Total No. of Printed Pages: 21

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# A

## Ph.D./URS-EE-Jan-2022

SET-Y

10001

SUBJECT: Computer Science

		Sr. No
Time: 1¼ Hours	Max. Marks : 100	Total Questions : 100
Roll No. (in figures)	(in words)	
Name	Father's Name	,
Mother's Name	Date of Examination_	
(Signature of the Candidate)	_	(Signature of the Invigilator)

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- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

	1.	How is a J-K Flip Flop made to toggle?	
,		(1) $J = 0, K = 0$	(2) $J = 1, K = 0$
		(3) $J = 0, K = 1$	(4) $J = I, K = I$
	2.	In which 0SI layers does the FDDI proto	ocol operate?
		(I) Physical	(II) Data link
		(III) Network	
		(1) I and II	(2) II and III
		(3) I and III	(4) None
	3.	Number of flip-flops used in decade cou	inter:
		(1) 3	(2) 2
		(3) 4	(4) None of these
	4.	The Octal number equivalent of the dec	imal number 489 is :
		(1) 750	(2) 752
		(3) 329	(4) 751
	5.	If the size of the stack is 10 and we trecondition is known as:	y to add the 11th element in the stack then the
		(1) Underflow	(2) Garbage collection
		(3) Overflow	(4) None
	6.	,	ress on Ethernet: 172.16.2,1/23. Which of the
		following can be valid host IDs on the l	
		(i) 172.16.1.100 (ii) 172.16.1.198 (iii) 1	72.16.2.255 (iv) 172.16.3.0
		(1) (i) only	(2) (ii) and (iii) only
		(3) (iii) and (iv) only	(4) None of these
	7.	If the baud rate is 400 for a 4-PSK sign	al, the bit rate is bps.
		(1) 1600	(2) 800
	,	(3) 400	(4) 100
PI	H <b>D</b> /\	URS-EE-2022/(Computer Science)(SE	T-Y)/(A) P. T. O.

8.	A binary search tree whose left subtree and right subtree differ in height by at most I unit is called
	(1) Lemma tree (2) Red Black tree
	(3) AVL tree (4) None of the above
9.	What will be the output of the following C code'?
	#include <stdio.h></stdio.h>
	int main()
, .	{ inf const a = 5;
	a++;
	printf("%d",a);
	}
	(1) 5
1.	(3) Compile time error (4) Runtime error
10.	Which of the following option is <i>not</i> correct?
9	(1) If the queue is implemented with a linked list, keeping track of a front pointer, Only rear pointers will change during an insertion into an non-empty queue.
	(2) Queue data structure can be used to implement least recently used (LRU) page fault algorithm and Quick short algorithm.
	(3) Queue data structure can be used to implement Quick short algorithm but not least recently used (LRU) page fault algorithm.
	(4) Both (1) and (3)
11.	The best data structure to check whether an arithmetic expression has balanced parentheses is a:
	(1) stack (2) queue
	(3) tree (4) list
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12、	In inheritance, order of execution of base	e class and derived class destructors are :
	(1) Base to derived	(2) Derived to base
	(3) Random order	(4) none
13.	What logic function is obtained by addir	ng an inverter to the inputs of an OR gate?
	(1) OR	(2) NAND
	(3) XOR	(4) NOR
14.	A C program contains the following dec	claration:
=	static int $X(8) = \{10, 20, 30, 40, 50, 60, 60, 60, 60, 60, 60, 60, 60, 60, 6$	, 70, 80}
	What are the values of (*X +2) and *(X-	+2) ?
	(1) 10, 30	(2) 10, 32
	(3) 30, 12	(4) 12, 30
15.	Which of the application layer loT Proto	ocols uses telemetry communication pattern?
	(1) COAP	(2) MQTT
	(3) AMQP	(4) None of the above
16.	Suppose V is a signed 16-bit integer with the result of V<<4?	ith hexadecimal value $0 \times 369$ C. What will be
	(1) $0 \times 669$ C	(2) 0 × 69C0
	$(3) 0 \times 0369$	(4) None of the above
17.	A computer has five resources, with a may need two resources. What is the deadlock free?	processes competing for them. Each process maximum value of $n$ for the system to be
	(1) 5	(2) 4
	(3) 3	(4) 2
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T.	(1) mutual exclusion	uired for a deadlock to be possible?
		esources while awaiting assignment of other
	<ul><li>(3) no resource can be forcibly remove</li><li>(4) all of the mentioned</li></ul>	d from a process holding it
19.	Let G be a simple undirected planar connected graph, then the number of plane is equal to:	graph of 10 vertices with 15 edges. If G is a bounded faces in any embedding of G on the
	(1) 6	(2) 5
	(3) 4	(4) 3
20.	$(p \to r) \lor (q \to r)$ is logically equivalent	ent to :
	(1) $(p \wedge q) \vee r$	$(2) (p \lor q) \to r$
	$(3) (p \land q) \rightarrow r$	(2) $(p \lor q) \to r$ (4) $(p \to q) \to r$
21.	What must be the base of the number, i	f expression $4 + 2 = 11$ is true?
	(1) 7	(2) 6
	(3) 5	(4) 4
22.	input values will cause an AND	logic gate to produce a HIGH output.
	(1) At least one input is HIGH	(2) At least one input is LOW
	(3) All inputs are LOW	(4) All inputs are HIGH
23.	Which of the following set of gates can	be used in a Full-Adder?
	(1) Two half-adders and one OR gate	film and the particular of the
	(2) Two OR gates and one half-adder	
	(3) One half-adder and two OR gates	
	(4) One OR gate and one half-adder	
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24.		pressive power ?
	(1) Deterministic finite automata(DFA) and N	
	(2) Deterministic push down automata(DPI automata(NPDA)	the state of the s
	(3) Deterministic single-tape Turing machine	ne and Non-deterministic single-tape
	(4) Single-tape Turing machine and multi-tape	Turing machine
25.	<ol> <li>A combinational logic circuit which is used whose source through a single transmission line</li> </ol>	
	(1) encoder (2) d	ecoder
	(3) multiplexer (4) d	emultiplexer
26.	6. Which one of the following RAID levels prostorage?	ovides the maximum reliability of data
1	(1) RAID 10 (2) R	AID 4
	(3) RAID 5 (4) R	AID 6
27.	7. How long is an IPv4 and IPv6 address respecti	vely?
	(1) 64 bits, 32 bits (2) 3	2bits, 64 bits
	(3) 128bits, 32 bits (4) 3	2 bits, 128 bits
28.	3. Which binary number represents 2' complement	it of the Hexadecimal number DEAF?
	(1) 0010 0001 0101 0111 (2) 1	101 1110 1010 1111
	(3) 0010 0001 0101 0011 (4) 0	010 0001 0101 0001
29.	9. Which of the following services use TCP?	and the second s
	(i) DHCP (ii) SMTP (iii) HTTP (iv) TFTP (v)	FTP
	(1) (i) and (ii) (2) (	i), (iii) and (v)
	(3) (i), (ii) and (iv) (4) (	), (iii) and (iv)

30,	Identify the correct statement about the application of XML?
	(1) XML must be used to produce XML and HTML output.
	(2) XML can not specify or contain presentation information
	(3) XML is used to describe hierarchically organized information.
	(4) XML performs the conversion of information between different e-busines applications.
31.	The web browser request goes to the server in:
	(1) Hex form (2) ASCII form
	(3) Binary form (4) Text form
32.	What does error 404 or Not Found error while accessing a URL mean?
	(1) The server could not find the requested URL
	(2) Requested HTML file is not available
	(3) The path to the interpreter of the script is not valid
	(4) The requested HTML file does not have sufficient permissions
33.	Which of the following can be used to store 1 bit of data?
	(1) Encoder (2) OR gate
	(3) Flip-Flop (4) Decoder
34.	Which one of the following about the MIPS rating of a computer is FALSE?
	(1) MIPS rating of a computer depends on the compiler being used
. /	(2) MIPS rating of a processor is independent of the Program is being executed
	(3) MIPS rating of a computer can vary based on which instructions of a processor are being considered.
	(4) MIPS rating of a computer depends upon the clock rate of the processor
35.	The interval from the time of submission of a process to the time of completion is termed as:
· .	(1) waiting time (2) turn around time

(4) throughput

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(3) response time

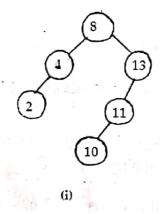
36.	In FTP protocol, client contacts server using as the transport protocol.
	(1) transmission control protocol
	(2) user datagram protocol
	(3) datagram congestion control protocol
	(4) stream control transmission protocol
37.	Which of the following would cause the Page Fault frequency in an operating system to reduce?
	(1) Cache memory size is increased
	(2) Size of pages is reduced
	(3) Executing processes remain CPU bound
7 .	(4) Executing processes exhibit high locality of reference
38.	The technique of memory compaction and reuse of memory can be applied to overcome the problem of:
	(1) External fragmentation (2) Internal Fragmentation
	(3) Page Fault (4) Swapping
39.	For a 10 Mbps Ethernet link, if the length of the packet is 32 bits, the transmission delay is (in microseconds).
	(1) 3.2
	(3) 0.32 (4) 320
40.	the Continuous are reasonized during
40.	(1) the code generation (2) the lexical analysis of the program
	(3) parsing of the program (4) data flow analysis
	(3) parsing of the program
41.	The set { 1, 2, 4, 7, 8,11,13, 14} is a group under multiplication modulo 15. The inverses of 4 and 7 are respectively:
	(1) 3 and 13 (2) 2 and 11
	(3) 4 and 13 (4) 8 and 14
	P.T.O

- 42. Thread synchronization is required because:
  - (1) all threads of a process share the same address space
  - (2) all threads of a process share the same global variables
  - (3) all threads of a process can share the same files
  - (4) all of the mentioned
- **43.** In the transfer of file between server and client, if the transmission rates along the path is 10 Mbps, 20 Mbps, 30 Mbps, 40 Mbps. The throughput is usually:
  - (1) 10 Mbps

(2) 20 Mbps

(3) 40 Mbps

- (4) 50 Mbps
- 44. Which of the below diagram is following AVL tree property?



(ii) 8 (iii) (iii) (iii) (iii)

(1) only i

(2) only ii

(3) Both i and ii

- (4) i is not a binary search tree
- 45. A connected planar graph having 6 vertices, 7 edges contains ...... regions.
  - (1) 15

(2) 3

(3) 1

- (4) 11
- **46.** Which of the following statements are *correct*?

