

GATE 2025 DA Question Paper

Time Allowed :3 Hour	Maximum Marks :100	Total questions :65
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1. Choose the most appropriate word to complete the analogy:

Courage : Bravery :: Yearning :

- (1) Desire
 - (2) Longing
 - (3) Craving
 - (4) None
-

2. When does the worst case of binary search occur?

- (1) When the element is present at the middle of the array
 - (2) When the element is present at the first position
 - (3) When the element is not in the array or is found at the last level of recursion
 - (4) When the element is at the second position
-

3. Suppose that insertion sort is applied to the array $[1, 2, 3, 5, 7, 9, 11, x, 15, 13]$ and it takes exactly 2 swaps to sort the array. Select all possible values of x .

- (1) 14
 - (2) 16
 - (3) 12
 - (4) 10
-

4. Given the lists:

$$A = [1, 2, 3], \quad B = [4, 5, 6]$$

Which of the following statements will result in

$$A = [1, 2, 3, 4, 5, 6]?$$

- (1) A.append(B)
 - (2) A.update(B)
 - (3) A.insert(B)
 - (4) A.extend(B)
-

5. Which of the following data structures supports binary search in $O(\log n)$ time complexity?

- (1) An array of integers in increasing order
 - (2) An array of integers in any order
 - (3) A linked list of n integers in increasing order
 - (4) A linked list of n integers in any order
-

6. Given the relation:

$$R = \{A, B, C, D, E, F, G\}$$

With the following functional dependencies (FDs):

$$A \rightarrow BCEF, \quad E \rightarrow DG, \quad BC \rightarrow A$$

Which of the following statements is correct?

- (1) A is the only candidate key of R
 - (2) A, B, C, D, E are candidate keys of R
 - (3) R is not in BCNF
 - (4) A, B, C are the candidate keys of R
-

7. Given the table facts:

$$\text{facts (D1, D2, val)}$$

with the following data:

D1	D2	val
1	x	...
2	x	...
3	x	...
1	y	...
2	y	...
3	y	...

Consider the following SQL query:

```
SELECT D1, D2, SUM(val)
FROM facts
GROUP BY CUBE(D1, D2);
```

What is the total number of rows produced?

- (1) 12
- (2) 9
- (3) 8
- (4) 6

8. Consider the following algorithm:

```
set x = 0, flag = 0, sum = 0
```

```
Push x onto stack S
```

```
While (S is not empty)
```

```
{
    If (flag == 0)
    {
        x = x + 1
        push x
    }
}
```

```

    If (x == 8) flag = 1

    If (flag == 1)
    {
        x = pop(S)

        If (x is odd)
        {
            pop(S)
        }

        sum = sum + x
    }
}

```

What will be the output (O/P) of this algorithm?

- (1) 16
 - (2) 20
 - (3) 24
 - (4) 18
-

9. Given the equation:

$$3^{x^2} = 27 \times 9^x$$

Find the value of:

$$\frac{2^{x^2}}{(2^x)^2}$$

- (1) 1
 - (2) 2
 - (3) 4
 - (4) 8
-

10. Consider the following graph with heuristic values:

Which of the following represents the correct order of node expansion using the A* search algorithm?

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

11. Consider the following sets:

$$A = \{\text{"this"}, \text{"that"}\}, \quad B = \{\text{"that"}, \text{"other"}\}, \quad C = \{\text{"other"}, \text{"this"}\}$$

The following operations are performed:

```
while "other" in C:
    if "this" in A:
        A, B, C = A - B, B - C, C - A

    if "that" in B:
        A, B, C = C - A, A | B, B | C
```

Which of the following sets remain non-empty at the end?

- (1) Only A
 - (2) A and C
 - (3) Only C
 - (4) Only B
-

12. Consider the given graph and shortest paths:

The shortest paths given are:

$$a - b - c - d, \quad e - f - g - h, \quad a - f - c - h$$

Which of the following cannot be an edge in the original graph?

- (1) (e, f)
 - (2) (b, d)
 - (3) (b, g)
 - (4) (b, h)
-

13. Consider the following database schema:

Person (aadhar CHAR(12) PK, name VARCHAR(32))

Customer (name VARCHAR(32), email VARCHAR(32) PK, phone CHAR, aadhar CHAR(12) FK(aadhar))

Which of the following statements is/are correct?

- (1) Aadhar is the candidate key (CK) of Person
 - (2) Phone number can be NULL in Customer
 - (3) Aadhar can be NULL in Person
 - (4) Aadhar is the candidate key in Customer
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