GATE 2026 CS 2 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. Consider three machines M, N, and P with IP addresses 100.10.5.2, 100.10.5.5, and 100.10.5.6 respectively. The subnet mask is set to 255.255.255.252 for all the three machines. Which one of the following is true?

(A) M, N, and P all belong to the same subnet
(B) Only M and N belong to the same subnet
(C) Only N and P belong to the same subnet
(D) M, N, and P belong to three different subnets

2. Assume that in a certain computer, the virtual addresses are 64 bits long and the physical addresses are 48 bits long. The memory is word addressible. The page size is 8 kB and the word size is 4 bytes. The Translation Look-aside Buffer (TLB) in the address translation path has 128 valid entries. At most how many distinct virtual addresses can be translated without any TLB miss?

(A) 16×2^{10}
(B) 256×2^{10}
(C) 4×2^{20}
(D) 8×2^{20}

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3. An array of 25 distinct elements is to be sorted using quicksort. Assume that the pivot element is chosen uniformly at random. The probability that the pivot element gets placed in the worst possible location in the first round of partitioning (rounded off to 2 decimal places) is ____.

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4. Which of the following protocol pairs can be used to send and retrieve e-mails (in that order)?

(A) IMAP, POP3
(B) SMTP, POP3
(C) SMTP, MIME
(D) IMAP, SMTP

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5. For $\Sigma = \{a, b\}$, let us consider the regular language $L = \{x \mid x = a^{2+3k}$ or $x = b^{10+12k},\ k \geq 0\}$. Which one of the following can be a pumping length (the constant guaranteed by the pumping lemma) for L?

(A) 3
(B) 5
(C) 9
(D) 24

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6. Which one of the following statements is NOT correct about the B^+ tree data structure used for creating an index of a relational database table?

(A) B^+ tree is a height-balanced tree
(B) Non-leaf nodes have pointers to data records
(C) Key values in each node are kept in sorted order
(D) Each leaf node has a pointer to the next leaf node

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7. Consider $Z = X - Y$, where X, Y and Z are all in sign-magnitude form. X and Y are each represented in n bits. To avoid overflow, the representation of Z would require a minimum of:

(A) n bits
(B) $n - 1$ bits
(C) $n + 1$ bits
(D) $n + 2$ bits

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8. Which one of the following kinds of derivation is used by LR parsers?

(A) Leftmost
(B) Leftmost in reverse
(C) Rightmost
(D) Rightmost in reverse

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9. A certain processor uses a fully associative cache of size 16 kB. The cache block size is 16 bytes. Assume that the main memory is byte addressable and uses a 32-bit address. How many bits are required for the Tag and the Index fields respectively in the addresses generated by the processor?

(A) 24 bits and 0 bits
(B) 28 bits and 4 bits
(C) 24 bits and 4 bits
(D) 28 bits and 0 bits

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10. The search engine's business model _____ around the fulcrum of trust.

(A) revolves
(B) plays

(C) sinks
(D) bursts

SECTION A: GENERAL APTITUDE

11. A day can only be cloudy or sunny. The prob. of day being cloudy is 0.5, independent of the condition on other days. What is prob. that in any given four days, there will be 3 cloudy days & one sunny day?

(A) 1/4
(B) 2/3
(C) 3/4
(D) 3/8

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12. Water: P :: Food: Q

(A) wet, Critic
(B) Thirst, Hunger
(C) Thirst, Satiated
(D) Drink, Hunger

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13. Expedite, hasten, hurry, ____:

(A) Disable
(B) Accelerate
(C) Retard
(D) Provide

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14. A die is thrown twice. What is the probability that sum of the outcomes is a prime no.?

(A) 15/36
(B) 19/36
(C) 13/36
(D) 3/36

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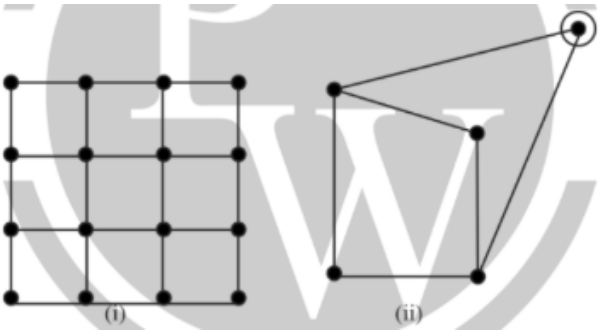
15. If a salesperson want to visit each city once and come to starting point again. Then on which of the city network, he can perform the visit.