S1:  $\{02n \mid n \ge 1\}$  is a regular language

S2:  $\{0m\ 0n\ 0(m+n)\ Im > = 1\ and\ n > = 2\}$  is a regular language

(1) S2 Only

(2) S1 Only

(3) Both SI and S2

(4) None of S1 and S2 is correct

47.	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'?
	(1) Each leaf node has a pointer to the next leaf node
•	(2) Non-leaf nodes have pointers to data records
	(3) B+ Tree is a height-balanced tree
· ,	(4) Key values in each node are kept in sorted order
48.	The Viewing plane or the projector is set up in which of the following position?
,	(1) Perpendicular to x and aligned with y, z
. 23	(2) Perpendicular to y and aligned with x, z
	(3) At origin
4	(4) Perpendicular to z and aligned with x, y
49.	What is the file size of a 640 by 480 pictures of 256 colours in a 8- bit resolution?
	(1) 128 KB (2) 300 KB
1 37	(3) 900 KB (4) 1024 KB
50.	Which of the following is TRUE?  (1) Every relation in 3NF is also in BCNF  (2) A relation R is in 3NF if every non prime attribute of R is fully functionally
	dependent on every key of R
	<ul><li>(3) Every relation in BCNF is also in 3NF</li><li>(4) No relation can be in both BCNF and 3NF</li></ul>
51.	Which transformation distorts the shape of an object such that the transformed shape appears as if the object were composed of internal layers that had been caused to slide over each other?
	(1) Rotation (2) Scaling up
	(3) Scaling down (4) Shearing
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52.	Which of the following type of perspe lines?	ctive projection is used in drawings of railwa
	(1) Three-point	
	(2) Two-point	
	(3) One-point	
	(4) Perspective projection is not used to	draw railway lines
53.	After performing Y-shear transformation the constant value is 2, then original contains the constant value is 2.	on on triangle we get A(2,5),B(4,11),C(2,7). I ordinates will be:
	(1) A(2, 5), B(4, 11),C(2, 7)	(2) A(2, 1), B(4, 3), C(2, 3)
	(3) A(4, 1), B(10,3), C(4, 3)	(4) A(5, 11), B(3, 4),C(3, 2)
54.	In the context of modular software desirable:	gn, which one of the following combinations is
	(1) High cohesion and high coupling	(2) High cohesion and low coupling
	(3) Low cohesion and high coupling	(4) Low cohesion and low coupling
55.	GSM is an example of:	
	(1) TDMA cellular systems	(2) FDMA cellular systems
	(3) CDMA cellular systems	(4) SDMA cellular systems
56.	A key concept of quality control is that	all work products :
	(1) Are delivered on time and under bu	dget
	(2) Have complete documentation	Kind well in the Wiles, with a second
	(3) Have measurable specifications for	process outputs
	(4) Are thoroughly tested before delive	ry to the customer
57.	The theoretic concept that will be usefu	l in software testing is:
	(1) Hamiltonian circuit	(2) Cyclomatic number
	(3) Eulerian Cycle	(4) None of these
58.	Which is not a task of software Configu	ration Management?
	(1) Version control	(2) Reporting
	(3) Change management	(4) Ouality control

59.	The requirement analysis is performed in:
	(1) System design phase (2) System development phase
	(3) System analysis phase (4) System testing phase
60.	Consider the following C code. Assume that unsigned long int type length is 64 bits.
5.	unsigned long int fun(unsigned long int n) {
	unsigned long int i, j, j=0, sum = 0;
	for $(i = n; i > 1; i = i/2) j++;$
	for $(; j > 1; j = j/2)$ sum++;
	return sum;
	A Company of the contract of t
	The value returned when we call fun with the input 2 <sup>40</sup> is:
14	(1) 4
	(3) 6 (4) 40
61.	Which search is similar to minimax search?
,	(1) Hill-climbing search (2) Depth-first search
	(3) Breadth-first search (4) All of these
62.	Which of the following can be identified as the cloud?
	(1) Intranet (2) Hadoop
- 4	(3) Web applications (4) All of the above
63.	In which ANN, loops are allowed?
	(1) FeedForward ANN (2) FeedBack ANN

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(3) Both (1) and (2)

P. T. O.

(4) None of the Above

64. Choose the best matching between the Group 1 and their characteristics in Group 2.

Group - 1

Group - 2

- P Regular expression
- 1. Syntax analysis
- Q Pushdown automata
- 2. Code generation
- R Dutaflow analysis
- 3. Lexical analysis
- S Register allocation
- 4. Code optimization
- (1) P-3, Q-2, R-1, S-4

(2) P-3, Q-1, R-4, S-2

(3) P-4, Q-2, R-1, S-3

(4) P-1, Q-2, R-3, S-4

65. The total number of states required to automate the given regular expression(00)\*(11)\*

(1) 3

(2) 4

(3) 5

(4) 6

66. Consider the following Syntax Directed Translation Scheme (SDTS), with non-terminals {S, A} and terminals {a, b}}.

 $S \rightarrow aA \{\{Print 1\}\}$ 

 $S \rightarrow a \{Print 2\}$ 

 $A \rightarrow Sb \{Print 3\}$ 

(1) 132

(2) 223

(3) 231

(4) Syntax error

**67.** Which of the following is *not* a horn clause?

(1) p

(2)  $\phi p \vee q$ 

(3)  $p \rightarrow q$ 

(4)  $p \rightarrow \phi q$ 

- 68. What is recurrence for worst case of QuickSort and what is the time complexity in Worst case?
  - (1) Recurrence is T(n) = T(n-2) + O(n) and time complexity is  $O(n^2)$
  - (2) Recurrence is T(n) = T(n-1) + O(n) and time complexity is  $O(n^2)$
  - (3) Recurrence is T(n) = 2T(n/2) + O(n) and time complexity is O(nLogn)
  - (4) Recurrence is T(n) = T(n/10) + T(9n/10) + O(n) and time complexity is O(nLogn)
- 69. How many states of a DFA can be converted from an NFA with n states?
  - (1) n

(2) n2

(3) 2n

- (4) None of these
- 70. Consider the intermediate code given below:
  - 1. i = 1
  - 2. j = 1
  - 3. t1=5\*i
  - 4. t2 = t1 + j
  - 5. t3 = 4 \* t2
  - 6. t4 = t3
  - 7. a[t4] = -1
  - 8. j = j + 1
  - 9. if  $j \le 5 \gcd(3)$
  - 10. i = i + 1
  - 11. if i < 5 goto(2)

The number of nodes and edges in the control-flow-graph constructed for the above code, respectively, are:

(1) 5 and 7

(2) 6 and 7

(3) 5 and 5

(4) 7 and 8

71. Consider the 3 processes, P1, P2 and P3 shown in the table:

Process	Arr	ival time	Time I	Jnits Required
P1	,	0		5
P2		1 ,		7
P3		3		4

The completion order of the 3 processes under the policies FCFS and RR2 (round robin scheduling with CPU quantum of 2 time units) are

- (1) FCFS: P1, P2, P3 RR2: P1, P2, P3
- (2) FCFS: P1, P3, P2 RR2: P1, P3, P2
- (3) FCFS: P1, P2, P3 RR2: P1, P3, P2
- (4) FCFS: P1, P3, P2 RR2: P1, P2, P3
- 72. Consider a system with byte-addressable memory, 32 bit logical addresses, 4 kilobyte page size and page table entries of 4 bytes each. What is the size of the page table in the system?
  - (1) 4 Megabyte

(2) 4 Kilobyte

(3) 2 Megabyte

- (4) 2 Kilobyte
- 73. A virtual memory system uses First In First Out (FIFO) page replacement policy and allocates a fixed number of frames to a process. Consider the following statements:
  - P: Increasing the number of page frames allocated to a process sometimes increases the page fault rate.
  - Q: Some programs do not exhibit locality of reference.

Which one of the following is TRUE?

- (1) Both P and Q are true, and Q is the reason for P
- (2) Both P and Q are true, but Q is not the reason for P.
- (3) P is false, but Q is true
- (4) Both P and Q are false

74.	On a system using fixed partitions, all of size 28, the number of bits used by the limit
	register is :

(1) 8

(2) 64

(3) 127

(4) 256

75. Consider a disk drive with 16 surfaces, 512 tracks/surface, 512 sectors/track, 1 KB/sector, rotation speed 3000 rpm. The disk is operated in cycle stealing mode whereby whenever one byte word is ready it is sent to memory; similarly, for writing, the disk interface reads a 4 byte word from the memory in each DMA cycle. Memory cycle time is 40 nsec. The maximum percentage of time that the CPU gets blocked during DMA operation is:

(1) 10

(2) 25

(3) 40

(4) 50

**76.** G is a graph on n vertices and 2n-2 edges. The edges of G can be partitioned into two edge-disjoint spanning trees. Which of the following is NOT true for G?

- (1) For every subset of k vertices, the induced subgraph has at most 2k-2 edges
- (2) The minimum cut in G has at least two edges
- (3) There are two edge-disjoint paths between every pair to vertices
- (4) There are two vertex-disjoint paths between every pair of vertices

77. In Al, the problem space of means-end analysis has:

- (1) An initial state and one or more goal states
- (2) One or more initial states and one goal state
- (3) One or more initial states and one or more goal state
- (4) One initial state and one goal state

78. If A and B are two fuzzy sets with membership functions :  $\mu_a(\chi) = \{0.2, 0.5, 0.6, 0.1, 0.9\}$ ,  $\mu_b(\chi) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ , then the value of  $\mu_a \cup \mu_b$  will be :

- $(1) \{0.2, 0.5, 0.6, 0.7, 0.9\}$
- (2) {0.2, 0.5,0.2, 0.1,0.8}
- (3) {0.1, 0.5, 0.6, 0.1, 0.8}
- (4) {0.1, 0.5, 0.2, 0.1,0.8}

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79.	Which of the following is correct for the	neural network ?
	I The training time is dependent on the	
	II Neural networks can be simulated on	
	III Artificial neurons are identical in ope	
	(1) Lie tonie	(2) II is true
	(3) I and II are true	(4) All of the above
80.	(1) better as a second constituents until in	a sentence (the symbol S) and successively adividual pre-terminal symbols are written.
	(2)	(2) top parser
	Ib	(4) bottom parser
81.	Which one of the following is NOT Specifications(SRS) document?	desired in a good Software Requirement
	(1) Functional Requirements	(2) Non-Functional Requirements
	(3) Goals of Implementation	(4) Algorithms for Software Implementation
82.	Which of the following is a widely use based on the idea of bagging?	ed and effective machine learning algorithm
	(1) Decision Tree	(2) Regression
	(3) Classification	(4) Random Forest
83.	The transport layer protocols used for remail, respectively are:	eal time multimedia, file transfer, DNS and
	(1) TCP, UDP, UDP and TCP	Table 1
	(2) UDP, TCP, TCP and UDP	
1	(3) UDP, TCP, UDP and TCP	
	(4) TCP, UDP, TCP and UDP	
		7 R

