

Code No.

**R – 2129**

**Entrance Examination for Admission to the M.Tech. Courses in the  
Teaching Departments, 2023**

**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. Probability that two randomly selected cards from a set of two red and two black cards are of the same colour is?
  - a)  $\frac{2}{3}$
  - b)  $\frac{1}{3}$
  - c)  $\frac{1}{2}$
  - d) 1

DO NOT WRITE HERE

- 
2. Which of the following logic expressions is wrong?
- |                    |                    |
|--------------------|--------------------|
| a) $0 + 1 = 1$     | b) $1 + 1 = 0$     |
| c) $1 + 0 + 1 = 1$ | d) $1 + 1 + 1 = 1$ |
3. If the primal Linear Programming Problem has unbounded solution, then it's dual problem will have?
- |                               |                                |
|-------------------------------|--------------------------------|
| a) Alternative solution       | b) Feasible solution           |
| c) No bounded solution at all | d) No feasible solution at all |

4. Let A and B be any two arbitrary events then which one of the following is true?
- $P(A \text{ intersection } B) = P(A) \cdot P(B)$
  - $P(A \text{ union } B) = P(A) + P(B)$
  - $P(AB) = P(A \text{ intersection } B) \cdot P(B)$
  - $P(A \text{ union } B) \geq P(A) + P(B)$
5. What is the median of the following set of scores?  
18, 6, 12, 10, 14
- 10
  - 14
  - 18
  - 12
6. The domain D of the relation R is defined as the
- Set of all first elements of ordered pair which belongs to R
  - Set of all elements of ordered pair which belongs to R
  - Set of all last elements of ordered pair which belongs to R
  - None of these
7. If two sets A and B have no common elements then such sets are known as?
- Union
  - Intersection
  - Disjoint
  - Complement
8. Let R be a symmetric and transitive relation on a set A. Then?
- R is reflexive and hence a partial order
  - R is reflexive and hence an equivalence relation
  - R is not reflexive and hence not an equivalence relation
  - None of above
9. The minimum number of cards to be dealt from an arbitrarily shuffled deck of 52 cards to guarantee that three cards are from the same suit is?
- 12
  - 9
  - 8
  - 3

10. A circle if scaled in only one dimension becomes
- a) Parabola
  - b) Hyperbola
  - c) Ellipse
  - d) Remains as circle only
11. If one measure has a reliability of 0.80 and the reliability of another measure is 0.30, then what is the maximum value that the correlation between these two variables may have?
- a) 0.55
  - b) 1.1
  - c) 0.24
  - d) 0.49
12. If any two adjacent rows or columns of a determinant are interchanged in position, the value of the determinant:
- a) Becomes zero
  - b) Remain the same
  - c) Changes its sign
  - d) Becomes infinitive
13. Let  $G$  be a group of order 6, and  $H$  be a subgroup of  $G$  such that  $1 < |H| < 6$ . Which one of the option is correct?
- a) Both  $G$  and  $H$  are always cyclic
  - b)  $G$  may not be cyclic, but  $H$  is always cyclic
  - c)  $G$  is always cyclic, but  $H$  may not be cyclic
  - d) Both  $G$  and  $H$  may not be cyclic
14. Which of the following is the principal conjunctive normal form for  $[(p \vee q) \wedge \sim p \rightarrow \sim q]$ ?
- a)  $p \vee q$
  - b)  $\sim p \vee q$
  - c)  $\sim p \vee \sim q$
  - d)  $p \vee \sim q$

15. Which one of the following is NOT necessarily a property of a group?
- a) Commutativity
  - b) Associativity
  - c) Existence of inverse for every element
  - d) Existence of identity
16. 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
17. Which of the following is a universal gate?
- a) NAND
  - b) AND
  - c) EX-OR
  - d) OR
18. The maximum value that a two byte integer variable can have
- a) -32768
  - b) 32767
  - c) 1024
  - d) 0
19. Semiconductor memory is:
- a) A volatile memory
  - b) Somewhat slower than magnetic core memory
  - c) A non-volatile memory
  - d) None of these
20. Stored program concept was introduced by
- a) Pascal
  - b) Stallman
  - c) Von Neumann
  - d) Kernighan

21. The binary equivalent of a hexadecimal number FA is:
- a) 10101010
  - b) 11111010
  - c) 11111111
  - d) 00000000
22. The operation which is commutative, but not associative is:
- a) OR
  - b) AND
  - c) NAND
  - d) None of these
23. A NOR gate recognizes only the input word whose bits are?
- a) 1's
  - b) 0's
  - c) 0's and 1's
  - d) None of the above
24. How many 3 to 8 decodes with an enable input are needed to construct a constant 6 to 64 line decoder without using any other logic gates?
- a) 7
  - b) 8
  - c) 9
  - d) 10
25. If there are m input lines and n output lines for a decoder that is used to uniquely address a byte addressable 1 KB RAM, then the minimum value of m + n is
- a) 1014
  - b) 1024
  - c) 1044
  - d) 1034
26. Which of the following bit-wise operator cannot be used to decide whether a given integer is odd or even?
- a) Bit-wise OR operator
  - b) Bit-wise AND operator
  - c) Bit-wise complement operator
  - d) Bit-wise XOR operator
27. Data hazards occur when
- a) Greater performance loss
  - b) Pipeline changes the order of read/write access to operands
  - c) Some functional unit is not fully pipelined
  - d) Machine size is limited

