 Quick Tip

MAC addresses play a crucial role in identifying devices on a network.

Question 46: Match List-I with List-II:

List-I (Device)	List-II (Use)
(A) RJ45 Connector	(IV) Plug-in device primarily used for connecting LANs, particularly Ethernet.
(B) Bridge	(I) Relay frames between two originally separate segments that follow the same protocols.
(C) Gateway	(III) Establishes an intelligent connection between a local area network and external networks.
(D) Repeater	(II) Amplifies a signal that is transmitted across the network so that the signal is received the same.

Choose the correct answer from the options given below:

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

Correct Answer: (4) (A) - (IV), (B) - (I), (C) - (III), (D) - (II)

Solution:

RJ45 connectors are typically used for connecting Ethernet LANs. A bridge operates by relaying frames between network segments that use the same protocols. Gateways facilitate communication between different networks with entirely different structures, while repeaters amplify signals to ensure the integrity of the transmitted data across distances. This matching aligns devices with their uses correctly.

 Quick Tip

Understanding the function of each networking component helps clarify their purpose in networking architecture.

Question 47: What is the purpose of Domain Name System (DNS) Server in networking?

- (1) To encrypt data during transmission.
- (2) To convert domain names into IP addresses.
- (3) To regulate network traffic flow.
- (4) To establish a secure connection between devices.

Correct Answer: (2) To convert domain names into IP addresses.

Solution:

DNS servers translate human-friendly domain names into machine-friendly IP addresses, enabling devices to locate each other over the internet or local networks. This critical function facilitates communication by mapping memorable domain names to their respective addresses.

 Quick Tip

DNS resolution is essential for accessing websites and services without needing to remember numerical IP addresses.

Question 48: 140.168.220.200 is a 32-bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 separated by decimal points. What is this number called?

- (1) IP Address
- (2) Web Address
- (3) MAC Address
- (4) Port Address

Correct Answer: (1) IP Address

Solution:

The given address format (140.168.220.200) is a representation of an IPv4 address. It consists of four octets, each ranging from 0 to 255, and is used for identifying devices on a network.

 Quick Tip

IP addresses are critical for identifying network devices and facilitating communication over the internet and local networks.

Question 49: In a _____ topology, if there are n devices in a network, each device has $n - 1$ ports for cables.

- (1) Mesh
- (2) Bus
- (3) Star
- (4) Ring

Correct Answer: (1) Mesh

Solution:

In a mesh topology, each device is directly connected to every other device, resulting in $n - 1$ ports per device for a network of n devices. This ensures robust connectivity and redundancy but can be costly and complex to implement.

💡 Quick Tip

Mesh topology offers high fault tolerance due to multiple paths for data transmission but can be resource-intensive.

Question 50: Amit wants to be familiar with SQL. One of his friends Anand suggests him to execute the following SQL commands:

- (A) Create Table Student
- (B) Use Database DB
- (C) Select * from Student
- (D) Insert into Student

In which order Amit needs to run the above commands?

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

Correct Answer: (3) (B), (A), (D), (C)

Solution:

Amit first needs to select the database using the 'USE' command, then create a table using 'CREATE TABLE'. Next, he can insert data using 'INSERT INTO' and finally view the data using 'SELECT *'.

💡 Quick Tip

Executing SQL commands in the proper order ensures correct data manipulation and retrieval within the database.