84.	Which of the following protocols is used to map MAC address to IP address?		
	(1) ARP	(2) RAPP	
1.	(3) DNS	(4) None of the above	
85.	Packets of the same session may be rout	ed through different paths in:	
	(1) TCP, but not UDP	(2) UDP, but not TCP	
	(3) TCP and UDP	(4) Neither TCP, nor UDP	
86.		are connected through two intermediate routers each packet has to visit the network layer and from S to D.	
	(1) Network layer – 4 times and Data lin	nk layer – 4 times	
	(2) Network layer – 4 times and Data lin	nk layer – 6 times	
	(3) Network layer – 2 times and Data lin	nk layer – 6 times	
	(4) None of the above		
87.	Which of the following is/are example(s	) of stateful application layer protocols?	
	(i) HTTP	(ii) FTP	
	(iii) TCP	(iv) POP3	
	(1) (i) and (ii) only	(2) (ii) and (iii) only	
	(3) (ii) and (iv) only	(4) (iv) only	
88.	In project 802, the data link layer of sublayer.	consists of the sublayer and the	
	(1) LAN, MAC	(2) LLC, MAC	
	(3) CSMA, LLC	(4) LLC, PDU	

89.	If subnet addresses are 129.253.4.0,129 the subnet mask?	.253.8.0,129.253.13	2.0 and 129.253.16.0 What is
	(1) 129.253.7.0	(2) 129.253.31.0	1
	(3) 129.253.192.0	(4) 129.253.252.	0
90.	What is the standard length of MAC ad-	dress?	
	(1) 16bits	(2) 32 bits	
	(3) 48 bits	(4) 64 bits	
91.	Which of the following problems is NO	T NP-hard?	
	(1) Hamiltonian circuit problem	(2) The 0/1 Kna	psack Problem
	(3) The graph colouring problem	(4) None of thes	e
92.	PGP encrypts data by using a block cip	her called:	
	(1) International data encryption algori	thm	
	(2) Private data encryption algorithm		
	(3) Internet data encryption algorithm		
	(4) Local data encryption algorithm		
93.	The following numbers are inserted order: 10, 1, 3, 5, 15, 12, 16. What is the		-
	(1) 2	(2) 3	
	(3) 4	(4) 6	
94.	Correct statements about static function	in C++ code are:	
	(I) Static function of a class can be operator i.e.	called by class	name using scope resolution
	(II) Static function can receive both sta	tic and non-static c	lata members of a class
	(III) Static function is not the part of ar		
	(1) I and II	(2) I only	
	(3) I and III	(4) I, II and III	
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```
Δ
```

