GATE (CS)

Sample Question Paper - 2022

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. A semaphore is used for:

(A) Process synchronization
(B) Disk scheduling
(C) File management
(D) Memory allocation

Q2. B+ tree is commonly used in:

(A) Graph traversal
(B) Database indexing
(C) Hashing
(D) Sorting

Q3. The halting problem is:

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

Q4. Which sorting algorithm has best-case O(n)?

(A) Quick Sort
(B) Insertion Sort
(C) Merge Sort
(D) Heap Sort

Q5. The three levels of data abstraction are:

(A) None of these
(B) Physical, Logical, View
(C) Class, Object, Method
(D) Low, Medium, High

Q6. In OOP, polymorphism allows:

(A) Same interface, different implementations

(B) Multiple inheritance only

(C) No overriding

(D) Single class only

Q7. Which sorting algorithm has best-case O(n)?

(A) Quick Sort

(B) Heap Sort

(C) Merge Sort

(D) Insertion Sort

Q8. Dijkstra's algorithm does not work with:

(A) Negative edge weights

(B) Dense graphs

(C) Undirected graphs

(D) Sparse graphs

Q9. In virtual memory, page replacement uses:

(A) Hashing only

(B) Indexing

(C) Binary search

(D) LRU, FIFO, Optimal

Q10. The time complexity of binary search is:

(A) O(n^2)

(B) O(log n)

(C) O(n log n)

(D) O(n)

Q11. The purpose of NAT in networking is:

(A) Encryption

(B) Routing

(C) IP address translation

(D) Error detection

Q12. In C, the size of int on a 64-bit system is typically:

(A) 1 byte

(B) 4 bytes

(C) 8 bytes

(D) 2 bytes

Q13. In SQL, which keyword eliminates duplicates?

(A) UNIQUE

(B) REMOVE

(C) DISTINCT

(D) DIFFERENT

Q14. TCP is a ____ protocol:

(A) Connectionless

(B) Broadcast

(C) Connection-oriented

(D) Stateless

Q15. Mutex is used for:

(A) Caching

(B) Memory management

(C) Mutual exclusion

(D) Networking

Q16. Dijkstra's algorithm does not work with:

(A) Sparse graphs

(B) Undirected graphs

(C) Negative edge weights

(D) Dense graphs

Q17. In OOP, polymorphism allows:

(A) Single class only

(B) No overriding

(C) Same interface, different implementations

(D) Multiple inheritance only

Q18. DNS resolves:

(A) IP to MAC

(B) MAC to IP

(C) Domain names to IP addresses

(D) Port to service

Q19. In a complete binary tree with n nodes, the height is:

(A) O(log n)

(B) O(1)

(C) O(n)

(D) O(sqrt(n))

Q20. TCP is a ____ protocol:

(A) Connection-oriented

(B) Stateless

(C) Broadcast

(D) Connectionless

Q21. Paging eliminates:

(A) Both

(B) Internal fragmentation

(C) Neither

(D) External fragmentation

Q22. The number of edges in a complete graph with n vertices is:

(A) 2n

(B) n^2

(C) n(n-1)/2

(D) n-1

Q23. In C, the size of int on a 64-bit system is typically:

(A) 8 bytes

(B) 4 bytes

(C) 2 bytes

(D) 1 byte

Q24. Which normal form eliminates transitive dependencies?

(A) BCNF

(B) 3NF

(C) 2NF

(D) 1NF

Q25. The subset sum problem is:

(A) NP-complete

(B) Undecidable

(C) Regular

(D) P

Q26. Dijkstra's algorithm does not work with:

(A) Dense graphs

(B) Sparse graphs

(C) Negative edge weights

(D) Undirected graphs

Q27. Which sorting algorithm has best-case O(n)?

(A) Insertion Sort

(B) Heap Sort

(C) Quick Sort

(D) Merge Sort

Q28. In virtual memory, page replacement uses:

(A) Binary search

(B) Hashing only

(C) Indexing

(D) LRU, FIFO, Optimal

Q29. Paging eliminates:

(A) Internal fragmentation

(B) Neither

(C) External fragmentation

(D) Both

Q30. Which layer of OSI handles routing?

(A) Transport

(B) Data Link

(C) Network

(D) Physical

Q31. The subset sum problem is:

(A) P

(B) Undecidable

(C) NP-complete

(D) Regular

Q32. B+ tree is commonly used in:

(A) Sorting

(B) Database indexing

(C) Graph traversal

(D) Hashing

Q33. TCP is a _____ protocol:

(A) Stateless

(B) Connectionless

(C) Broadcast

(D) Connection-oriented

Q34. A language is regular if and only if it is accepted by:

(A) LBA

(B) Turing Machine

(C) PDA

(D) Finite Automaton

Q35. Which layer of OSI handles routing?

