Code No.	T – 2141

Entrance Examination for Admission to the M.Tech. Courses in the Teaching Departments, 2024

CSS

COMPUTER SCIENCE WITH SPECIALIZATION IN DIGITAL IMAGE COMPUTING

General Instructions

1. The Question Paper is having 100 Objective Questions, each carrying one mark.
2. The answers are to be (✓) 'tick marked' **only** in the "**Response Sheet**" provided.
3. **Negative marking** : **0.25 marks** will be deducted for each wrong answer .

Time : 2 Hours **Max. Marks : 100**

To be filled in by the Candidate									
Register Number	in Figures								
	in words								

Choose appropriate answer from the options in the questions.

(100 × 1 = 100 marks)

1. Which of the following logic expressions is correct?
   A. 0 * 1 = 1
   B. 1 * 1 = 1
   C. 1 * 0 * 1 = 1
   D. 1 * 1 * 1 = 0

---

2. Under linear programming, if dual has an unbounded solution, then its corresponding primal has

   A. Alternative solution
   B. Feasible solution
   C. Infeasible solution
   D. Unbounded solution

3. What is the median of the following set of scores? 20, 30, 10, 40, 50

   A. 10
   B. 20
   C. 40
   D. 30

4. If intersection and union of two sets A and B is same, then which one of the following is correct?

A. A is empty
B. $A \neq B$
C. A = B
D. B is empty

5. A circle if scaled equally in two dimensions becomes

A. Parabola
B. Hyperbola
C. Ellipse
D. Remains as circle only

6. Which one of the following is true?

A. $R \cap S = (R \cup S) \cup (R - S)$
B. $R \cup S = (R \cap S) - [(R - S) \cup (S - R)]$
C. $R \cap S = (R \cup S) - [(R - S) \cap (S - R)]$
D. $R \cap S = (R \cup S) - [(R - S) \cup (S - R)]$

7. Which of the following is the principal conjunctive normal form for $[(pVq) \wedge \sim p \rightarrow \sim q]$?

A. pVq
B. ~pVq
C. ~pV~q
D. pV~q

8. Let G be a group of order 6, and H be a subgroup of G such that $1 < |H| < 6$. Which one of the following options is correct?

A. G is always cyclic, but H may not be cyclic
B. G may not be cyclic, but H is always cyclic
C. Both G and H are always cyclic
D. Both G and H may not be cyclic

9. A shift register can be used for:

A. Parallel to serial conversion
B. Serial to parallel conversion
C. Digital delay line
D. All of the above

10. Which of the following is a universal gate?

A. NOR
B. AND
C. EX-OR
D. OR

11. The maximum value that a two byte unsigned integer variable can have
    A. 32768 B. 65535
    C. –32768 D. 32767

12. The binary equivalent of a hexadecimal number EF is:
    A. 10101010 B. 11101111
    C. 11111111 D. 00000000

13. Consider a link with packet loss probability of 0.2. What is the expected number of transmissions it would take to transfer 200 packets given that the stop and wait protocol is used?
    A. 50 B. 150
    C. 250 D. 350

14. The conic section that is obtained when a right circular cone is cut through a plane that is parallel to the side of the cone is called
    A. parabola B. hyperbola
    C. circle D. ellipse

15. What is the maximum value of the function $f(x) = 2x^2 – 2x + 6$ in the interval [0,3]?
    A. 6 B. 0.5
    C. 10 D. 18

16. A polynomial $p(x)$ satisfies the following:
    $p(1) = p(3) = p(5) = p(7) = 1$
    and $p(2) = p(4) = p(6) = –1$
    The minimum degree of such a polynomial is
    A. 6 B. 5
    C. 4 D. 3

17. Semiconductor memory is
    A. A volatile memory
    B. Somewhat slower than magnetic core memory
    C. A non-volatile memory
    D. None of these

18. Given the basic ER and relational models, which of the following is INCORRECT?
    A. An attribute of an entity can have more than one value
    B. An attribute of an entity can be composite
    C. In a row of a relational table, an attribute can have more than one value
    D. In a row of a relational table, an attribute can have exactly one value or a NULL value

19. The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is called
    A. Piggybacking
    B. Cyclic redundancy check
    C. Fletcher's checksum
    D. None of the mentioned

20. A piece of icon or image on a web page associated with another webpage is called
    A. url
    B. hyperlink
    C. plugin
    D. superlink