```
Consider the function f defined below:
     struct item
     int data;
     struct item * next;
     };
     int f(struct item *p)
     return (
         (p = NULL) \parallel
         (p->next == NULL) \parallel
         ((P->data \le p->next->data) && f(p->next))
          );
     For a given linked list p, the function f returns 1 if and only if:
     (1) the list is empty or has exactly one element
     (2) the elements in the list are sorted in non-decreasing order of data value
    · (3) the elements in the list are sorted in non-increasing order of data value
     (4) not all elements in the list have the same data value
     What is the purpose of bin directory in Linux environment?
96.
                                               (2) Contains essential binary commands
     (1) Contains essential device files
                                               (4) Contains user home directories
     (3) Containing configuration files
     The maximum number of nodes in a tree for which post-order and pre-order traversals
97.
     may be equal is:
                                              (2) 2
     (1) 1
                                               (4) any number
     (3) 3
98. In a C programming language x - y + 1 means :
                                               (2) x = x - y + 1
     (1) x = -x - y - 1
                                               (4) x = -x + y + 1
     (3) x = x - y - 1
```

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99.	A 4-input neuron has weights 1, 2, 3, and 4. The transfer function is linear, with the
	constant of proportionality being equal to 2. The inputs are 4,10,5, and 20 respectively.
1	The output will be:

(1) 76

(2) 238

(3) 123

(4) 119

100. C++ abstract class can contain:

(1) Pure virtual function

(2) Non-virtual function

(3) Only pure virtual function

(4) Both pure virtual and non-virtual function

Total No. of Printed Pages: 21

### (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU

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# ARE ASKED TO DO SO) Ph.D./URS-EE-Jan-2022

SET-Y

SUBJECT: Computer Science

10022

		Sr. No
Time: 1¼ Hours  Roll No. (in figures)	Max. Marks : 100 (in words)	Total Questions : 100
Name	Father's Name	
Mother's Name	Date of Examination_	
,		
(Signature of the Candidate)		(Signature of the Invigilator)

## CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- All questions are compulsory.
- 2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
- 5. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers *must not* be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark.

  Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

1.	The best data structure to chec parentheses is a:	k whetl	her a	an arithmetic ex	pression has	balanced
	(1) stack	. (	2) q	ueue		
	(3) tree	1   (	4) li	st		
2.	In inheritance, order of execution of	of base of	class	and derived class	s destructors a	re:
	(1) Base to derived	(	2) D	erived to base	1	
	(3) Random order	(	(4) n	one		
3.	What logic function is obtained by	adding	an ir	verter to the inpu	uts of an OR g	ate?
	(1) OR	(	(2) N	IAND		
	(3) XOR	. (	(4) N	IOR		
4.	A C program contains the following	ng decla	aratio	on:		
	static int $X(8) = \{10, 20, 30, 40, 5\}$	50, 60, 7	0, 80	)}		
	What are the values of (*X +2) and	d *(X+	2) ?	ř ř		
	(1) 10, 30	. (	(2) 1	0, 32		
	(3) 30, 12		(4) 1	2, 30		
5.	Which of the application layer loT	Protoco	ols us	ses telemetry com	nmunication p	attern?
	(1) COAP	. (	(2) N	<b>I</b> QTT		
	(3) AMQP		(4) N	lone of the above		· .
6.	Suppose V is a signed 16-bit integer the result of V<<4?	ger with	hex	adecimal value 0	0 × 369C. Wh	nat will be
	(1) 0 × 669C	(	(2) 0	× 69C0	16	
	(3) 0 × 0369	(	(4) N	None of the above		

7.	A computer has five resources, with may need two resources. What is the deadlock free?	processes competing for the maximum value of <i>n</i> for t	m. Each process he system to be
	(1) 5	(2) 4	
	(3) 3	(4) 2	
8.	Which of the following condition is requ (1) mutual exclusion	nired for a deadlock to be poss	ible?
	(2) a process may hold allocated re resources	sources while awaiting assign	gnment of other
	<ul><li>(3) no resource can be forcibly removed</li><li>(4) all of the mentioned</li></ul>	I from a process holding it	
9.	Let G be a simple undirected planar geomected graph, then the number of plane is equal to:	graph of 10 vertices with 15 bounded faces in any embedd	edges. If G is a ding of G on the
	(1) 6	(2) 5	
	(3) 4	(4) 3	
10.	$(p \rightarrow r) \lor (q \rightarrow r)$ is logically equivale	nt to:	
	(1) $(p \wedge q) \vee r$	$(2) (p \lor q) \to r$	
	$(3) (p \land q) \rightarrow r$	$(4) (p \to q) \to r$	and the second
11.	Which of the following problems is NO	ΓNP-hard?	
	(1) Hamiltonian circuit problem	(2) The 0/1 Knapsack Proble	em .
	(3) The graph colouring problem	(4) None of these	
12.	PGP encrypts data by using a block ciph	er called :	
	(1) International data encryption algorit	hm	
	(2) Private data encryption algorithm		
	(3) Internet data encryption algorithm		
	(4) Local data encryption algorithm		. '

13.	The following numbers are inserted into an empty binary search tree in the give	er
	order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree?	

(1) 2

(2) 3

(3) 4

(4) 6

### 14. Correct statements about static function in C++ code are:

- (I) Static function of a class can be called by class name using scope resolution operator i.e.
- (II) Static function can receive both static and non-static data members of a class
- (III) Static function is not the part of an object of a class
- (1) I and II

(2) 1 only

(3) I and III

(4) I, II and III

15. Consider the function f defined below:

For a given linked list p, the function f returns 1 if and only if:

- (1) the list is empty or has exactly one element
- (2) the elements in the list are sorted in non-decreasing order of data value
- (3) the elements in the list are sorted in non-increasing order of data value
- (4) not all elements in the list have the same data value

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(1) Contains essential device files

(2) Contains essential binary commands

(3) Containing configuration files

(4) Contains user home directories

17. The maximum number of nodes in a tree for which post-order and pre-order traversals may be equal is:

(1) 1

4

(2) 2

(3) 3

(4) any number

**18.** In a C programming language x - = y + 1 means :

(1) x = -x - y - 1

(2) x = x - y + 1

(3) x = x - y - 1

(4) x = -x + y + 1

19. A 4-input neuron has weights 1, 2, 3, and 4. The transfer function is linear, with the constant of proportionality being equal to 2. The inputs are 4,10,5, and 20 respectively. The output will be:

(1) 76

(2) 238

(3) 123

(4) 119

20. C++ abstract class can contain:

(1) Pure virtual function

(2) Non-virtual function

(3) Only pure virtual function

(4) Both pure virtual and non-virtual function

21. Consider the 3 processes, P1, P2 and P3 shown in the table:

Process Arrival time Time Units Required
P1 0 5
P2 1 7
P3 3 4

The completion order of the 3 processes under the policies FCFS and RR2 (round robin scheduling with CPU quantum of 2 time units) are

(1) FCFS: P1, P2, P3 RR2: P1, P2, P3

(2) FCFS: P1, P3, P2 RR2: P1, P3, P2

(3) FCFS: P1, P2, P3 RR2: P1, P3, P2

(4) FCFS: P1, P3, P2 RR2: P1, P2, P3

22.	_	•	ressable memory, 3 of 4 bytes each. Wl		
ť	(1) 4 Megabyte		(2) 4 Kilob	yte	
	(3) 2 Megabyte		(4) 2 Kilob	yte	
23.		•	rst In First Out (FI to a process. Cons		
	P: Increasing the the page fault rate		e frames allocated	to a process some	etimes increases
	Q : Some program	s do not exhibit	locality of reference	e.	
ı	Which one of the	following is TRI	JE?		
d a	(1) Both P and Q	are true, and Q i	s the reason for P	i de la companya de La companya de la co	
	(2) Both P and Q	are true, but Q is	s not the reason for	P	
	(3) P is false, but	Q is true			
	(4) Both P and Q	are false		ign in the	
24.	On a system using register is:	g fixed partitions	s, all of size 2 <sup>8</sup> , the	number of bits u	sed by the limit
	(1) 8		(2) 64		
,	(3) 127	A to	(4) 256		•
25.	KB/sector, rotation whereby whenever the disk interface in	n speed 3000 rone byte word eads a 4 byte was a 5 maxin	surfaces, 512 tracerpm. The disk is of is ready it is sent to ord from the memorum percentage of	operated in cycle to memory; simila ory in each DMA	s stealing mode orly, for writing, cycle. Memory
	(1) 10		(2) 25		
	(3) 40		(4) 50		

- 26. G is a graph on n vertices and 2n-2 edges. The edges of G can be partitioned into two edge-disjoint spanning trees. Which of the following is NOT true for G?
  - (1) For every subset of k vertices, the induced subgraph has at most 2k-2 edges
  - (2) The minimum cut in G has at least two edges
  - (3) There are two edge-disjoint paths between every pair to vertices
  - (4) There are two vertex-disjoint paths between every pair of vertices
- 27. In Al, the problem space of means-end analysis has:
  - (1) An initial state and one or more goal states
  - (2) One or more initial states and one goal state
  - (3) One or more initial states and one or more goal state
  - (4) One initial state and one goal state
- **28.** If A and B are two fuzzy sets with membership functions :  $\mu_a(\chi) = \{0.2, 0.5., 0.6, 0.1, 0.9\}$ ,  $\mu_b(\chi) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ , then the value of  $\mu_a$  U  $\mu_b$  will be :
  - (1) {0.2,0.5,0.6,0.7,0.9}
  - $(2) \{0.2, 0.5, 0.2, 0.1, 0.8\}$
  - (3) {0.1, 0.5, 0.6, 0.1, 0.8}
  - $(4) \ \{0.1, 0.5, 0.2, 0.1, 0.8\}$
- 29. Which of the following is *correct* for the neural network?
  - The training time is dependent on the size of the network
  - II Neural networks can be simulated on the conventional computers
  - III Artificial neurons are identical in operation to a biological one
  - (1) I is true

(2) II is true

(3) I and II are true

- (4) All of the above
- 30. A ...... begins by hypothesizing a sentence (the symbol S) and successively predicting lower level constituents until individual pre-terminal symbols are written.
  - (1) bottom-up parser

(2) top parser

(3) top-down parser

(4) bottom parser

•
Which transformation distorts the shape of an object such that the transformed shape appears as if the object were composed of internal layers that had been caused to slide over each other?
(1) Rotation (2) Scaling up
(3) Scaling down (4) Shearing
Which of the following type of perspective projection is used in drawings of railway lines?
(1) Three-point
(2) Two-point
(3) One-point
(4) Perspective projection is not used to draw railway lines
After performing Y-shear transformation on triangle we get A(2,5),B(4,11),C(2,7). If the constant value is 2, then original coordinates will be:  (1) A(2, 5), B(4, 11),C(2, 7)  (2) A(2, 1), B(4, 3),C(2, 3)
(3) $A(4, 1), B(10,3), C(4, 3)$ (4) $A(5, 11), B(3, 4), C(3, 2)$