(A) Only (i)
(B) Only (ii)
(C) Both (i) and (ii)
(D) Neither

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16. When is it raining peacock dance option that is necessarily true?

(A) when peacocks dance, it is raining
(B) Peacocks dance only when it is raining.
(C) when peacocks are not dancing, it is not raining
(D) when it is not raining, peacocks do not dance.

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17. A man sales two stocks (stocks A & stocks B) then cost price stock each of 250 and the cost of stock Beach of 280. The Salse price of stock A each 55 & stock B is each 70. Then profit is __.

(A) 20
(B) 0
(C) 5
(D) 10

SECTION B: CS & IT ENGINEERING

18. An unbiased 6-faced dice whose faces are marked with no. 1, 2, 3, 4, 5, 6 is rolled twice & no. on top face is recorded each time. The problem. that the sum of 2 recorded no. is prime?

(A) 19/36
(B) 3/36
(C) 15/36
(D) 13/36

19. Let R be a binary relation on the set A = {1, 2, ..., 10} defined by (x, y) $\in$ R $\iff$ xy is a perfect square. Which of the following properties does R satisfy?

(A) Symmetric
(B) Antisymmetric
(C) Transitive
(D) Reflexive

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20. Four 4 bit 2's-complement numbers are given: N_1 = 1011, N_2 = 1101, N_3 = 1010, N_4 = 1001. Which of the following arithmetic operations results in overflow?

(A) $N_1 + N_2$
(B) $N_2 + N_3$
(C) $N_1 + N_4$
(D) $N_3 - N_4$

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21. Let $I(a) = \int_{-1}^{1}(3x^3 - ax + 1)dx$. Then which of the following is/are correct?

(A) The value of I(a) is independent of a
(B) The value of I(a) is dependent on a.
(C) There exists a, $a \in (-\infty, +\infty)$, where I(a) is a positive number.
(D) There exists a, $a \in (-\infty, +\infty)$, where I(a) is a negative number.

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22. Which can be recurrence relations to an algo. with T.C O(n)?

(A) $T(n) = 2T\left(\frac{n}{2}\right) + n, T(1) = 1$
(B) $T(n) = T(n-1) + 1$
(C) $T(n) = 2T\left(\frac{n}{2}\right) + 1, T(1) = 1$
(D) $T(n) = T(n-1) + n$

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23. Which of the following CPU scheduling algo cannot be pre-emptive?

(A) RR (Round Robin)
(B) SRTF (Shortest Remaining Time First)
(C) Priority
(D) FCFS (First Come First Served)

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24. Consider a probability density function (PDF) of a random variable X as $f_X(x) = \frac{1}{3\sqrt{2\pi}} e^{-\frac{x^2}{18}}, x \in (-\infty, +\infty)$. Then, which one of the following statements is/are true?

(A) X is following Poisson distribution
(B) X is following normal distribution.
(C) X is following exponential distribution
(D) X is following uniform distribution

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25. Match the following -
Case-I Case-II
I. Logical schema L. Views
II. Physical Schema M. file organization & index
III. External Schema. N. Relations.

(A) I-N, II-M, III-L
(B) I-N, II-L, III-M
(C) I-L, II-LM, III-M
(D) I-M, II-N, III-L

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26. If an IP network uses a S.M of 255.255.208.0, the max number of IP add. that can be assigned to network interfaces is _____.

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27. The 32-bit IEEE 754 single-precision representation of a number is 0xC2710000. Find the decimal representation of the number (correct to two decimal places).

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28. In C runtime eigenvalues which one of the following our is stored in heap.

(A) Local variables
(B) Global variables
(C) Static variables
(D) Dynamically allocated memory

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29. When it is raining peacocks dance option that is necessarily true?

(A) when peacocks dance, it is raining
(B) Peacocks dance only when it is raining.
(C) when peacocks are not dancing, it is not raining
(D) when it is not raining, peacocks do not dance.