21. Which one of the following fields of an IP header is NOT modified by a typical IP router?
    A. Checksum
    B. Source address
    C. Time to Live (TTL)
    D. Length

22. What is the output of the program?

```
#include<stdio.h>
void main()
{   int i=4,j=6,k,l;        float a,b;
    k = i/j*j;              l = j/i*j;
    a = i/j*j;              b = j/i*i;
    printf("%d,%d,%f,%f\n",k,l,a,b)
}
```

    A. 0,6,0.000000,4.000000
    B. 6,0,0,0
    C. 0,0,0,0
    D. 4,6,6,4

23. Which of the following type of class allows only one object of it to be created?
    A. Virtual class
    B. Abstract class
    C. Singleton class
    D. Friend class

24. Among the following softwares, which one always resides in main memory?
    A. Text editor
    B. Linker
    C. Loader
    D. Assembler

25. The correct sequence of GCC compilation process is
    A. preprocessing **–>** compilation **–>** assemble **–>** linking
    B. assemble **–>** preprocessing **–>** compilation **–>** linking
    C. preprocessing **->** assemble **->** compilation **->** linking
    D. none of the mentioned

26. Process information in the current shell can be obtained by using:
    A. kill
    B. bg
    C. fg
    D. ps

27. In the context of unix, any file's attribute information is stored in which structure on the disk?
    A. inode
    B. data blocks
    C. file blocks
    D. directory file

28. Which of the following are used to generate a message digest by the network security protocols?
    (P) RSA
    (Q) SHA-1
    (R) DES
    (S) MD5
    A. P and R only
    B. Q and R only
    C. Q and S only
    D. R and S only

29. In a binary tree, if the In-order tree traversal output is the same as the Pre-order tree traversal output, then the binary tree is:
    A. Completely balanced
    B. Right skewed
    C. Left skewed
    D. Bound balanced

30. A data warehouse
    A. can be updated by end users
    B. contains numerous naming conventions and formats
    C. is organized around important subject areas
    D. contains only current data

31. What is WPA?
    A. Wired Protected Access
    B. Wi-fi Protected Access
    C. Wired Process Access
    D. Wi-fi Process Access

32. Context free Grammar is
    A. a language expression
    B. a compiler
    C. a regular expression
    D. All of these

33. A Pushdown automata is ———————— if there is at most one transition applicable to each configuration.
    A. Deterministic
    B. Non Deterministic
    C. Finite
    D. Infinite

34. The graphical representation of the transition of finite automata is given
    A. Finite diagram
    B. E-R diagram
    C. Node diagram
    D. State diagram

35. A combination logic circuit that is used when it is desired to send data from two or more sources through a single transmission line is:
    A. Encoder
    B. Multiplexer
    C. Decoder
    D. De multiplexer

36. A locked file can be
    A. Accessed by only one user
    B. Modified by users with the correct password
    C. Used to hide information
    D. Accessed by all users

37. The dining – philosophers problem will occur in case of:
    A. 5 philosophers and 5 chopsticks
    B. 4 philosophers and 5 chopsticks
    C. 3 philosophers and 5 chopsticks
    D. 6 philosophers and 5 chopsticks

38. The state of the data accessed by an aborted transaction must be restored to what it was just before the transaction started executing. This restoration is known as ———————— of transaction.
    A. Safety
    B. Protection
    C. Roll–back
    D. Revert–back

39. All processes share a semaphore variable mutex, initialized to 1. Each process must execute wait(mutex) before entering the critical section and signal(mutex) afterward. Suppose a process executes in the following manner:

signal(mutex);

.....

critical section

.....

wait(mutex);

In this situation, what will happen?

A. A deadlock will occur
B. Processes will starve to enter critical section
C. Several processes maybe executing in their critical section
D. All of these

40. Segment replacement algorithms are more complex than page replacement algorithms because:

A. Segments are better than pages
B. Pages are better than segments
C. Segments have variable sizes
D. Segments have fixed sizes

41. The importance of software design can be summarized in a single word which is

A. Efficiency
B. Accuracy
C. Quality
D. Complexity

42. A firewall is a

A. Wall built to prevent fires from damaging a corporate intranet
B. Security device deployed at the boundary of a company to prevent unauthorized physical access
C. Security device deployed at the boundary of a corporate intranet to protect it from unauthorized access
D. Device to prevent all accesses from the internet to the corporate intranet