In the context of modular software design, which one of the following combinations is desirable:  (1) High cohesion and high coupling  (2) High cohesion and low coupling  (3) Low cohesion and high coupling  (4) Low cohesion and low coupling
GSM is an example of:  (1) TDMA cellular systems  (2) FDMA cellular systems  (3) CDMA cellular systems  (4) SDMA cellular systems
A key concept of quality control is that all work products:
(1) Are delivered on time and under budget
(2) Have complete documentation
(3) Have measurable specifications for process outputs

(4) Are thoroughly tested before delivery to the customer

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37.	The theoretic concept that will be useful (1) Hamiltonian circuit	(2) Cyclomatic number
	(3) Eulerian Cycle	(4) None of these
38.	Which is not a task of software Configuration (1) Version control (3) Change management	ation Management ? (2) Reporting (4) Ouality control
39.	The requirement analysis is performed in (1) System design phase (3) System analysis phase	<ul><li>(2) System development phase</li><li>(4) System testing phase</li></ul>
40.	Consider the following C code. Assume	that unsigned long int type length is 64 bits.
	unsigned long int fun(unsigned long int	n) {
	unsigned long int i, j, $j=0$ , sum = 0;	in the second marketing.
	for $(i = n; i > 1; i = i/2) j++;$	
	for $(; j > 1; j = j/2)$ sum++;	e i destropulation destruction
	return sum;	agreement to the second second
	}	240
	The value returned when we call fun wit	
	(1) 4	(2) 5
	(3) 6	(4) 40
41.	The web browser request goes to the ser	ever in:
	(1) Hex form	(2) ASCII form
	(3) Binary form	(4) Text form
42.	What does error 404 or Not Found error	while accessing a URL mean?
	(1) The server could not find the reques	
	(2) Requested HTML file is not available	
	(3) The path to the interpreter of the sc	
	(4) The requested HTML file does not	have sufficient permissions
	•	

43.	3. Which of the following can be used to store 1 bit of data?			
	(1) Encoder	(2) OR gate		
	(3) Flip-Flop	(4) Decoder		
44.	Which one of the following about the M	IIPS rating of a computer is FALSE?		
	(1) MIPS rating of a computer depends	on the compiler being used		
	(2) MIPS rating of a processor is independent	endent of the Program is being executed		
	(3) MIPS rating of a computer can vary being considered.	based on which instructions of a processor are		
	(4) MIPS rating of a computer depends	upon the clock rate of the processor		
45.	The interval from the time of submiss termed as:	ion of a process to the time of completion is		
	(1) waiting time	(2) turn around time		
	(3) response time	(4) throughput		
46.	In FTP protocol, client contacts server u	sing as the transport protocol.		
	(1) transmission control protocol	d markung markaga at a sa s		
	(2) user datagram protocol	The AR English College in the Section of the		
	(3) datagram congestion control protoco	l manife afrons pro for the co		
	(4) stream control transmission protocol	to a comparation of the page of the little of the comparation of the c		
47.	Which of the following would cause the reduce?	Page Fault frequency in an operating system to		
	(1) Cache memory size is increased	s. Sordenzi, je zeta kon 🐣 🕡 🚟		
E A	(2) Size of pages is reduced	Challenge will remine the to		
n un	(3) Executing processes remain CPU bo	und in the state of the state o		
	(4) Executing processes exhibit high loc	ality of reference		
48.	The technique of memory compaction overcome the problem of:	n and reuse of memory can be applied to		
	(1) External fragmentation	(2) Internal Fragmentation		
	(3) Page Fault	(4) Swapping		
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U			the transmission		
49.	For a 10 Mbps Ethernet link, if the lendelay is (in microseconds).	ngth	h of the packet is 32 bits, the transmission		
		(2)	) 32		
	(1) 3.2 (3) 0.32		) 320		
50.	In a compiler, keywords of a language as	re re	ecognized during		
50.	(1) the code generation	(2)	) the lexical analysis		
	(3) parsing of the program		) data flow analysis		
51.	What must be the base of the number, if expression $4 + 2 = 11$ is true?				
	(1) 7		2) 6		
	(3) 5	• 1	4) 4		
52 <b>.</b>	input values will cause an AND	logic	ic gate to produce a HIGH output.		
52.	(1) At least one input is HIGH	(2)	2) At least one input is LOW		
•	(3) All inputs are LOW	(4)	All inputs are HIGH		
53.	Which of the following set of gates can	be u	used in a Full-Adder?		
	(1) Two half-adders and one OR gate				
	(2) Two OR gates and one half-adder				
	(3) One half-adder and two OR gates				
	(4) One OR gate and one half-adder				
54.	Which of the following pairs have differ	rent	t expressive power?		
	(1) Deterministic finite automata(DFA) and Non-deterministic finite automata (NFA)				
	(2) Deterministic push down automata(NPDA)	ata(E	DPDA)and Non-deterministic push down		
	(3) Deterministic single-tape Turing Turing machine		achine and Non-deterministic single-tape		
· ·	(4) Single-tape Turing machine and mu	lti-ta	tape Turing machine		
			. *		

55.	A combinational logic circuit which is u more source through a single transmission	sed when it is desired to send data from two or on line is known as :
	(1) encoder	(2) decoder
	(3) multiplexer	(4) demultiplexer
56.	Which one of the following RAID lev storage?	rels provides the maximum reliability of data
	(1) RAID 10	(2) RAID 4
<i>,</i> • •	(3) RAID 5	(4) RAID 6
57.	How long is an IPv4 and IPv6 address re	spectively?
	(1) 64 bits, 32 bits	(2) 32bits, 64 bits
	(3) 128bits, 32 bits	(4) 32 bits, 128 bits
58.	Which binary number represents 2' comp	element of the Hexadecimal number DEAF?
	(1) 0010 0001 0101 0111	(2) 1101 1110 1010 1111
	(3) 0010 0001 0101 0011	(4) 0010 0001 0101 0001
59.	Which of the following services use TCP	?
	(i) DHCP (ii) SMTP (iii) HTTP (iv) TFT	P (v) FTP
	(1) (i) and (ii)	(2) (ii), (iii) and (v)
	(3) (i), (ii) and (iv)	(4) (i), (iii) and (iv)
60.	Identify the correct statement about the a	pplication of XML?
	(1) XML must be used to produce XML	and HTML output.
(	(2) XML can not specify or contain preson	entation information
. (	(3) XML is used to describe hierarchical	ly organized information.
(	(4) XML performs the conversion of applications.	f information between different e-business
	3.41	

**61.** The set { 1, 2, 4, 7, 8,11,13, 14} is a group under multiplication modulo 15. The inverses of 4 and 7 are respectively:

(1) 3 and 13

(2) 2 and 11

(3) 4 and 13

(4) 8 and 14

**62.** Thread synchronization is required because:

- (1) all threads of a process share the same address space
- (2) all threads of a process share the same global variables
- (3) all threads of a process can share the same files
- (4) all of the mentioned

**63.** In the transfer of file between server and client, if the transmission rates along the path is 10 Mbps, 20 Mbps, 30 Mbps, 40 Mbps. The throughput is usually:

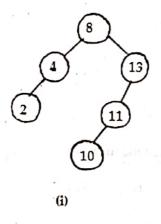
(1) 10 Mbps

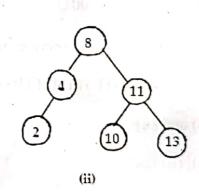
(2) 20 Mbps

(3) 40 Mbps

(4) 50 Mbps

64. Which of the below diagram is following AVL tree property?





(1) only i

(2) only ii

(3) Both i and ii

(4) i is not a binary search tree

65. A connected planar graph having 6 vertices, 7 edges contains ...... regions.

(1) 15

(2) 3

(3) 1

(4) 11

66.	Which of	the	following	statements	are	correct	7
-----	----------	-----	-----------	------------	-----	---------	---

S1:  $\{02n \mid n \ge 1\}$  is a regular language

S2:  $\{0m\ 0n\ 0(m+n)\ Im > = 1\ and\ n > = 2\}$  is a regular language

(1) S2 Only

(2) S1 Only

(3) Both SI and S2

(4) None of S1 and S2 is correct

## 67. 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'?

- (1) Each leaf node has a pointer to the next leaf node
- (2) Non-leaf nodes have pointers to data records
- (3) B+ Tree is a height-balanced tree
- (4) Key values in each node are kept in sorted order

#### 68. The Viewing plane or the projector is set up in which of the following position?

- (1) Perpendicular to x and aligned with y, z
- (2) Perpendicular to y and aligned with x, z
- (3) At origin
- (4) Perpendicular to z and aligned with x, y

#### 69. What is the file size of a 640 by 480 pictures of 256 colours in a 8- bit resolution?

(1) 128 KB

(2) 300 KB

(3) 900 KB

(4) 1024 KB

#### **70.** Which of the following is TRUE?

- (1) Every relation in 3NF is also in BCNF
- (2) A relation R is in 3NF if every non prime attribute of R is fully functionally dependent on every key of R
- (3) Every relation in BCNF is also in 3NF
- (4) No relation can be in both BCNF and 3NF

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71.	Which search is similar to minimax search?			
	(1) Hill-climbing search	(2) Depth-first search		
٠.	(3) Breadth-first search	(4) All of these		
72.	Which of the following can be ide	entified as the cloud?		
	(1) Intranet	(2) Hadoop		
	(3) Web applications	(4) All of the above		
73.	In which ANN, loops are allowed?			
	(1) FeedForward ANN	(2) FeedBack ANN		
	(3) Both (1) and (2)	(4) None of the Above		
74.	Choose the best matching between	en the Group 1 and their characteristics in Group 2.		
	Group – 1	Group – 2		
	P Regular expression 1.	Syntax analysis		
	Q Pushdown automata 2.	Code generation		
	R Dutaflow analysis 3.	Lexical analysis		
	S Register allocation 4.	Code optimization		
4.	(1) P-3, Q-2, R-1, S-4	(2) P-3, Q-1, R-4, S-2		
	(3) P-4, Q-2, R-1, S-3	(4) P-1, Q-2, R-3, S-4		
75	5. The total number of states requi	red to automate the given regular expression(00)*(11)*		
	(1) 3	(2) 4		
	(3) 5	(4) 6		
	. "			

76. Consider the following Syntax Directed Translation Scheme (SDTS), with non-terminals {S, A} and terminals {a, b}}.

$$S \rightarrow aA \{\{Print 1\}\}$$

$$S \rightarrow a \{Print 2\}$$

$$A \rightarrow Sb \{Print 3\}$$

(1) 132

(2) 223

(3) 231

(4) Syntax error

77. Which of the following is *not* a horn clause?

(1) p

(2)  $\phi p \vee q$ 

(3)  $p \rightarrow q$ 

(4)  $p \rightarrow \phi q$ 

78. What is recurrence for worst case of QuickSort and what is the time complexity in Worst case?

- (1) Recurrence is T(n) = T(n-2) + O(n) and time complexity is  $O(n^2)$
- (2) Recurrence is T(n) = T(n-1) + O(n) and time complexity is  $O(n^2)$
- (3) Recurrence is T(n) = 2T(n/2) + O(n) and time complexity is O(nLogn)
- (4) Recurrence is T(n) = T(n/10) + T(9n/10) + O(n) and time complexity is O(nLogn)

79. How many states of a DFA can be converted from an NFA with n states?

(1) n

(2) n2

(3) 2n

(4) None of these

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80. Consider the intermediate code given below:

- 1. i = 1
- 2. j = 1
- 3. t1=5\*i
- 4. t2 = t1 + j
- 5. t3 = 4 \* t2
- 6. t4 = t3
- 7. a[t4] = -1
- 8. j = j + 1
- 9. if  $j \le 5 \text{ goto}(3)$
- 10. i = i + 1
- 11. if i < 5 goto(2)

The number of nodes and edges in the control-flow-graph constructed for the above code, respectively, are:

(1) 5 and 7

(2) 6 and 7

(3) 5 and 5

(4) 7 and 8

81. How is a J-K Flip Flop made to toggle?

