GATE 2026 CS 1 Question Paper

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

General Instructions

Please read the following instructions carefully:

1. This question paper is divided into three sections:
   - **General Aptitude (GA):** 10 questions (5 questions × 1 mark + 5 questions × 2 marks) for a total of 15 marks.
   - **Environmental Science and Engineering + Engineering Mathematics:**
     - **Part A (Mandatory):** 36 questions (1 questions × 1 mark + 19 questions × 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 × 1 mark + 11 questions × 2 marks) for a total of 30 marks.
2. The total number of questions is **65**, carrying a maximum of **100 marks**.
3. The duration of the exam is **3 hours**.
4. 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.
5. Ensure you attempt questions only from the optional section (Part B1 or Part B2) you have selected.
6. Follow the instructions provided during the exam for submitting your answers.

1. Despite his initial hesitation, Rehman's _____ to contribute to the success of the project never wavered.

(A) ambivalence
(B) satisfaction
(C) resolve
(D) revolve

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2. Bird : Nest :: Bee :

(A) Kennel
(B) Hammock
(C) Hive
(D) Lair

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3. If $Pe^x = Qe^{-x}$ for all real values of x, which one of the following statements is true?

(A) P = Q = 0
(B) P = Q = 1
(C) P = 1; Q = 1
(D) P/Q = 0

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4. Let p_1 and p_2 denote two arbitrary prime numbers. Which one of the following statements is correct for all values of p_1 and p_2?

(A) $p_1 + p_2$ is not a prime number.
(B) $p_1 p_2$ is not a prime number.
(C) $p_1 + p_2 + 1$ is a prime number.
(D) $p_1 p_2 + 1$ is a prime number.

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5. Based only on the conversation below, identify the logically correct inference: "Even if I had known that you were in the hospital, I would not have gone there to see you," Ramya told Josephine.

(A) Ramya knew that Josephine was in the hospital.
(B) Ramya did not know that Josephine was in the hospital.
(C) Ramya and Josephine were once close friends; but now, they are not.
(D) Josephine was in the hospital due to an injury to her leg.

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6. A machine receives an IPv4 datagram. The protocol field of the IPv4 header has the protocol number of a protocol X. Which ONE of the following is NOT a possible candidate for X?

(A) ICMP
(B) IGMP
(C) OSPF
(D) RIP

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7. Consider an unordered list of N distinct integers. What is the minimum number of element comparisons required to find an integer in the list that is NOT the largest in the list?

(A) 1
(B) N 1
(C) N
(D) 2N – 1

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8. Each Ethernet frame can carry a max of 1500 bytes. A UDP segment with 7488 bytes of payload is transmitted. Find the total number of fragments and the size of the last fragment including IPv4 header (assume no options).

(A) 5 fragments, 1488 bytes
(B) 6 fragments, 88 bytes
(C) 6 fragments, 108 bytes
(D) 6 fragments, 116 bytes

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9. Which ONE of the following languages is accepted by a deterministic pushdown automaton (DPDA)?

(A) Any regular language.
(B) Any context-free language.
(C) Any language accepted by an NPDA.
(D) Any decidable language.

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10. Two joint holders attempted simultaneous transfers of Rs. 10000 each. Both read Rs. 11000 balance. A was debited only once (final balance 1000). Which properties were violated?

(A) Atomicity
(B) Consistency
(C) Isolation
(D) Durability

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11. The Antonym of the word "Protagonist" is _____.

(A) Agnostic
(B) Antagonist
(C) Anarchist
(D) Arsonist

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12. Consider a heap containing n elements, where $n > 100$ and n is odd. Assuming 1-based indexing, which of the following cannot be the index of a leaf node in the heap?

(A) $\frac{(n-1)}{2}$
(B) $\frac{(n-3)}{2}$
(C) n
(D) $\frac{(n+1)}{2}$

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13. $T_1(n) = 4T_1\left(\frac{n}{2}\right) + n^{\log_4 5}$**. Which is true?**

(A) $T_1(n) = \theta(n^2)$
(B) $T_1(n) = \theta(n^{\log_4 5})$
(C) $T_1(n) = \theta(n^{\log_4 5} \log n)$
(D) $T_1(n) = \theta(n^2 \log n)$

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14. Which of the following is always true for LL(1) parser?