43. Context free languages are closed under

A. Union, intersection
B. Intersection, complement
C. Union , kleene star
D. Complement, kleene star

44. Which of the following concepts means determining at runtime what method to invoke?
    A. Data hiding
    B. Dynamic Typing
    C. Dynamic binding
    D. Dynamic loading

45. The target of an assignment statement should be
    A. r-value
    B. l-value
    C. Either l-value or r-value
    D. Neither l-value nor r-value

46. The macros specified in source code are expanded by:
    A. Pre-processor
    B. Assembler
    C. Compiler
    D. Linker

47. Which of the following is not a type of constructor?
    A. Copy constructor
    B. Friend constructor
    C. Default constructor
    D. Parameterized constructor

48. On which of the following the % operator cannot be used:
    A. float variable
    B. int variable
    C. int constant
    D. All of the above

49. A turing machine operates over:
    A. Finite memory tape
    B. Infinite memory tape
    C. Depends on the algorithm
    D. None of the mentioned

50. P, O, R be regular expression over Σ, P is not ε, then R = Q + RP has a unique solution:
    A. Q*P
    B. QP*
    C. Q*P*
    D. (P*O*) *

51. Before the use of DBMS, information was stored using
    A. Data System
    B. Cloud Storage
    C. File Management System
    D. None of these

52. Write ahead logging is a way:
    A. To ensure atomicity
    B. To keep data consistent
    C. That records data on stable storage
    D. All of these

53. What is a database?
    A. Organized collection of information that cannot be accessed, updated, and managed
    B. Collection of data or information without organizing
    C. Organized collection of data or information that can be accessed, updated, and managed
    D. Organized collection of data that cannot be updated

54. Which one of the following event is not possible in wireless LAN?
    A. Collision detection
    B. Acknowledgement of data frames
    C. Multi-mode data transmission
    D. None of the mentioned

55. In the network HTTP resources are located by:
    A. Uniform resource identifier
    B. Unique resource locator
    C. Unique resource identifier
    D. None of the mentioned

56. DNS database contains:
    A. Hostname-to-address records
    B. Name server records
    C. Hostname aliases
    D. All of the mentioned

57. The file transfer protocol is built on:
    A. Data centric architecture
    B. Service oriented architecture
    C. Client server architecture
    D. None of the mentioned

58. Producer consumer problem can be solved using:
    A. Semaphores
    B. Monitors
    C. Event counters
    D. All of above

59. The bounded buffer problem is also known as:
    A. Readers – Writers problem
    B. Dining – Philosophers problem
    C. Producer – Consumer problem
    D. None of these

60. A digital signature is
    A. A bit string giving identity of a correspondent
    B. A unique identification of a sender
    C. An authentication of an electronic record by tying it uniquely to a key only a sender knows
    D. An encrypted signature of a sender

61. In asymmetric key cryptography, the private key is kept by
    A. Sender
    B. Receiver
    C. Sender and receiver
    D. All the connected devices to the network

62. Cryptanalysis is used:
    A. To find some insecurity in a cryptographic scheme
    B. To increase the speed
    C. To encrypt the data
    D. None of the mentioned

63. What is the first step in the software development lifecycle?
    A. System Design
    B. Coding
    C. System Testing
    D. Preliminary Investigation and Analysis

64. IC chips used in computers are usually made of
    A. Lead
    B. Silicon
    C. Chromium
    D. Gold

65. Entities having Primary key are called
    A. Primary entities
    B. Weak entities
    C. Strong entities
    D. Standard entities

66. Which of the following refers to the associative memory?
    A. The address of the data is generated by the CPU
    B. The address of the data is supplied by the users
    C. There is no need for an address i.e. the data is used as an address
    D. The data are accessed sequentially

67. The time required for the fetching and execution of one simple machine instruction is called as
    A. Delay time
    B. CPU cycle
    C. Real time
    D. Seek time

68. Project join normal form is also referred to as

A. Second Normal Form
B. Third Normal Form
C. Fourth Normal Form
D. Fifth Normal Form

69. The tracks on a disk which can be accused without repositioning the R/W heads is called as

A. Surface
B. Cylinder
C. Cluster
D. All of the above

70. Which of the following is the 1's complement of 00111011

A. 11110000
B. 00001111
C. 10101010
D. 11000100

71. A station in a network forwards incoming packets by placing them on its shortest output queue. What routing algorithm is being used?