(1) J = 0, K = 0

(2) J = 1, K = 0

(3) J = 0, K = 1

(4) J = 1, K = 1.

82. In which OSI layers does the FDDI protocol operate?

(I) Physical

(II) Data link

- (III) Network
- (1) I and II

(2) II and III

(3) I and III

(4) None

83. Number of flip-flops used in decade counter:

(1) 3

(2) 2

(3) 4

(4) None of these

84.	The Octal number equivalent of the decimal number 489 is:		
Harry .	(1) 750	(2) 752	
	(3) 329	(4) 751	
85.	If the size of the stack i condition is known as:	s 10 and we try to add the 11th element in the stack then the	
	(1) Underflow	(2) Garbage collection	
	(3) Overflow	(4) None	
86.	Your router has the following IP address on Ethernet: 172.16.2.1/23. Which of the following can be valid host IDs on the LAN interface attached to the router?		
	(i) 172.16.1.100 (ii) 172.16.1.198 (iii) 172.16.2.255 (iv) 172.16.3.0		
	(1) (i) only	A digard ones	
	(2) (ii) and (iii) only		
	(3) (iii) and (iv) only		
Tues .	(4) None of these	The state of the s	
87.	If the baud rate is 400 for	a 4-PSK signal, the bit rate is bps.	
	(1) 1600	(2) 800	
	(3) 400	(4) 100	
88.	A binary search tree who unit is called	se left subtree and right subtree differ in height by at most 1	
97	(1) Lemma tree		
	(2) Red Black tree		
	(3) AVL tree		
	(4) None of the above	a Sulmark	
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89.	What will be the output of the following	ng C code' ?
	#include <stdio.h></stdio.h>	
	int main()	
	{ int const $a = 5$ ;	
	a++;	
	printf("%d",a);	
	}	
	(1) 5	(2) 6
	(3) Compile time error	(4) Runtime error
90.	Only rear pointers will change du  (2) Queue data structure can be use fault algorithm and Quick short a	th a linked list, keeping track of a front pointer, aring an insertion into an non-empty queue.  ed to implement least recently used (LRU) page lgorithm.
	(3) Queue data structure can be used recently used (LRU) page fault a	to implement Quick short algorithm but not least
	(4) Both (1) and (3)	
91.	Which one of the following is N Specifications(SRS) document?	NOT desired in a good Software Requiremen
	(1) Functional Requirements	(2) Non-Functional Requirements
	(3) Goals of Implementation	(4) Algorithms for Software Implementation
92.	Which of the following is a widely based on the idea of bagging?	y used and effective machine learning algorithm
•	(1) Decision Tree	(2) Regression
•	(3) Classification	(4) Random Forest
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93.	The transport layer protocols used for email, respectively are:	r real time multimedia, file transfer, DNS and
	(1) TCP, UDP, UDP and TCP	
	(2) UDP, TCP, TCP and UDP	
	(3) UDP, TCP, UDP and TCP	11 14 6.294
	(4) TCP, UDP, TCP and UDP	
94.	Which of the following protocols is used	d to map MAC address to IP address?
	(1) ARP	(2) RAPP
	(3) DNS	(4) None of the above
95.	Packets of the same session may be rout	ed through different paths in:
	(1) TCP, but not UDP	(2) UDP, but not TCP
	(3) TCP and UDP	(4) Neither TCP, nor UDP
96.	6. Assume that source S and destination D are connected through two intermediate routers labeled R. Determine how many times each packet has to visit the network layer and the data link layer during a transmission from S to D.	
	(1) Network layer – 4 times and Data lin	nk layer – 4 times
	(2) Network layer – 4 times and Data lin	nk layer – 6 times
7.	(3) Network layer – 2 times and Data lin	nk layer – 6 times
	(4) None of the above	
97.	Which of the following is/are example(s)	of stateful application layer protocols?
	(i) HTTP	(ii) FTP
	(iii) TCP	(iv) POP3
	(1) (i) and (ii) only	(2) (ii) and (iii) only
	(3) (ii) and (iv) only	(4) (iv) only
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98.	In project 802, the data link layer of sublayer.	consists of the sublayer and the
	(1) LAN, MAC	(2) LLC, MAC
	(3) CSMA, LLC	(4) LLC, PDU
99.	If subnet addresses are 129.253.4.0,129. the subnet mask?	253.8.0,129.253.12.0 and 129.253.16.0 What is
,	(1) 129.253.7.0	(2) 129.253.31.0
	(3) 129.253.192.0	(4) 129.253.252.0
100.	What is the standard length of MAC add	lress?
	(1) 16bits	(2) 32 bits
	(3) 48 bits	(4) 64 bits

Total No. of Printed Pages: 21

## (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

# С

### Ph.D./URS-EE-Jan-2022

SET-Y

**SUBJECT: Computer Science** 

10003

		Sr. No
Time: 11/4 Hours Roll No. (in figures)	Max. Marks : <b>100</b> (in words)	Total Questions : 100
Name	Father's Name	
Mother's Name	Date of Examinati	,
(Signature of the Candidate)		(Signature of the Invigilator)

## CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- 1. All questions are compulsory.
- 2. The candidates must return the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
- 5. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers *must not* be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

1. The set { 1, 2, 4, 7, 8,11,13, 14} is a group under multiplication modulo 15. The inverses of 4 and 7 are respectively:

(1) 3 and 13

(2) 2 and 11

(3) 4 and 13

(4) 8 and 14

2. Thread synchronization is required because:

- (1) all threads of a process share the same address space
- (2) all threads of a process share the same global variables
- (3) all threads of a process can share the same files
- (4) all of the mentioned

3. In the transfer of file between server and client, if the transmission rates along the path is10 Mbps, 20 Mbps, 30 Mbps, 40 Mbps. The throughput is usually:

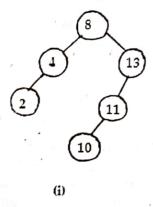
(1) 10 Mbps

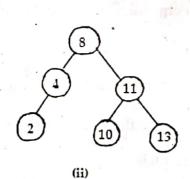
(2) 20 Mbps

(3) 40 Mbps

(4) 50 Mbps

4. Which of the below diagram is following AVL tree property?





(1) only i

(2) only ii

(3) Both i and ii

(4) i is not a binary search tree

5. A connected planar graph having 6 vertices, 7 edges contains ...... regions.

(1) 15

(2) 3

(3) 1

(4) 11

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6.	Which of the following statements	s are correct?	
	S1: $\{02n \mid n \ge 1\}$ is a regular lang	guage	
	S2: $\{0m\ 0n\ 0(m+n)\ Im > = 1\ and$	1 n > = 2 is a regular language	
	(1) S2 Only	(2) SI Only	
	(3) Both SI and S2	(4) None of S1 and S2 is correct	
7. Which one of the following statements is NOT correct about the B+ tree data sused for creating an index of a relational database table'?		ructure	
	(1) Each leaf node has a pointer t	to the next leaf node	
	(2) Non-leaf nodes have pointers	to data records	
	(3) B+ Tree is a height-balanced	tree	10-19
	(4) Key values in each node are k	cept in sorted order	

- 8. The Viewing plane or the projector is set up in which of the following position?
  - (1) Perpendicular to x and aligned with y, z
  - (2) Perpendicular to y and aligned with x, z
  - (3) At origin
  - (4) Perpendicular to z and aligned with x, y
- 9. What is the file size of a 640 by 480 pictures of 256 colours in a 8- bit resolution?
  - (1) 128 KB

(2) 300 KB

(3) 900 KB

- (4) 1024 KB
- 10. Which of the following is TRUE?
  - (1) Every relation in 3NF is also in BCNF
  - (2) A relation R is in 3NF if every non prime attribute of R is fully functionally dependent on every key of R
  - (3) Every relation in BCNF is also in 3NF
  - (4) No relation can be in both BCNF and 3NF

11.	What must be the base of the number, if expression $4 + 2 = 11$ is true?
	(1) 7 (2) 6
	(3) 5
12.	input values will cause an AND logic gate to produce a HIGH output.  (1) At least one input is HIGH  (2) At least one input is LOW  (3) All inputs are LOW  (4) All inputs are HIGH
13.	Which of the following set of gates can be used in a Full-Adder?
	(1) Two half-adders and one OR gate  (2) Two OR gates and one half-adder
	(3) One half-adder and two OR gates
	(4) One OR gate and one half-adder
14.	Which of the following pairs have different expressive power?
	(1) Deterministic finite automata(DFA) and Non-deterministic finite automata (NFA)
	(2) Deterministic push down automata(DPDA)and Non-deterministic push down automata(NPDA)
	(3) Deterministic single-tape Turing machine and Non-deterministic single-tape Turing machine
	(4) Single-tape Turing machine and multi-tape Turing machine
15.	A combinational logic circuit which is used when it is desired to send data from two or more source through a single transmission line is known as:
	(1) encoder (2) decoder
	(3) multiplexer (4) demultiplexer
16.	Which one of the following RAID levels provides the maximum reliability of data storage?
	(1) RAID 10 (2) RAID 4
	(3) RAID 5 (4) RAID 6
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17.	How long is an IPv4 and IPv6 address respectively?		
•	(1) 64 bits, 32 bits	(2) 32bits, 64 bits	
	(3) 128bits, 32 bits	(4) 32 bits, 128 bits	
18.	·Which binary number represents 2' com	plement of the Hexadecimal number DEAF?	
	(1) 0010 0001 0101 0111	(2) 1101 1110 1010 1111	
	(3) 0010 0001 0101 0011	(4) 0010 0001 0101 0001	
19.	Which of the following services use TC	r i Angele – grazi e i i i i i i i i i i i i i i i i i i	
	(i) DHCP (ii) SMTP (iii) HTTP (iv) TF7	TP (v) FTP	
	(1) (i) and (ii)	(2) (ii), (iii) and (v)	
	(3) (i), (ii) and (iv)	(4) (i), (iii) and (iv)	
20.	Identify the <i>correct</i> statement about the application of XML?  (1) XML must be used to produce XML and HTML output.		
	(2) XML can not specify or contain pres	sentation information	
	(3) XML is used to describe hierarchical	lly organized information.	
	(4) XML performs the conversion of applications.	of information between different e-business	
21.	How is a J-K Flip Flop made to toggle?	the term down the term	
	(1) $J = 0, K = 0$	(2) $J = I, K = 0$	
	(3) $J = 0, K = 1$	(4) $J = 1, K = 1$	
22.	In which OSI layers does the FDDI proto	ocol operate?	
	(I) Physical	(II) Data link	
	(III) Network	of the company of the second party. He	
	(1) I and II	(2) II and III	
	(3) I and III	(4) None	
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23.	Number of flip-flops used in decade counter:	
	(1) 3	(2) 2
	(3) 4	(4) None of these
24.	The Octal number equivalent of the deci	mal number 489 is:
	(1) 750	(2) 752
	(3) 329	(4) 751
25.	If the size of the stack is 10 and we try condition is known as:	to add the 11th element in the stack then the
	(1) Underflow	(2) Garbage collection
	(3) Overflow	(4) None
26.	Your router has the following IP addre following can be valid host IDs on the L	AN interface attached to the router?
	(i) 172.16.1.100 (ii) 172.16.1.198 (iii) 17	72.16.2.255 (iv) 172.16.3.0
	(1) (i) only	rand saigair <b>m</b> ad i de dan Albeig. Taile ta saighe <u>an</u> direac <b>an</b>
t en	(2) (ii) and (iii) only	inga de santineste en la cele
	(3) (iii) and (iv) only	
	(4) None of these	
27.	If the baud rate is 400 for a 4-PSK signal	I, the bit rate is bps.
	(1) 1600	(2) 800
	(3) 400	(4) 100
28.	A binary search tree whose left subtree unit is called	and right subtree differ in height by at most 1
	(1) Lemma tree	(2) Red Black tree
	(3) AVL tree	(4) None of the above
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29. What will be the output of the following C code'?