30. Let the determinant of a 4×4 matrix A is 3, then what is the determinant of 2A?

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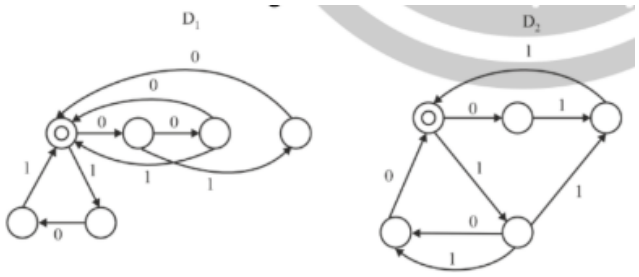
31. Consider the following finite automaton D_1 and D_2. Which of the following is true?



(A) $L(D_1) \cap L(D_2) = \{\epsilon\}$
(B) $(L(D_1) \cup L(D_2))$ consists all strings in $\{0, 1\}$ whose length is divisible by 3
(C) $L(D_1) = L(D_2)$
(D) $L(D_1)$ is a proper subset of $L(D_2)$

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32. 1MB Physical memory, word length 1B, direct mapped cache with block number starting from 0. The physical add. 0xA2C28 is mapped to cache block 176_{10}. The max possible size of cache in (KB)____.

A′ B′	01	11	2	12
A′ B	4	5	7	6
A B	12	43	15	14
A B′	82		11	10

---

33. Which of the following statements is equivalent to following? Turing Machine M decides the language L over $\{0, 1\}$?

(A) M accepts all input strings in L
(B) M halts on all input strings in $\{0, 1\}$
(C) M accepts all input strings in L & rejects all input strings in $\{0, 1\}^- L$.
(D) M rejects all input strings $\{0, 1\} - L$

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34. The set T ref's traversal, S ref's order of visiting nodes:
T S
I. In-order L: Left ST, Node, Right ST
II. Preorder M: Node, L ST, Right ST
III. Post order N: Left ST, Right ST, Node

(A) I–L, II–M, III–N
(B) I–M, II–L, III–N
(C) I–L, II–N, III–M
(D) I–N, II–L, III–M

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35. Which protocol needs to (rely) broadcast some of its message?

(A) HTTP
(B) FTP
(C) SNMP
(D) DHCP

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36. Which of the following stored in heap?

(A) Static variable declared inside a function
(B) array of index declared inside a function
(C) Dynamically allocated array of integers Create using malloc()
(D) Return address function

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37. Let $\Sigma = \{a, b, c, d\}$ and let $L = \{a^i b^j c^k d^l \mid i, j, k, l \geq 0\}$. Which ensure that L is CFL?

(A) $i + k = j + l$
(B) $j = l$ & $i = k$
(C) $i + j = k + l$
(D) $i = l$ & $j = k$

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38. Consider an array A of int of size n the indices of A run from 1 to n, an algo is to be designed that satisfies below: $\forall i, j \in \{1, ..., n-1\}$ is such that $i > j$, $(A[i+1] - A[i]) > (A[j+1] - A[j])$. Which one of the following is the Time complexity of the fastest algo that can be designed for problem?

(A) $\Theta(n)$
(B) $\Theta(n^2)$
(C) $\Theta(n \log(n))$
(D) $\Theta(\log(n))$

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39. Consider the transmission 110001011 over CRC. If the generated bit pattern is given to be 1001, which one of the following options shows the remainder bit pattern appended to the data bits before transmission?

(A) 000
(B) 101
(C) 011
(D) 100

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40. These keys 5, 28, 19, 15, 26, 33, 12, 17, 10 inserted into hash table using hash function h(K) = K mod 7 the collisions are resolved using chaining. After all the keys are inserted, the length of the longest chain is ____.

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41. Which grammar is/are ambiguous?

(A) E $\rightarrow$ E+E / EE / id
(B) S $\rightarrow$ aS / ϵ
(C) S $\rightarrow$ aS / Sa / ϵ
(D) S $\rightarrow$ aSb / ϵ

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42. Consider the system of equation:

$$\begin{cases} ax + y = b \\ 16x + ay = 24 \end{cases}$$

What is the value of a, if system has infinitely many solution?

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43. If an IP network uses a subnet mask of 255.255.240.0, the maximum number of IP addresses that can be assigned to network interface is _____.