A. Hot potato routing
B. Flooding
C. Static routing
D. Delta routing

72. Which strings are valid for Regular Expression aa(bb)*

A. bb, bbbb, bbbbbb,...
B. abb, abbbb, abbbbbb,...
C. aabb, aabbbb, aabbb,...
D. aabb, aabbbb, aabbbb,...

73. Regular expression for all strings starts with ab and ends with b defined over {a,b}

A. ab(a+b)b
B. ab(a+b)* b
C. ab*b
D. a*b*

74. Which of the following is/are example(s) of stateful application layer protocol?

(i) HTTP
(ii) FTP
(iii) TCP
(iv) POP3

A. (i) and (ii) only
B. (ii) and (iii) only
C. (ii) and (iv) only
D. (iv) only

75. A language is regular if and only if it is accepted by a

A. Finite automata
B. Non-finite automata
C. Pushdown automata
D. Pushdown deterministic automata

76. The Management Information system (MIS) structure with one main computer system is called a

A. Hierarchical MIS structure
B. Distributed MIS structure
C. Centralized MIS structure
D. Decentralized MIS structure

77. In a JK flip-flop, if J = K, the resulting flip-flop is referred to as a

A. D-flip-flop
B. T flip-flop
C. SR flip-flop
D. None of these

78. When we convert $123.125_{(10)}$ decimal number into octal and hexadecimal numbers we get

A. 173.125 and 7B.2
B. 173.1 and 7B.2
C. 123.125 and 123.125
D. 173 and 7B

79. Predict the output of the program:

```
main()
{ int i=100, j=5, r=20;
printf("%o\n", i+j-r);
}
```

A. 100
B. 85
C. 125
D. 20

80. SELECT operation in SQL is equivalent to

A. The selection operation in relational algebra, except that SELECT in SQL retains duplicates
B. The projection operation in relational algebra
C. The projection operation in relational algebra, except that SELECT in SQL retains duplicates
D. The selection operation in relational algebra

81. Banker's algorithm is used as

A. Deadlock occurrence method
B. Deadlock avoidance method
C. Deadlock detection method
D. Deadlock recovery method

82. Belady's Anomaly is a behavior of which page replacement algorithm?

A. FIFO
B. Optimal
C. Circular FIFO
D. LRU

83. In SQL, which command(s) is(are) used to enable/disable all triggers on a table?

A. ALTER TRIGGERS
B. ALTER TABLE
C. MODIFY TRIGGERS IN TABLE
D. All of the above

84. In which addressing mode the effective address of the operand is the contents of a register specified in the instruction and after accessing the operand, the contents of this register is incremented to point to the next item in the list?

A. Index addressing
B. Indirect addressing
C. Auto increment
D. Auto decrement

85. Consider the following transaction involving two bank accounts x and y. read (x) ; $x := x - 50$; write (x); read (y); $y := y + 50$; write (y)

The constraint that the sum of the accounts x and y should remain constant is that of

A. Atomicity
B. Consistency
C. Isolation
D. Durability

86. The average time necessary for the correct sector of a disk to arrive at the read-write head is called

A. Down time
B. Seek time
C. Access time
D. Rotational delay

87. The in-order and pre-order tree traversal outputs of a binary tree are D C B A and A B C D. 'Then the post-order tree traversal output would be

A. A B C D
B. D C B A
C. B A D C
D. C D A B

88. Consider an implementation of unsorted single linked list. Suppose it has its representation with a head and a tail pointer (i.e. pointers to the first and last nodes of the linked list). Given the representation, which of the following operation can not be implemented in O(1) time?
    A. Insertion at the front of the linked list
    B. Insertion at the end of the linked list
    C. Deletion of the front node of the linked list
    D. Deletion of the last node of the linked list

89. Given a list of unsorted numbers with duplicates, to remove the duplicates and to retain single occurrence of each number, using the best approach, the time complexity would be
    A. O(1)
    B. $O(\log_2 n)$
    C. O(n)
    D. $O(n \log_2 n)$

90. A bit-stuffing based framing protocol uses an 8-bit delimiter pattern of 01111110. If the output bit-string after stuffing is 01111100101, then the input bit-string is
    A. 0111110101
    B. 0111110100
    C. 0111111101
    D. 0111111111

91. An organization has a class B network and wishes to form subnets for 64 departments. The subnet mask would be:
    A. 255.255.0.0
    B. 255.255.64.0
    C. 255.255.128.0
    D. 255.255.252.0

92. All pair shortest paths problem is efficiently solved using:
    A. Bellman-Ford algorithm
    B. Dijkstra' algorithm
    C. Floyd-Warshall algorithm
    D. Kruskal algorithm