```
#include <stdio.h>

int main()

{ int const a = 5;
    a++;
    printf("%d",a);
}

(1) 5 (2) 6

(3) Compile time error (4) Runtime error
```

- **30.** Which of the following option is *not* correct?
  - (1) If the queue is implemented with a linked list, keeping track of a front pointer, Only rear pointers will change during an insertion into an non-empty queue.
  - (2) Queue data structure can be used to implement least recently used (LRU) page fault algorithm and Quick short algorithm.
  - (3) Queue data structure can be used to implement Quick short algorithm but not least recently used (LRU) page fault algorithm.
  - (4) Both (1) and (3)
- 31. Which of the following problems is NOT NP-hard?
  - (1) Hamiltonian circuit problem
- (2) The 0/1 Knapsack Problem
- (3) The graph colouring problem
- (4) None of these
- 32. PGP encrypts data by using a block cipher called:
  - (1) International data encryption algorithm
  - (2) Private data encryption algorithm
  - (3) Internet data encryption algorithm
  - (4) Local data encryption algorithm

- 33. The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree?
  - $(1) \cdot 2$

(2) 3

(3) 4

- (4) 6
- 34. Correct statements about static function in C++ code are:
  - (I) Static function of a class can be called by class name using scope resolution operator i.e.
  - (II) Static function can receive both static and non-static data members of a class
  - (III) Static function is not the part of an object of a class
  - (1) I and II

(2) 1 only

(3) I and III

- (4) I, II and III
- 35. Consider the function f defined below:

For a given linked list p, the function f returns 1 if and only if:

- (1) the list is empty or has exactly one element.
- (2) the elements in the list are sorted in non-decreasing order of data value
- (3) the elements in the list are sorted in non-increasing order of data value
- (4) not all elements in the list have the same data value

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	•	
36.	What is the purpose of bin directory in L	inux environment?
	(1) Contains essential device files	(2) Contains essential binary commands
	(3) Containing configuration files	(4) Contains user home directories
37.	The maximum number of nodes in a tre may be equal is:	e for which post-order and pre-order traversals
	((1) 1)	(2) 2
	(3) 3	(4) any number
38.	In a C programming language $x - = y +$	
		(2) $x = x - y + 1$
	(3) $x = x - y - 1$	(4)  x = -x + y + 1
39.		and 4. The transfer function is linear, with the to 2. The inputs are 4,10,5, and 20 respectively.
	(1) 76	(2) 238
	(3) 123	(4) 119
40.	C++ abstract class can contain:	The state of the s
	(1) Pure virtual function	(2) Non-virtual function
	(3) Only pure virtual function	(4) Both pure virtual and non-virtual function
41.	Which search is similar to minimax sear	rch?
	(1) Hill-climbing search	(2) Depth-first search
. 7	(3) Breadth-first search	(4) All of these
42.	Which of the following can be identified	d as the cloud?
ė.	(1) Intranet	(2) Hadoop

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(3) Web applications

(4) All of the above

43. In which ANN, loops are allowed?

	(1) FeedForward ANN	(2) FeedBack ANN
	(3) Both (1) and (2)	(4) None of the Above
44.	Choose the best matching between	n the Group 1 and their characteristics in Group 2.
	Group - 1	Group - 2
	P Regular expression 1.	Syntax analysis
	Q Pushdown automata 2.	Code generation
	R Dutaflow analysis 3.	Lexical analysis
	S Register allocation 4.	Code optimization
	(1) P-3, Q-2, R-1, S-4	(2) P-3, Q-1, R-4, S-2
	(3) P-4, Q-2, R-1, S-3	(4) P-1, Q-2, R-3, S-4
45.	The total number of states require	ed to automate the given regular expression(00)*(11)*
	(1) 3	(2) 4
	(3) 5	(4) 6
46.	Consider the following Syntax terminals {S, A} and terminals {a	Directed Translation Scheme (SDTS), with non- a, b}}.
	$S \rightarrow aA \{\{Print 1\}$	
	$S \rightarrow a \{Print 2\}$	Charles S.
	$A \rightarrow Sb \{Print 3\}$	139 2
	(1) 132	(2) 223
	(3) 2 3 1	(4) Syntax error
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47. Which of the following is *not* a horn clause?

(1) p

(2)  $\phi p \vee q$ 

(3)  $p \rightarrow q$ 

(4)  $p \rightarrow \phi q$ 

48. What is recurrence for worst case of QuickSort and what is the time complexity in Worst case?

- (1) Recurrence is T(n) = T(n-2) + O(n) and time complexity is  $O(n^2)$
- (2) Recurrence is T(n) = T(n-1) + O(n) and time complexity is  $O(n^2)$
- (3) Recurrence is T(n) = 2T(n/2) + O(n) and time complexity is O(nLogn)
- (4) Recurrence is T(n) = T(n/10) + T(9n/10) + O(n) and time complexity is O(nLogn)

49. How many states of a DFA can be converted from an NFA with n states?

(1) n

(2) n2

(3) 2n

(4) None of these

50. Consider the intermediate code given below:

- 1. i = 1
- 2. i = 1
- 3. t1=5\*i
- 4. t2 = t1 + j
- 5. t3 = 4 \* t2
- 6. t4 = t3
- 7. a[t4] = -1
- 8. j = j + 1
- 9. if  $j \le 5 \text{ goto}(3)$
- 10. i = i + 1
- 11. if i < 5 goto(2)

The number of nodes and edges in the control-flow-graph constructed for the above code, respectively, are:

- (1) 5 and 7
- (2) 6 and 7
- (3) 5 and 5
- (4) 7 and 8

51.	The web browser request goes to the ser	ver in :	
	(1) Hex form	(2) ASCII form	
	(3) Binary form	(4) Text form	
52.	What does error 404 or Not Found error while accessing a URL mean?  (1) The server could not find the requested URL  (2) Requested HTML file is not available  (3) The path to the interpreter of the script is not valid  (4) The requested HTML file does not have sufficient permissions		
53.	Which of the following can be used to s	tore 1 bit of data?	
	(1) Encoder	(2) OR gate	
	(3) Flip-Flop	(4) Decoder	
54.	•	on the compiler being used endent of the Program is being executed y based on which instructions of a processor are	
55.	The interval from the time of submiss termed as:	sion of a process to the time of completion is	
	(1) waiting time	(2) turn around time	
-	(3) response time	(4) throughput	
56.	In FTP protocol, client contacts server u	ising as the transport protocol.	
	(1) transmission control protocol		
	(2) user datagram protocol		
	(3) datagram congestion control protoc	ol .	
	(4) stream control transmission protoco	1	
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57.	Which of the following would	l cause the Page Fault freque	ency i	n an o	perating system	to
	reduce?			¥ =		

- (1) Cache memory size is increased
- (2) Size of pages is reduced
- (3) Executing processes remain CPU bound
- (4) Executing processes exhibit high locality of reference
- **58.** The technique of memory compaction and reuse of memory can be applied to overcome the problem of:
  - (1) External fragmentation
- (2) Internal Fragmentation

(3) Page Fault

- (4) Swapping
- **59.** For a 10 Mbps Ethernet link, if the length of the packet is 32 bits, the transmission delay is ...... (in microseconds).
  - (1) 3.2

(2) 32

(3) 0.32

- (4) 320
- 60. In a compiler, keywords of a language are recognized during ......
  - (1) the code generation

- (2) the lexical analysis of the program
- (3) parsing of the program
- '(4) data flow analysis
- 61. Consider the 3 processes, P1, P2 and P3 shown in the table:

Process	Arri	val t	ime	Time Units Require	d
P1		0	1	5	
P2		1		7	
P3		3		4	

The completion order of the 3 processes under the policies FCFS and RR2 (round robin scheduling with CPU quantum of 2 time units) are

- (1) FCFS: P1, P2, P3 RR2: P1, P2, P3
- (2) FCFS: P1, P3, P2 RR2: P1, P3, P2
- (3) FCFS: P1, P2, P3 RR2:\_P1,\_P3, P2
- (4) FCFS: P1, P3, P2 RR2: P1, P2, P3

62.	Consider a system with byte-addressable memory, 32 bit logical addresses, 4 kilobyte page size and page table entries of 4 bytes each. What is the size of the page table in the system?			
	(1) 4 Megabyte		(2) 4 Kilobyte	2
	(3) 2 Megabyte	•	(4) 2 Kilobyte	
63.	P: Increasing the n the page fault rate. Q: Some programs	nber of frames to a pumber of page fram	rocess. Consider the less allocated to a pro	e replacement policy and following statements: cess sometimes increases
	Which one of the fol	_		247.11
	(1) Both P and Q ar			
	(2) Both P and Q are (3) P is false, but Q is		ne reason for P.	
	(4) Both P and Q are			
			o' Bill	
64.	On a system using f register is:	ixed partitions, all o	of size $2^8$ , the numbe	r of bits used by the limit
	(1) 8	(2) 64	(3) 127	(4) 256
65.	KB/sector, rotation whereby whenever of the disk interface rea	speed 3000 rpm. one byte word is readed a 4 byte word field. The maximum p	The disk is operated dy it is sent to memory in e	ace, 512 sectors/track, 1 d in cycle stealing mode bry; similarly, for writing, ach DMA cycle. Memory hat the CPU gets blocked
	743	(2) 25	(3) 40	(4) 50
66.		rtices and 2n-2 edg	es. The edges of G c	an be partitioned into two
	(1) For every subset	of k vertices, the in	duced subgraph has a	it most 2k-2 edges
	(2) The minimum cu	it in G has at least to	vo edges	
	(3) There are two ed	lge-disjoint paths be	tween every pair to v	rertices
	(4) There are two ve	rtex-disjoint paths b	etween every pair of	vertices

67.	. In Al, the problem space of means-end analysis	has:
	(1) An initial state and one or more goal states	
	(2) One or more initial states and one goal state	
	(3) One or more initial states and one or more g	goal state
	(4) One initial state and one goal state	
68.	If A and B are two fuzzy sets with membershi 0.9}, $\mu_b(\chi) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ , then the val	-
	(1) {0.2,0.5,0.6,0.7,0.9}	
	(2) {0.2, 0.5,0.2, 0.1,0.8}	
	(3) {0.1, 0.5, 0.6, 0.1, 0.8}	and the second s
	(4) {0.1, 0.5, 0.2, 0.1, 0.8}	
69.	9. Which of the following is <i>correct</i> for the neural	l network?
· .	I The training time is dependent on the size of	of the network .
	II Neural networks can be simulated on the co	onventional computers
	III Artificial neurons are identical in operation	to a biological one
	(1) 115 1146	is true
	(3) I and II are true (4) A	all of the above
70.	<b>0.</b> A begins by hypothesizing a se predicting lower level constituents until individual	ntence (the symbol S) and successively dual pre-terminal symbols are written.
		op parser
		ottom parser
71.	1. Which one of the following is NOT desi Specifications(SRS) document?	red in a good Software Requirement
,	(1) Functional Requirements (2) N	Non-Functional Requirements
	(3) Goals of Implementation (4) A	Algorithms for Software Implementation
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72.	Which of the following is a widely used and effective machine learning algorithm based on the idea of bagging?
	(1) Decision Tree (2) Regression
	(3) Classification (4) Random Forest
73.	The transport layer protocols used for real time multimedia, file transfer, DNS and email, respectively are:
	(1) TCP, UDP, UDP and TCP
	(2) UDP, TCP, TCP and UDP
	(3) UDP, TCP, UDP and TCP
	(4) TCP, UDP, TCP and UDP
74.	Which of the following protocols is used to map MAC address to IP address?
	(1) ARP (2) RAPP
	(3) DNS (4) None of the above
75.	Packets of the same session may be routed through different paths in:
	(1) TCP, but not UDP (2) UDP, but not TCP
	(3) TCP and UDP (4) Neither TCP, nor UDP
76.	Assume that source S and destination D are connected through two intermediate routers labeled R. Determine how many times each packet has to visit the network layer and the data link layer during a transmission from S to D.
	(1) Network layer – 4 times and Data link layer – 4 times
	(2) Network layer – 4 times and Data link layer – 6 times
	(3) Network layer – 2 times and Data link layer – 6 times
	(4) None of the above
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77.	Which of the following is/are example(s	e) of stateful application layer protocols?
	(i) HTTP	(ii) FTP
. :	(iii) TCP	(iv) POP3
	(1) (i) and (ii) only	(2) (ii) and (iii) only
	(3) (ii) and (iv) only	(4) (iv) only
78.	In project 802, the data link layer of sublayer.	consists of the sublayer and th
	(1) LAN, MAC	(2) LLC, MAC
4	(3) CSMA, LLC	(4) LLC, PDU
79.	If subnet addresses are 129.253.4.0,129. the subnet mask?	253.8.0,129.253.12.0 and 129.253.16.0 What i
÷	(1) 129.253.7.0	(2) 129.253.31.0
	(3) 129.253.192.0	(4) 129.253.252.0
80.	What is the standard length of MAC add	lress?
	(1) 16bits (3) 48 bits	(2) 32 bits (4) 64 bits
81.	The best data structure to check wh parentheses is a:	ether an arithmetic expression has balance
	(1) stack	(2) queue
	(3) .tree	(4) list
82.	In inheritance, order of execution of bas	e class and derived class destructors are:
	(1) Base to derived	(2) Derived to base
	(3) Random order	(4) none

83.	What logic function is obtained by addir	ng an inverter to the inputs of an OR gate?
	(1) OR	(2) NAND
	(3) XOR	(4) NOR
84.	A C program contains the following de	claration:
	static int $X(8) = \{10, 20, 30, 40, 50, 60\}$	, 70, 80}
	What are the values of (*X +2) and *(X	+ 2) ?
	(1) 10, 30	(2) 10, 32
	(3) 30, 12	(4) 12, 30
85.	Which of the application layer IoT Proto	ocols uses telemetry communication pattern?
	(1) COAP	(2) MQTT
	(3) AMQP	(4) None of the above
86.	Suppose V is a signed 16-bit integer we the result of V<<4?	ith hexadecimal value 0 × 369C. What will be
, z	(1) 0 × 669C	(2) $0 \times 69C0$
	$(3) 0 \times 0369$	(4) None of the above
87.	•	n processes competing for them. Each process e maximum value of $n$ for the system to be
	(1) 5	(2) 4
	(3) 3	(4) 2
88.	(1) mutual exclusion	quired for a deadlock to be possible?
	<ul><li>(3) no resource can be forcibly remove</li><li>(4) all of the mentioned</li></ul>	ed from a process holding it
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plane is equal to:

(1).6

(3) 4

	90.	$(p \to r) \lor (q \to r)$ is logically equivalent to:			
		(1) $(p \land q) \lor r$ (2) $(p \lor q) \to r$ (3) $(p \land q) \to r$ (4) $(p \to q) \to r$			
		(3) $(p \land q) \rightarrow r$ $ (4) (p \rightarrow q) \rightarrow r $			
	91.	appears as if the object were composed of internal layers over each other?	h that the transformed shape that had been caused to slide		