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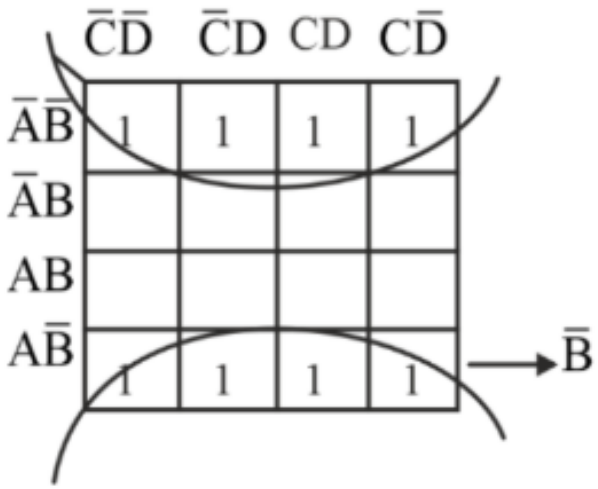
44. F(A,B,C,D) = Σm(0,1,2,3,8,9,10,11). Which of the following is the simplified form of F?



(A) $\bar{B}$
(B) A
(C) $\bar{A} + B$
(D) $\bar{C}$

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45. A man sells two stocks: Stock A (2 units at CP 50 each) and Stock B (1 unit at CP 80). If SP of Stock A is 55 each and Stock B is 70, find the profit or loss percentage.

(A) 20%
(B) 0%
(C) 5%
(D) 10%

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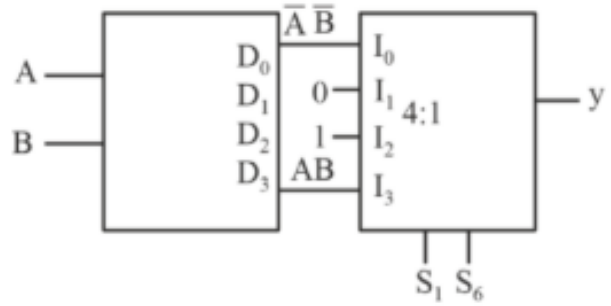
46. For how many combinations of S_1, S_b will the output $y = 1$ for the given circuit $[A, B, S_1, S_0]$?



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47. Which of the following is not a property of Boolean algebra?

(A) $a + \bar{a} = 1$
(B) $a + b = b + a$

(C) $a \cdot \bar{a} = 1$
(D) $a \cdot b = b \cdot a$

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48. File size = 4 Million bytes. If the bandwidth is 500 KBps, what is the total time required? (in sec.)

(A) 8
(B) 16
(C) 64
(D) 731

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49. Let T_1 and T_2 be two transactions accessing the same data item A. Which of the following is a non-conflict pair?

(A) $T_1 \to W(A), T_2 \to W(A)$
(B) $T_1 \to W(A), T_2 \to R(A)$
(C) $T_1 \to R(A), T_2 \to R(A)$
(D) $T_1 \to R(A), T_2 \to W(A)$

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50. Let a function f be defined as $f : (0, 1) \to \{0, 1\}$. For $r \in (0, 1)$, $f(r) = 1$ if the second digit after decimal is 2, 3, 6 & 7 and $f(r) = 0$ otherwise. Then number of points where f is discontinuous?

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51. Let a fair coin is tossed 6 times, where the coin tosses are independent of any other coin toss. Let E_1 be an event that there are at least 2 heads in attempt 2, 4 & 6. And E_2 be an event that the number of heads and number of tails are equal in attempts 1, 2, 3 & 5. Then what is the value of $P(E_1/E_2)$?

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52. Consider there are 8 holes of size 20KB, 4KB, 25KB, 18KB, 7KB, 9KB, 15KB, and 12KB, and there arrive two processes, process P1 of size 16KB and process P2 of size 9KB. We apply best fit algorithm. The number of holes less than 8KB size are _____.

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53. Which one of the following may need to broadcast some of its messages?

(A) SMTP
(B) DHCP

(C) FTP
(D) HTTP

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54. Find the number of blocks required to hold free disk block numbers using a Linked List approach. Given: Disk size = 16 GB, Block size = 2 KB, Block number size = 32 bits, and Pointer size = 4 bytes.

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55. Let G be a weighted directed acyclic graph (DAG) with n vertices and m edges. Find the worst-case time complexity of the fastest algorithm to find lengths of shortest paths from source S.

(A) $\theta(m + n)$
(B) $\theta(m + n \log(n))$
(C) $\theta(n^3)$
(D) $\theta(nm)$