(A) Data Link

(B) Physical

(C) Network

(D) Transport

Q36. In C, the size of int on a 64-bit system is typically:

(A) 2 bytes

(B) 1 byte

(C) 4 bytes

(D) 8 bytes

Q37. A semaphore is used for:

(A) Disk scheduling

(B) Process synchronization

(C) File management

(D) Memory allocation

Q38. The time complexity of binary search is:

(A) O(n^2)

(B) O(log n)

(C) O(n log n)

(D) O(n)

Q39. The number of edges in a complete graph with n vertices is:

(A) n^2

(B) n(n-1)/2

(C) 2n

(D) n-1

Q40. A language is regular if and only if it is accepted by:

(A) PDA

(B) Finite Automaton

(C) Turing Machine

(D) LBA

Q41. In a complete binary tree with n nodes, the height is:

(A) O(log n)

(B) O(sqrt(n))

(C) O(1)

(D) O(n)

Q42. A language is regular if and only if it is accepted by:

(A) Turing Machine

(B) Finite Automaton

(C) PDA

(D) LBA

Q43. The three levels of data abstraction are:

(A) None of these

(B) Class, Object, Method

(C) Physical, Logical, View

(D) Low, Medium, High

Q44. The subset sum problem is:

(A) NP-complete

(B) P

(C) Undecidable

(D) Regular

Q45. The subset sum problem is:

(A) Undecidable

(B) P

(C) NP-complete

(D) Regular

Section 2: Engineering Mathematics (20 Questions)

Q46. If z = 4 + 4i, then |z| =

(A) 8.61

(B) 2.14

(C) 1.47

(D) 7.91

Q47. If det(A) = 3 and A is 3x3, then det(2A) =

(A) 40

(B) 35

(C) 89

(D) 57

Q48. Integral of (x^2 + 2) dx from 0 to 2 equals:

(A) 16

(B) 84

(C) 29

(D) 51

Q49. The probability of getting exactly 4 heads in 8 tosses of a fair coin is:

(A) 29/128

(B) 12/256

(C) 5/64

(D) 39/128

Q50. The derivative of x^2 sin(x) at x = pi is:

(A) 2.14

(B) 14.84

(C) 5.21

(D) -3.62

Q51. The sum of first 24 terms of AP with a = 3, d = 4 is:

(A) 4404

(B) 4128

(C) 4396

(D) 784

Q52. lim(x->0) sin(4x)/x =

(A) 6

(B) 5

(C) 3

(D) 5

Q53. The sum of first 41 terms of AP with a = 5, d = 1 is:

(A) 4098

(B) 3996

(C) 161

(D) 4049

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

(A) 1530

(B) 2588

(C) 505

(D) 1702

Q55. The mean of a binomial distribution with n = 48 and p = 0.3 is:

(A) 32.3

(B) 28.9

(C) 15.9

(D) 33.3

Q56. The area under y = x^3 from x = 0 to x = 2 is:

(A) 94.6

(B) 71.6

(C) 137.9

(D) 196.8

Q57. The probability of getting exactly 4 heads in 7 tosses of a fair coin is:

(A) 48/256

(B) 5/128

(C) 35/32

(D) 41/128

Q58. The equation of tangent to y = x^2 at x = 1 is:

(A) y = 3x - 1

(B) y = 8x - 3

(C) y = 8x - 10

(D) y = 12x - 13

Q59. The number of ways to arrange 4 distinct objects in a circle is:

(A) 315

(B) 4671

(C) 1459

(D) 3983

Q60. The area under y = x^3 from x = 0 to x = 4 is:

(A) 142.5

(B) 55.6

(C) 107.9

(D) 71.0

Q61. The probability of getting exactly 4 heads in 6 tosses of a fair coin is:

(A) 9/128

(B) 33/64

(C) 25/256

(D) 24/128

Q62. The value of integral sin^4(x) dx from 0 to pi/2 is:

(A) 12pi/8

(B) 3pi/32

(C) 12pi/8

(D) 15pi/8

Q63. The area under y = x^2 from x = 0 to x = 4 is:

(A) 14.4

(B) 109.2

(C) 30.0

(D) 18.4

Q64. Integral of (x^2 + 1) dx from 0 to 2 equals:

(A) 91

(B) 36

(C) 7

(D) 99

Q65. The distance between parallel lines 4x + 5y = 8 and 5x + 2y = 11 is:

(A) 4.60

(B) 1.18

(C) 2.24

(D) 4.07

Answer Key

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