(A) Grammar must be left factored
(B) LL(1) parser is more powerful than SLR(1).
(C) LL(1) is non back tracking.
(D) Grammar must be left recursive.

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15. Consider the following grammar: $S \to aSbS \mid bS \mid \epsilon$**.**
Which of the following is true?

(A) Grammar is ambiguous
(B) abab is having only one parse tree
(C) abb is ambiguous string
(D) None of these

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16. Consider the following C statement:
char * str1 = "Hello"; // stmt S
char * str2 = "Hello"; // stmt S
char * str3 = "Hello" // stmt S
Which of the following are correct?

(A) S_1 and S_2 are lexical errors
(B) S_2 is lexical and S_3 is semantic

(C) S_2 is syntax and S_3 is semantic
(D) S_1 is lexical and S_3 is syntax

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17. Which one of the following of register operands on different instructions can cause data hazard in the pipelined processor?

(A) Write After Read
(B) Write After Write
(C) Read After Read
(D) Read After Write

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18. Match the following List-I and List-II:
List-I
A. Immediate AM
B. Base register
C. Indirect
D. Index
List-II
1. Pointer
2. Constant
3. Array element
4. Position independent codes

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

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19. Consider a system with the following cache configuration:
Block size = 128 bytes
Physical memory size = 2^{23} bytes
Cache size = 2^{13} bytes.
Two cache organizations are used:
1. A direct-mapped cache with tag size = m bits.
2. A k-way set associative cache with tag size = n bits where k = 2^L, L $\in \{1, 2, 3, ...\}$.
Which of the following relations between n and m is / are correct?

(A) n = m - L
(B) n = m + L
(C) n = mL
(D) n = m + k

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20. Consider the following single precision floating point numbers and the operation.
X : (35C00000)H
Y : (34A00000)H
Z = X + Y
What is the value of 'Z' in hexadecimal?

(A) (B5E80000)H
(B) (F5E80000)H
(C) (35C80000)H
(D) (35E80000)H

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21. Consider the following 8-bit signed integers x, y using sign-magnitude format is x = 10110100, y = 01001100. Which of the following operations results overflow?

(A) x - y
(B) x + y
(C) -x + y
(D) -x - y

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22. Which of the following is may not dependency preserving decomposition?

(A) 1NF
(B) 2NF
(C) 3NF
(D) BCNF

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23. Consider a relation R(A, B, C, D). The candidate keys of the relation are AB and AC. How many distinct superkeys does the relation R have?

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24. Consider a relation R(A, B, C, D) and functional dependencies of X → Y. Which of the following statement are correct?

(A) If PQ → R, then P → R or Q → R.
(B) If P → R and Q → S, then PQ → RS.
(C) If P → R, then PQ → R.
(D) If PQ → R and P → R, then Q → R.

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25. Consider two relational R(P, Q) and S(X, Y). Given E = {u — ∃ v ∃ w such that (u, v) ∈ R and (v, w) ∈ S} Which one of the following relational Algebra expressions is equivalent to E?

(A) $\pi_p(S \bowtie_{S.X=R.Q} R)$
(B) $\pi_p(R \bowtie_{R.P=S.X} S)$
(C) $\pi_p(S \bowtie_{S.X=R.Q} R)$
(D) $\pi_p(S \bowtie_{R.P=S.Y} R)$

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26. f(P, Q, R, S) = $\sum m(1, 2, 3, 4, 5, 7, 10, 12, 13, 14)$. Find SOP expression?

(A) $P\bar{S} + Q\bar{R} + \bar{P}\bar{Q}R + \bar{Q}R\bar{S}$
(B) $P\bar{S} + Q\bar{R} + \bar{P}\bar{Q}R + PR\bar{S}$
(C) $\bar{P}S + Q\bar{R} + \bar{P}\bar{Q}R + \bar{Q}R\bar{S}$
(D) $\bar{P}S + Q\bar{R} + \bar{P}\bar{Q}R + PR\bar{S}$

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27. F(P, Q) = $(\bar{P} + Q) \oplus \bar{P}Q$ is are

(A) $\bar{P} \oplus \bar{Q}$
(B) $P \oplus \bar{Q}$
(C) $P \oplus Q$
(D) $\bar{P} \oplus Q$

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28. Consider 2-bit saturating up/down counter for p = 0 and p = 1 respectively. Find excitation D_1 and D_0 for the given table.

