

GATE 2026 Data Science and Artificial Intelligence (DA) Question Paper with Solutions

Time Allowed :3 Hour	Maximum Marks :100	Total Questions :65
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General Instructions

Please read the following instructions carefully:

- This question paper is divided into three sections:
 - General Aptitude (GA):** 10 questions (5 questions \times 1 mark + 5 questions \times 2 marks) for a total of 15 marks.
 - Environmental Science and Engineering + Engineering Mathematics:**
 - Part A (Mandatory):** 36 questions (1 questions \times 1 mark + 19 questions \times 2 marks) for a total of 55 marks.
 - Part B (Section 1):** Candidates can choose either Part B1 (Surveying and Mapping) or Part B2 (Section 2). Each part contains 16 questions (8 questions \times 1 mark + 11 questions \times 2 marks) for a total of 30 marks.
- The total number of questions is **65**, carrying a maximum of **100 marks**.
- The duration of the exam is **3 hours**.
- Marking scheme:
 - For 1-mark MCQs, $\frac{1}{3}$ mark will be deducted for every incorrect response.
 - For 2-mark MCQs, $\frac{2}{3}$ mark will be deducted for every incorrect response.
 - No negative marking for numerical answer type (NAT) questions.
 - No marks will be awarded for unanswered questions.
- Ensure you attempt questions only from the optional section (Part B1 or Part B2) you have selected.
- Follow the instructions provided during the exam for submitting your answers.

1. Consider the relation $R(A, B, C, D, E)$

Functional Dependencies:

$$A \rightarrow BC$$

$$CD \rightarrow E$$

$$E \rightarrow A$$

Find the number of candidate keys.

2. Which of the following logical statements is not valid?

- (A) $\forall x P(x) \Rightarrow \exists x \neg P(x)$
- (B) $\forall x P(x) \Rightarrow \exists x P(x)$
- (C) $\exists x P(x) \Rightarrow \forall x P(x)$
- (D) $\exists x P(x) \Leftrightarrow \forall x P(x)$

3. Consider a binary tree whose preorder traversal is

P, Q, S, E, R, F, G

and inorder traversal is

$S, Q, E, P, F, R, G.$

Which of the following statements is correct?

- (A) Node Q has only one child.
- (B) Postorder traversal is $S, E, Q, F, G, R, P.$
- (C) P is the root of the tree.
- (D) The left subtree of node R contains node $G.$

4. If xyz is a three-digit number and the product of its digits is 70, then find the sum of the digits.

- (A) 16
- (B) 14
- (C) 18
- (D) 12

5. In a data warehouse, a 3D cube initially has dimensions: Product type, Month, and Country. After visualization, the dimension Country is refined into State. Which OLAP operation is performed?

- (A) Roll up
- (B) Slicing
- (C) Dicing
- (D) Drill down

6. Consider the following Python code:

```
def outer():
    x = []
    def inner(val):
        x.append(val)
        return x
    return inner
```

```
F1 = outer()
F2 = outer()
print(F1(10))
print(F1(20))
print(F2(30))
print(F2(40))
```

Which of the following statements is correct?

- (A) Output of line Q is [10, 20]
- (B) Output of line S is [10, 20, 40]
- (C) Output of line R is [10, 20, 30]
- (D) F1 & F2 share the same list

7. Node size = 4096 B
Node pointer = 10 B
Search key = 11 B
Record pointer = 12 B

Find the maximum number of node pointers.

8. Given the Python code:

```
def fun(L, i=0):
    if i >= len(L) - 1:
        return 0

    if L[i] > L[i+1]:
        L[i+1], L[i] = L[i], L[i+1]
        return 1 + fun(L, i+1)
    else:
        return fun(L, i+1)
```

```
data = [5, 3, 4, 1, 2]
count = 0

for _ in range(len(data)):
    count += fun(data)

print(count)
```

9. Consider the ER model:

E1 (A11, A12, A13)

E2 (A21, A22, A23)

Where:

- A21 is the key of E2
- A22 is a multivalued attribute
- R12 is a many-to-many relationship between E1 and E2

Find the minimum number of relations required to convert this ER model into tables.

10. Which of the following recurrence relations represents the average case time complexity of QuickSort?

- (A) $T(n) = T(n/4) + T(3n/4) + O(n)$
 - (B) $T(n) = 2T(n/2) + O(n)$
 - (C) $T(n) = \frac{1}{n} \sum_{k=0}^{n-1} [T(k) + T(n-k-1)] + O(n)$
 - (D) $T(n) = T(1) + T(n-1) + O(n)$
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