28. 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
29. A Computer handles several interrupt sources of which the following are relevant for this question: Which one these will be handled at the HIGHEST priority?
- a) Interrupt from CPU temperature sensor (raises interrupt if CPU temperature is too high)
  - b) Interrupt from Mouse (raises interrupt if the mouse is moved or a button is pressed)
  - c) Interrupt from keyboard (raises interrupt when a key is pressed or release)
  - d) Interrupt from Hard Disk (raises interrupt when a disk read is completed)
30. Listed below are some operating system abstractions (in the left column) and the hardware components (in the right column)
- | List I                                 | List II                                |
|--|--|
| (A) Thread                             | (i) Interrupt                          |
| (B) Virtual Address space              | (ii) Memory                            |
| (C) File System                        | (iii) CPU                              |
| (D) Signal                             | (iv) Disk                              |
| a) (A)-(ii) (B)-(iv) (C)-(iii) (D)-(i) | b) (A)-(i) (B)-(ii) (C)-(iii) (D)-(iv) |
| c) (A)-(iii) (B)-(ii) (C)-(iv) (D)-(i) | d) (A)-(iv) (B)-(i) (C)-(ii) (D)-(iii) |
31. Consider the following Boolean function with four variables  $F(w,x,y,z)=\Sigma(1,3,4,6,9,11,12,14)$  the function is
- a) Independent of one variable
  - b) Independent of two variables
  - c) Independent of three variables
  - d) Dependent on all variables

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36. In a binary tree, if the In-order traversal output is the reverse of the Pre-order traversal output, then the binary tree is:
- a) Completely balanced
  - b) Right skewed
  - c) Left skewed
  - d) None of the above
37. All pair shortest paths problem is efficiently solved using:
- a) Bellman-Ford algorithm
  - b) Dijkstra' algorithm
  - c) Floyd-Warshall algorithm
  - d) Kruskal algorithm
38. If G is an undirected planner graph on n vertices with e edges then?
- a)  $e \leq n$
  - b)  $e \leq 2n$
  - c)  $e \leq 3n$
  - d) none of these
39. In a tree, between every pair of vertices there is?
- a) Exactly one path
  - b) A self-loop
  - c) Two circuits
  - d) N number of paths
40. The minimum number of nodes in a binary tree of depth d (root at level 0) is
- a)  $d+1$
  - b) d
  - c)  $2^d - 1$
  - d)  $2^d + 1$
41. In a binary tree, if both the In-order traversal output and Pre-order traversal output are same, then the binary tree is:
- a) Completely balanced
  - b) Left skewed
  - c) Right skewed
  - d) Height balanced
42. Which of the following problems is not NP complete?
- a) Hamiltonian circuit
  - b) Bin packing
  - c) Halting problem
  - d) Partition problem