93. What is the function of control unit?
    A. To transfer data to primary storage
    B. To store program instructions
    C. To perform logic operations
    D. To decode program instructions

94. The 2's compliment of a binary number is obtained by adding ———————— to its compliment.
    A. 0 B. 1
    C. 10 D. 12

95. The two statements that can be used to change the flow of control are
    A. If and while B. If and switch
    C. Switch and do-while D. Break and continue

96. A one dimensional array 'a' has indices 1 to 75. Each element of the array takes up a memory of three words. The array is stored starting at location 1120. The starting address of a[49] is
    A. 1164 B. 1264
    C. 1386 D. 1451

97. The number of nodes in a full binary tree of 5 levels is (assuming that the root is at level 0)
    A. 15 B. 25
    C. 33 D. 63

98. Which can detect two bit errors?
    A. Parity check
    B. Cyclic redundancy check
    C. Parity and Cyclic redundancy check
    D. None of the mentioned

99. Virtual memory allows:
    A. Execution of a process that may not be completely in memory
    B. A program to be smaller than the physical memory
    C. A program to be larger than the secondary storage
    D. Execution of a process without being in physical memory

100. Four necessary conditions for deadlock are non pre-emption, circular wait, hold and wait and
    A. Mutual exclusion B. Race condition
    C. Buffer overflow D. None of above

———————

ANSWER SHEET

1	A	B	C	D	E	26	A	B	C	D	E	51	A	B	C	D	E	76	A	B	C	D	E
2	A	B	C	D	E	27	A	B	C	D	E	52	A	B	C	D	E	77	A	B	C	D	E
3	A	B	C	D	E	28	A	B	C	D	E	53	A	B	C	D	E	78	A	B	C	D	E
4	A	B	C	D	E	29	A	B	C	D	E	54	A	B	C	D	E	79	A	B	C	D	E
5	A	B	C	D	E	30	A	B	C	D	E	55	A	B	C	D	E	80	A	B	C	D	E
6	A	B	C	D	E	31	A	B	C	D	E	56	A	B	C	D	E	81	A	B	C	D	E
7	A	B	C	D	E	32	A	B	C	D	E	57	A	B	C	D	E	82	A	B	C	D	E
8	A	B	C	D	E	33	A	B	C	D	E	58	A	B	C	D	E	83	A	B	C	D	E
9	A	B	C	D	E	34	A	B	C	D	E	59	A	B	C	D	E	84	A	B	C	D	E
10	A	B	C	D	E	35	A	B	C	D	E	60	A	B	C	D	E	85	A	B	C	D	E
11	A	B	C	D	E	36	A	B	C	D	E	61	A	B	C	D	E	86	A	B	C	D	E
12	A	B	C	D	E	37	A	B	C	D	E	62	A	B	C	D	E	87	A	B	C	D	E
13	A	B	C	D	E	38	A	B	C	D	E	63	A	B	C	D	E	88	A	B	C	D	E
14	A	B	C	D	E	39	A	B	C	D	E	64	A	B	C	D	E	89	A	B	C	D	E
15	A	B	C	D	E	40	A	B	C	D	E	65	A	B	C	D	E	90	A	B	C	D	E
16	A	B	C	D	E	41	A	B	C	D	E	66	A	B	C	D	E	91	A	B	C	D	E
17	A	B	C	D	E	42	A	B	C	D	E	67	A	B	C	D	E	92	A	B	C	D	E
18	A	B	C	D	E	43	A	B	C	D	E	68	A	B	C	D	E	93	A	B	C	D	E
19	A	B	C	D	E	44	A	B	C	D	E	69	A	B	C	D	E	94	A	B	C	D	E
20	A	B	C	D	E	45	A	B	C	D	E	70	A	B	C	D	E	95	A	B	C	D	E
21	A	B	C	D	E	46	A	B	C	D	E	71	A	B	C	D	E	96	A	B	C	D	E
22	A	B	C	D	E	47	A	B	C	D	E	72	A	B	C	D	E	97	A	B	C	D	E
23	A	B	C	D	E	48	A	B	C	D	E	73	A	B	C	D	E	98	A	B	C	D	E
24	A	B	C	D	E	49	A	B	C	D	E	74	A	B	C	D	E	99	A	B	C	D	E
25	A	B	C	D	E	50	A	B	C	D	E	75	A	B	C	D	E	100	A	B	C	D	E

ROUGH WORK

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