GATE (CS)

Sample Question Paper - 2024

Country: IN | Duration: 3 hours | Max Marks: 100 | Language: English

Negative Marking: Yes (-1/3) | Total Questions: 65 | QuizVerse AI Tutor

---

General Instructions:

1. This paper contains 65 questions across 2 section(s): Computer Science & IT, Engineering Mathematics.
2. Duration: 3 hours. Maximum marks: 100.
3. Negative marking: Yes (-1/3).
4. Read each question carefully before answering.

Section 1: Computer Science & IT (45 Questions)

Q1. Which layer of OSI handles routing?

(A) Network
(B) Physical
(C) Data Link
(D) Transport

Q2. The purpose of NAT in networking is:

(A) Error detection
(B) IP address translation
(C) Encryption
(D) Routing

Q3. The subset sum problem is:

(A) P
(B) NP-complete
(C) Undecidable
(D) Regular

Q4. In SQL, which keyword eliminates duplicates?

(A) REMOVE
(B) UNIQUE
(C) DISTINCT
(D) DIFFERENT

Q5. In virtual memory, page replacement uses:

(A) Hashing only
(B) Binary search
(C) LRU, FIFO, Optimal
(D) Indexing

Q6. Which layer of OSI handles routing?

(A) Transport

(B) Network

(C) Physical

(D) Data Link

Q7. DNS resolves:

(A) IP to MAC

(B) Domain names to IP addresses

(C) MAC to IP

(D) Port to service

Q8. Dijkstra's algorithm does not work with:

(A) Undirected graphs

(B) Sparse graphs

(C) Negative edge weights

(D) Dense graphs

Q9. In C, the size of int on a 64-bit system is typically:

(A) 1 byte

(B) 8 bytes

(C) 2 bytes

(D) 4 bytes

Q10. Which sorting algorithm has best-case O(n)?

(A) Insertion Sort

(B) Merge Sort

(C) Heap Sort

(D) Quick Sort

Q11. A language is regular if and only if it is accepted by:

(A) Turing Machine

(B) PDA

(C) Finite Automaton

(D) LBA

Q12. Paging eliminates:

(A) Internal fragmentation

(B) Neither

(C) Both

(D) External fragmentation

Q13. In C, the size of int on a 64-bit system is typically:

(A) 8 bytes

(B) 2 bytes

(C) 4 bytes

(D) 1 byte

Q14. Which scheduling algorithm may cause starvation?

(A) SJF (non-preemptive)

(B) Priority Scheduling

(C) FCFS

(D) Round Robin

Q15. The subset sum problem is:

(A) Regular

(B) P

(C) NP-complete

(D) Undecidable

Q16. Paging eliminates:

(A) External fragmentation

(B) Internal fragmentation

(C) Both

(D) Neither

Q17. DNS resolves:

(A) Port to service

(B) IP to MAC

(C) MAC to IP

(D) Domain names to IP addresses

Q18. Mutex is used for:

(A) Memory management

(B) Caching

(C) Mutual exclusion

(D) Networking

Q19. A language is regular if and only if it is accepted by:

(A) LBA

(B) Finite Automaton

(C) PDA

(D) Turing Machine

Q20. Which traversal visits root first?

(A) Preorder

(B) Postorder

(C) Level order

(D) Inorder

Q21. Which data structure uses LIFO?

(A) Stack

(B) Array

(C) Linked List

(D) Queue

Q22. Which traversal visits root first?

(A) Inorder

(B) Preorder

(C) Postorder

(D) Level order

Q23. DNS resolves:

(A) IP to MAC

(B) Port to service

(C) MAC to IP

(D) Domain names to IP addresses

Q24. Mutex is used for:

(A) Memory management

(B) Caching

(C) Networking

(D) Mutual exclusion

Q25. B+ tree is commonly used in:

(A) Database indexing

(B) Sorting

(C) Graph traversal

(D) Hashing

Q26. Which scheduling algorithm may cause starvation?

(A) SJF (non-preemptive)

(B) Round Robin

(C) Priority Scheduling

(D) FCFS

Q27. The number of edges in a complete graph with n vertices is:

(A) n(n-1)/2

(B) n-1

(C) 2n

(D) n^2

Q28. Dijkstra's algorithm does not work with:

(A) Sparse graphs

(B) Negative edge weights

(C) Undirected graphs

(D) Dense graphs

Q29. The subset sum problem is:

(A) P

(B) Undecidable

(C) Regular

(D) NP-complete

Q30. The number of edges in a complete graph with n vertices is:

(A) n^2

(B) n-1

(C) n(n-1)/2

(D) 2n

Q31. In a complete binary tree with n nodes, the height is:

(A) O(sqrt(n))

(B) O(n)

(C) O(1)

(D) O(log n)

Q32. In OOP, polymorphism allows:

(A) Same interface, different implementations

(B) Multiple inheritance only

(C) No overriding

(D) Single class only

Q33. TCP is a _____ protocol:

(A) Connection-oriented

(B) Connectionless

(C) Stateless

(D) Broadcast

Q34. Which normal form eliminates transitive dependencies?