43. 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
44. 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
45. What is the output of the program?
- ```
#include<stdio.h>
void main()
{
    printf("nnn /n/n nnn/n");
}
```
- a) nnn /n/n nnn
  - b) nn /n/n
  - c) syntax error
  - d) compilation error
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. What is the output of the program?

```
#include<stdio.h>

void main()
{
    int i=4, j=6,k,1;          float a,b;
    k = i/j*j;                1 = j/j*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) None of the above

50. Which of the following is false in C or C++?

- a) Capital letters can be used in variable names
- b) Keywords cannot be used as variable names
- c) Variable names can contain a digit
- d) Variable names do not contain a blank space

51. 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

52. Which one of the following statement is false?

- a) Context-free languages are closed under union
- b) Context-free languages are closed under concatenation
- c) Context-free languages are closed under intersection
- d) Context-free languages are closed under Kleene closure

53. A Pushdown automata is \_\_\_\_\_ if there is at most one transition applicable to each configuration.
- a) Deterministic
  - b) Non Deterministic
  - c) Finite
  - d) Non Finite
54. Parsing is also known as:
- a) Lexical analysis
  - b) Semantic analysis
  - c) Syntax analysis
  - d) Code analysis
55. The graphical representation of the transition of finite automata is?
- a) Finite diagram
  - b) E-R diagram
  - c) Node diagram
  - d) State diagram
56. A turing machine operates over:
- a) finite memory tape
  - b) infinite memory tape
  - c) depends on the algorithm
  - d) none of the mentioned
57. The ability for a system of instructions to simulate a Turing Machine is called
- a) Turing Completeness
  - b) Simulation
  - c) Turing Halting
  - d) None of the mentioned
58. The minimum number of states required to recognize an octal number divisible by 3 are/is
- a) 1
  - b) 3
  - c) 5
  - d) 7
59. A finite automaton accepts which type of language:
- a) Type 0
  - b) Type 1
  - c) Type 2
  - d) Type 3

60.  $P, Q, R$  be regular expression over  $\Sigma$ ,  $P$  is not  $\epsilon$ , then  $R = Q + RP$  has a unique solution:
- a)  $Q^*P$
  - b)  $QP^*$
  - c)  $Q^*P^*$
  - d)  $(P^*Q)^*$
61. A trigger is:
- a) A statement that enables to start any DBMS
  - b) A statement that is automatically executed by the system as a side effect of modification to the database
  - c) A statement that is executed by the user when debugging an application program
  - d) A condition the system tests for the validity of the database user
62. The undo and redo operations must be \_\_\_\_\_ to guarantee correct behaviour, even if a failure occurs during recovery process.
- a) Idempotent
  - b) Easy
  - c) Protected
  - d) All of these
63. 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
64. 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) None of these

65. Disadvantages of file systems to store data:
- a) Data redundancy and inconsistency
  - b) Difficulty in accessing data
  - c) Data isolation
  - d) All of the above
66. Before the use of DBMS, information was stored using
- a) Data System
  - b) Cloud Storage
  - c) File Management System
  - d) None of these
67. 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
68. A \_\_\_\_\_ consists of a sequence of query and/or update statements.
- a) Transaction
  - b) Commit
  - c) Rollback
  - d) Flashback
69. Data about data is called
- a) Table
  - b) Database
  - c) Integration
  - d) Metadata
70. 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

71. If there are  $N$  routers from source to destination, then total end to end delay in sending packet  $P$  is (where  $L$  is the number of bits in the packet and  $R$  is the transmission rate):
- a)  $N$
  - b)  $(2N*L)/R$
  - c)  $(N*L)/R$
  - d)  $L/R$
72. 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
73. 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
74. 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
75. Which standard TCP port is assigned for contacting SSH servers?
- a) port 21
  - b) port 22
  - c) port 23
  - d) port 24

76. DNS database contains:
- a) hostname-to-address records
  - b) name server records
  - c) hostname aliases
  - d) all of the mentioned
77. Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?
- a) CDMA
  - b) ALOHA
  - c) CSMA/CA
  - d) None of the mentioned
78. The file transfer protocol is built on:
- a) data centric architecture
  - b) service oriented architecture
  - c) client server architecture
  - d) none of the mentioned
79. Which one of the following is a cryptographic protocol used to secure HTTP connection?
- a) Stream Control Transmission Protocol (SCTP)
  - b) Transport Layer Security (TSL)
  - c) Explicit Congestion Notification (ECN)
  - d) Resource Reservation Protocol
80. In which topology there is a central controller or hub?
- a) Star
  - b) Mesh
  - c) Ring
  - d) Bus
81. Producer consumer problem can be solved using:
- a) Semaphores
  - b) Monitors
  - c) Event counters
  - d) All of above



82. What is the mounting of file system?
- a) crating of a file system
  - b) deleting a file system
  - c) attaching portion of the file system into a directory structure
  - d) removing portion of the file system into a directory structure
83. The ability to execute a program that is only partially in memory has benefits like: (choose the odd one)
- a) The amount of physical memory cannot put a constraint on the program
  - b) Programs for an extremely large virtual space can be created
  - c) CPU utilization increases
  - d) Less I/O will be needed to load or swap each user program in memory
84. 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 :
- 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

85. To access the services of the operating system, the interface is provided by the
- a) Library
  - b) Assembly instructions
  - c) System calls
  - d) API
86. The bounded buffer problem is also known as:
- a) Readers — Writers problem
  - b) Dining — Philosophers problem
  - c) Producer — Consumer problem
  - d) None of these
87. 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
88. What is the main function of the command interpreter?
- a) to provide the interface between the API and application program
  - b) to handle the files in the operating system
  - c) to only interpret statements
  - d) to get and execute the next user – specified command
89. Among the following system softwares, which one always resides in main memory?
- a) Text editor
  - b) Linker
  - c) Loader
  - d) Assembler

90. 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
91. What is Cyclomatic complexity?
- a) Black box testing
  - b) White box testing
  - c) Yellow box testing
  - d) Green box testing
92. 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
93. 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
94. 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

95. Which of the following term describes testing?
- a) Finding broken code
  - b) Evaluating deliverable to find errors
  - c) A stage of all projects
  - d) None of the mentioned
96. What is Data Encryption Standard (DES)?
- a) block cipher
  - b) stream cipher
  - c) bit cipher
  - d) none of the mentioned
97. The importance of software design can be summarized in a single word which is:
- a) Efficiency
  - b) Accuracy
  - c) Quality
  - d) Complexity
98. Choose among the following technique, which is used to hide information inside a picture.
- a) Image rendering
  - b) Rootkits
  - c) Steganography
  - d) Bitmapping
99. 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
100. What is the first step in the software development lifecycle?
- a) System Design
  - b) Coding
  - c) System Testing
  - d) Preliminary Investigation and Analysis

# 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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