P	Q_1	Q_0	Q_1^+	Q_0^+
0	0	0	0	1
0	0	1	1	0
0	1	0	1	1
0	1	1	1	1
1	0	0	0	0
1	0	1	0	0
1	1	0	0	1
1	1	1	1	0

Find D_1 and D_0

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29. f(x) = $\left(\frac{|x|}{2} - x\right) \times \left(x - \frac{|x|}{2}\right)$. Identify the correct property.

(A) f has local minimum
(B) f has local maximum
(C) f' is continuous at x = 0
(D) f' is not differentiable at x = 0

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30. For $n > 1$, the maximum multiplicity of any eigenvalue of an n × n matrix with real entries is?

(A) n - 1
(B) n + 1
(C) n
(D) 1

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31. f(x) = $\begin{cases} C_1 e^x - C_2 \log_e\left(\frac{1}{x}\right), & x > 0 \\ 3, & \text{otherwise} \end{cases}$ **Where $C_1, C_2 \in R$. If f is continuous at x = 0 then $C_1 + C_2$ is _____.**

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32. An unbiased six faced dice whose faces are marked with 1, 2, 3, 4, 5 and 6 is rolled twice. The probability that the number appearing in the second roll is an integer multiple of the number appearing in the first roll?

(A) $\frac{1}{6}$
(B) $\frac{5}{18}$
(C) $\frac{7}{18}$
(D) $\frac{5}{6}$

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33. $A_{n\times n}, n > 1$. If (1, 0, 1, 0, 0, ..., 0) $\in R^n$ belongs to the null space of A then

(A) $|A| = 0$
(B) $|A| = 1$
(C) $RankA = 1$
(D) There are at least 2 non zero vectors in the null space of A.

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34. There are 5 processes in a system. The maximum number of records a process can take is 2. At a time, a process can take only a single resource and can free only a single resource. How many records are required to ensure deadlock-free execution _____?

35. Consider TLB, cache and MMU with paging. Which is never be true?

(A) TLB miss, PT hit, cache hit
(B) TLB miss, PT miss, cache miss
(C) TLB miss, PT miss, cache hit
(D) TLB hit, PT miss, cache hit

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36. Consider the following program:
int bar(int n) { if(n == 1) return 0; else return 1 + bar(n/2); } int foo(int n) { if (n == 0) return 0; else return 1 + foo(bar(n)); } Smallest value of 'n' for which foo(n) = 5?

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37. Consider the following program, what is the output printed _____?
void f(int i, int j) { if (i <j) { i = 0; while (i < 10) { j = j + 2; i++; } printf(i); } }
int main() { int i = 9, int j = 10; f(i, j); return 0; }

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38. Count the number of nodes in the linked list which is not empty?
struct node { int value; struct node * next; } fun (node * head) { if (E1) return 1; else E2; }

(A) E1: head == Null, E2: 1 + fun (head);
(B) E1: head == Null, E2: 1 + fun (head → next);
(C) E1: head → next == Null, E2: 1 + fun (head → next);
(D) None of these

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39. Which of the following cannot be the number of states in the minimal DFA equivalent to the NFA of 6 states?

(A) 1
(B) 32
(C) 65
(D) 128

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40. If $L_1 \cap L_2$ and L_2 are regular then which of the following is always true?

(A) $\bar{L}_1$ is CFL
(B) L_1 is Regular

(C) $L_1 \cup L_2$ is regular
(D) $\bar{L}_2$ is CFL

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41. Sliding window protocol: L = 1000 bits, R = 100 Kbps, T_p = 100 ms, T_{pm} = 0. Find optimal window size?

(A) 10
(B) 11
(C) 20
(D) 21

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42. Which of the following is correct about the TCP connection?

(A) Two-way handshaking.
(B) TCP is half duplex.
(C) The server can't initiate closing of connection before client.
(D) Client and server initiate closing connection at same time.

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43. An ISP having Address Block 202.16.0.0/15. Assign a Block of 6000 IP Address to a client using the Classless Addressing. Which of the following Address Block can be assigned by the ISP?

(A) 202.16.32.0/19
(B) 202.16.0.0/19
(C) 202.17.24.0/19
(D) 202.17.64.0/19