(A) 3NF

(B) BCNF

(C) 2NF

(D) 1NF

Q35. In a complete binary tree with n nodes, the height is:

(A) O(sqrt(n))

(B) O(n)

(C) O(log n)

(D) O(1)

Q36. TCP is a _____ protocol:

(A) Connectionless

(B) Stateless

(C) Connection-oriented

(D) Broadcast

Q37. A language is regular if and only if it is accepted by:

(A) Turing Machine

(B) Finite Automaton

(C) LBA

(D) PDA

Q38. In a complete binary tree with n nodes, the height is:

(A) O(log n)

(B) O(1)

(C) O(sqrt(n))

(D) O(n)

Q39. In OOP, polymorphism allows:

(A) Same interface, different implementations

(B) Single class only

(C) No overriding

(D) Multiple inheritance only

Q40. Which sorting algorithm has best-case O(n)?

(A) Heap Sort

(B) Insertion Sort

(C) Merge Sort

(D) Quick Sort

Q41. A semaphore is used for:

(A) File management

(B) Process synchronization

(C) Memory allocation

(D) Disk scheduling

Q42. In SQL, which keyword eliminates duplicates?

(A) DIFFERENT

(B) REMOVE

(C) DISTINCT

(D) UNIQUE

Q43. The subset sum problem is:

(A) P

(B) Undecidable

(C) NP-complete

(D) Regular

Q44. In OOP, polymorphism allows:

(A) Same interface, different implementations

(B) Multiple inheritance only

(C) Single class only

(D) No overriding

Q45. Which normal form eliminates transitive dependencies?

(A) 3NF

(B) 1NF

(C) BCNF

(D) 2NF

Section 2: Engineering Mathematics (20 Questions)

Q46. The derivative of x^4 sin(x) at x = pi is:

(A) -19.82

(B) 18.38

(C) 18.16

(D) 3.97

Q47. The probability of getting exactly 4 heads in 6 tosses of a fair coin is:

(A) 9/128

(B) 25/256

(C) 24/128

(D) 33/64

Q48. lim(x->0) sin(4x)/x =

(A) 5

(B) 3

(C) 5

(D) 6

Q49. The derivative of x^2 sin(x) at x = pi is:

(A) 5.21

(B) 2.14

(C) -3.62

(D) 14.84

Q50. If det(A) = 3 and A is 3x3, then det(2A) =

(A) 58

(B) 4

(C) 29

(D) 49

Q51. The area under y = x^2 from x = 0 to x = 4 is:

(A) 109.2

(B) 18.4

(C) 30.0

(D) 14.4

Q52. Integral of (x^3 + 4) dx from 0 to 4 equals:

(A) 60

(B) 22

(C) 61

(D) 97

Q53. Integral of (x^2 + 2) dx from 0 to 2 equals:

(A) 84

(B) 29

(C) 51

(D) 16

Q54. The number of ways to arrange 4 distinct objects in a circle is:

(A) 1702

(B) 1530

(C) 505

(D) 2588

Q55. lim(x->0) sin(7x)/x =

(A) 4

(B) 2

(C) 4

(D) 4

Q56. Integral of (x^2 + 1) dx from 0 to 2 equals:

(A) 36

(B) 99

(C) 91

(D) 7

Q57. The number of ways to arrange 4 distinct objects in a circle is:

(A) 4671

(B) 315

(C) 1459

(D) 3983

Q58. The distance between parallel lines 4x + 5y = 8 and 5x + 2y = 11 is:

(A) 1.18

(B) 4.60

(C) 2.24

(D) 4.07

Q59. The eccentricity of the ellipse x^2/6 + y^2/1 = 1 is:

(A) 0.41

(B) 0.53

(C) 0.58

(D) 0.73

Q60. If z = 4 + 4i, then |z| =

(A) 7.91

(B) 2.14

(C) 8.61

(D) 1.47

Q61. The probability of getting exactly 4 heads in 7 tosses of a fair coin is:

(A) 48/256

(B) 5/128

(C) 41/128

(D) 35/32

Q62. The sum of first 45 terms of AP with a = 5, d = 1 is:

(A) 1128

(B) 1298

(C) 4110

(D) 4754

Q63. If det(A) = 3 and A is 3x3, then det(2A) =

(A) 35

(B) 89

(C) 40

(D) 57

Q64. The equation of tangent to y = x^2 at x = 1 is:

(A) y = 8x - 10

(B) y = 12x - 13

(C) y = 8x - 3

(D) y = 3x - 1

Q65. The derivative of x^5 sin(x) at x = pi is:

(A) 8.20

(B) -1.40

(C) 18.29

(D) -9.74

Answer Key

Q1: (A)	Q2: (B)	Q3: (B)	Q4: (C)	Q5: (C)
Q6: (B)	Q7: (B)	Q8: (C)	Q9: (D)	Q10: (A)
Q11: (C)	Q12: (D)	Q13: (C)	Q14: (B)	Q15: (C)
Q16: (A)	Q17: (D)	Q18: (C)	Q19: (B)	Q20: (A)
Q21: (A)	Q22: (B)	Q23: (D)	Q24: (D)	Q25: (A)
Q26: (C)	Q27: (A)	Q28: (B)	Q29: (D)	Q30: (C)
Q31: (D)	Q32: (A)	Q33: (A)	Q34: (A)	Q35: (C)
Q36: (C)	Q37: (B)	Q38: (A)	Q39: (A)	Q40: (B)
Q41: (B)	Q42: (C)	Q43: (C)	Q44: (A)	Q45: (A)
Q46: (B)	Q47: (C)	Q48: (A)	Q49: (B)	Q50: (D)
Q51: (C)	Q52: (A)	Q53: (A)	Q54: (A)	Q55: (A)
Q56: (D)	Q57: (C)	Q58: (D)	Q59: (B)	Q60: (D)
Q61: (B)	Q62: (B)	Q63: (A)	Q64: (B)	Q65: (D)