	,	(1) Rotation (2) Scaling up			
		(3) Scaling down (4) Shearing			
4	92.	lines?	used in drawings of railway		
	,	(1) Three-point			
		(2) Two-point	1000		
,		(3) One-point			
		(4) Perspective projection is not used to draw railway line			
	93.	3. After performing Y-shear transformation on triangle we the constant value is 2, then original coordinates will be:	e get A(2,5),B(4,11),C(2,7). I		
		(1) $A(2, 5), B(4, 11), C(2, 7)$ (2) $A(2, 1), B($	4, 3),C(2, 3)		
		(3) A(4, 1), B(10,3), C(4, 3) (4) A(5, 11), B	(3, 4),C(3, 2)		
	94.	4. In the context of modular software design, which one of desirable:	the following combinations		
		(1) High cohesion and high coupling (2) High cohes	ion and low coupling		
		(3) Low cohesion and high coupling (4) Low cohesi	on and low coupling		

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89. Let G be a simple undirected planar graph of 10 vertices with 15 edges. If G is a

connected graph, then the number of bounded faces in any embedding of G on the

(2) 5

(4) 3

- 95. GSM is an example of:
  - (1) TDMA cellular systems
  - (2) FDMA cellular systems
  - (3) CDMA cellular systems
  - (4) SDMA cellular systems
- 96. A key concept of quality control is that all work products:
  - (1) Are delivered on time and under budget
  - (2) Have complete documentation
  - (3) Have measurable specifications for process outputs
  - (4) Are thoroughly tested before delivery to the customer
- 97. The theoretic concept that will be useful in software testing is:
  - (1) Hamiltonian circuit
  - (2) Cyclomatic number
  - (3) Eulerian Cycle
  - (4) None of these
- 98. Which is not a task of software Configuration Management?
  - (1) Version control
  - (2) Reporting
  - (3) Change management
  - (4) Ouality control

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- 99. The requirement analysis is performed in:
  - (1) System design phase
  - (2). System development phase
  - (3) System analysis phase
  - (4) System testing phase
- 100. Consider the following C code. Assume that unsigned long int type length is 64 bits.

unsigned long int fun(unsigned long int n) {

unsigned long int i, j, j=0, sum = 0;

for (i = n; i > 1; i = i/2) j++;

for (; j > 1; j = j/2) sum++;

return sum;

}

The value returned when we call fun with the input  $2^{40}$  is:

(1) 4

(2) 5

· (3) 6

(4) 40

Total No. of Printed Pages: 21

# (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO) SET-Y

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### Ph.D./URS-EE-Jan-2022

SUBJECT: Computer Science

10024

		Sr. No
Time: 11/4 Hours	Max. Marks : 100	Total Questions: 100
Roll No. (in figures)	(in words)	
Name	Father's Name	· · · · · · · · · · · · · · · · · · ·
Mother's Name	Date of Examination	
(Signature of the Candidate)		(Signature of the Invigilator)

### CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- 1. All questions are compulsory.
- 2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
- 5. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers *must not* be ticked in the question booklet.
- 6. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

1. Consider the 3 processes, P1, P2 and P3 shown in the table:

Process	Arrival time	Time Units Required
P1	0	5
P2	1	- 7
Р3	3	4

The completion order of the 3 processes under the policies FCFS and RR2 (round robin scheduling with CPU quantum of 2 time units) are

- (1) FCFS: P1, P2, P3 RR2: P1, P2, P3
- (2) FCFS: P1, P3, P2 RR2: P1, P3, P2
- (3) FCFS: P1, P2, P3 RR2: P1, P3, P2
- (4) FCFS: P1, P3, P2 RR2: P1, P2, P3
- 2. Consider a system with byte-addressable memory, 32 bit logical addresses, 4 kilobyte page size and page table entries of 4 bytes each. What is the size of the page table in the system?
  - (1) 4 Megabyte

(2) 4 Kilobyte

(3) 2 Megabyte

- (4) 2 Kilobyte
- 3. A virtual memory system uses First In First Out (FIFO) page replacement policy and allocates a fixed number of frames to a process. Consider the following statements:
  - P: Increasing the number of page frames allocated to a process sometimes increases the page fault rate.
  - Q : Some programs do not exhibit locality of reference.

Which one of the following is TRUE?

- (1) Both P and Q are true, and Q is the reason for P
- (2) Both P and Q are true, but Q is not the reason for P.
- (3) P is false, but Q is true
- (4) Both P and Q are false

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		*	
4.	On a system using fix register is:	ked partitions, all of size 2 <sup>8</sup> , the number of	of bits used by the limit
	(1) 8	(2) 64	
,	(3) 127	(4) 256	
5.		we with 16 surfaces, 512 tracks/surface	

5. Consider a disk drive with 16 surfaces, 512 tracks/surface, 512 sectors/track, 1 KB/sector, rotation speed 3000 rpm. The disk is operated in cycle stealing mode whereby whenever one byte word is ready it is sent to memory; similarly, for writing, the disk interface reads a 4 byte word from the memory in each DMA cycle. Memory cycle time is 40 nsec. The maximum percentage of time that the CPU gets blocked during DMA operation is:

 (1) 10
 (2) 25

 (3) 40
 (4) 50

- 6. G is a graph on n vertices and 2n-2 edges. The edges of G can be partitioned into two edge-disjoint spanning trees. Which of the following is NOT true for G?
  - (1) For every subset of k vertices, the induced subgraph has at most 2k-2 edges
  - (2) The minimum cut in G has at least two edges
  - (3) There are two edge-disjoint paths between every pair to vertices
  - (4) There are two vertex-disjoint paths between every pair of vertices
- 7. In Al, the problem space of means-end analysis has:
  - (1) An initial state and one or more goal states
  - (2) One or more initial states and one goal state
  - (3) One or more initial states and one or more goal state
  - (4) One initial state and one goal state
  - 8. If A and B are two fuzzy sets with membership functions :  $\mu_a(\chi) = \{0.2, 0.5, 0.6, 0.1, 0.9\}$ ,  $\mu_b(\chi) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ , then the value of  $\mu_a$  U  $\mu_b$  will be :
    - (1) {0.2,0.5,0.6,0.7,0.9}
    - $(2) \{0.2, 0.5, 0.2, 0.1, 0.8\}$
    - (3) {0.1, 0.5, 0.6, 0.1, 0.8}
    - $(4) \ \{0.1, 0.5, 0.2, 0.1, 0.8\}$

9.	Which of the following is correct for the	e neural network?			
	I The training time is dependent on th	e size of the network			
	II Neural networks can be simulated or	n the conventional computers			
	III Artificial neurons are identical in operation to a biological one				
	(1) I is true	(2) II is true			
	(3) I and II are true	(4) All of the above			
10.	A begins by hypothesizing a sentence (the symbol S) and successively predicting lower level constituents until individual pre-terminal symbols are written.				
	(1) bottom-up parser	(2) top parser			
	(3) top-down parser	(4) bottom parser			
11.	Which transformation distorts the shape appears as if the object were composed over each other?	e of an object such that the transformed shape of internal layers that had been caused to slide			
	(1) Rotation	(2) Scaling up			
	(3) Scaling down	(4) Shearing			
12.	Which of the following type of perspectines?	ctive projection is used in drawings of railway			
	(1) Three-point	· · · · · · · · · · · · · · · · · · ·			
	(2) Two-point				
	(3) One-point				
	(4) Perspective projection is not used to	draw railway lines			
13.	After performing Y-shear transformation the constant value is 2, then original coo	on on triangle we get $A(2,5),B(4,11),C(2,7)$ . If rdinates will be:			
,	(1) A(2, 5), B(4, 11),C(2, 7)	and the second of the second o			
•	(2) A(2, 1), B(4, 3), C(2, 3)				
	(3) A(4, 1), B(10,3), C(4, 3)				
	(4) A(5, 11), B(3, 4),C(3, 2)				
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is

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14.	In the context of modular software design, which one of the following combinations desirable:  (1) High cohesion and high coupling  (2) High cohesion and low coupling  (3) Low cohesion and high coupling  (4) Low cohesion and low coupling		
15.	GSM is an example of:  (1) TDMA cellular systems  (2) FDMA cellular systems  (3) CDMA cellular systems  (4) SDMA cellular systems		
16.	<ol> <li>A key concept of quality control is that all work products:</li> <li>(1) Are delivered on time and under budget</li> <li>(2) Have complete documentation</li> <li>(3) Have measurable specifications for process outputs</li> <li>(4) Are thoroughly tested before delivery to the customer</li> </ol>		
17.	The theoretic concept that will be useful in software testing is:  (1) Hamiltonian circuit		

- (2) Cyclomatic number
- (3) Eulerian Cycle
- (4) None of these
- 18. Which is not a task of software Configuration Management?
  - (1) Version control

(2) Reporting

(3) Change management

(4) Ouality control

- 19. The requirement analysis is performed in:
  - (1) System design phase
  - (2) System development phase
  - (3) System analysis phase
  - (4) System testing phase

20. Consider the following C code. Assume that unsigned long int type length is 64 bits.

unsigned long int fun(unsigned long int n) {

unsigned long int i, j, j=0, sum = 0;

for 
$$(i = n; i > 1; i = i/2) i++;$$

for 
$$(; j > 1; j = j/2)$$
 sum++;

return sum:

}

The value returned when we call fun with the input  $2^{40}$  is:

(1) 4

(2) 5

(3) 6

- (4) 40
- 21. The web browser request goes to the server in:
  - (1) Hex form

(2) ASCII form

(3) Binary form

- (4) Text form
- 22. What does error 404 or Not Found error while accessing a URL mean?
  - (1) The server could not find the requested URL
  - (2) Requested HTML file is not available
  - (3) The path to the interpreter of the script is not valid
  - (4) The requested HTML file does not have sufficient permissions
- 23. Which of the following can be used to store 1 bit of data?
  - (1) Encoder

(2) OR gate

(3) Flip-Flop

- (4) Decoder
- 24. Which one of the following about the MIPS rating of a computer is FALSE?
  - (1) MIPS rating of a computer depends on the compiler being used
  - (2) MIPS rating of a processor is independent of the Program is being executed
  - (3) MIPS rating of a computer can vary based on which instructions of a processor are being considered.
  - (4) MIPS rating of a computer depends upon the clock rate of the processor

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<b>25.</b>	The interval from the time of submission of a process to the time of completion is termed as:
	(1) waiting time (2) turn around time
	(3) response time (4) throughput
26.	In FTP protocol, client contacts server using as the transport protocol.
	(1) transmission control protocol
,	(2) user datagram protocol
	(3) datagram congestion control protocol
- 1	(4) stream control transmission protocol
27,	Which of the following would cause the Page Fault frequency in an operating system to reduce?
	<ol> <li>(1) Cache memory size is increased</li> <li>(2) Size of pages is reduced</li> <li>(3) Executing processes remain CPU bound</li> <li>(4) Executing processes exhibit high locality of reference</li> </ol>
28.	The technique of memory compaction and reuse of memory can be applied to overcome the problem of:  (1) External fragmentation  (3) Page Fault  (4) Swapping
29.	For a 10 Mbps Ethernet link, if the length of the packet is 32 bits, the transmission delay is
30.	In a compiler, keywords of a language are recognized during

31.	The best data structure to check whether an arithmetic expression has balanced parentheses is a :				
	(1) stack	(2) queue			
	(3) tree	(4) list			
32.	In inheritance, order of execution of base	e class and derived class destructors are:			
	(1) Base to derived	(2) Derived to base			
	(3) Random order	(4) none			
33.	3. What logic function is obtained by adding an inverter to the inputs of an OR gate?				
	(1) OR	(2) NAND			
	(3) XOR	(4) NOR			
34.	A C program contains the following dec	claration:			
	static int $X(8) = \{10, 20, 30, 40, 50, 60,$	70, 80}			
	What are the values of $(*X +2)$ and $*(X + 2)$	+2) ?			
	(1) 10, 30	(2) 10, 32			
	(3) 30, 12	(4) 12, 30			
35.	Which of the application layer loT Proto	cols uses telemetry communication pattern?			
	(1) COAP	(2) MQTT			
	(3) AMQP	(4) None of the above			
36.	Suppose V is a signed 16-bit integer with hexadecimal value $0 \times 369$ C. What will be the result of V<<4?				
	(1) $0 \times 669$ C	(2) $0 \times 69C0$			
	(3) 0 × 0369	(4) None of the above			

37.	A computer has five resor	arces, with n	processes	competing	for them.	Each p	rocess
	may need two resources.	What is the	maximum	value of	n for the	system	to be
	deadlock free?						

(1) 5

(2) 4.

(3) 3

(4) 2

38. Which of the following condition is required for a deadlock to be possible?

- (1) mutual exclusion
- (2) a process may hold allocated resources while awaiting assignment of other resources
- (3) no resource can be forcibly removed from a process holding it
- (4) all of the mentioned

39. Let G be a simple undirected planar graph of 10 vertices with 15 edges. If G is a connected graph, then the number of bounded faces in any embedding of G on the plane is equal to:

(1) 6

(2) 5

(3) 4

(4) 3

**40.**  $(p \rightarrow r) \lor (q \rightarrow r)$  is logically equivalent to :

(1)  $(p \wedge q) \vee r$ 

(2)  $(p \lor q) \rightarrow r$ 

(3)  $(p \land q) \rightarrow r$ 

(4)  $(p \rightarrow q) \rightarrow r$ 

41. Which of the following problems is NOT NP-hard?

- (1) Hamiltonian circuit problem
- (2) The 0/1 Knapsack Problem
- (3) The graph colouring problem
- (4) None of these

42. PGP encrypts data by using a block cipher called:

- (1) International data encryption algorithm
- (2) Private data encryption algorithm
- (3) Internet data encryption algorithm
- (4) Local data encryption algorithm

- The following numbers are inserted into an empty binary search tree in the given 43. order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree?
  - (1) 2

(2) 3

(3) 4

(4) 6

- Correct statements about static function in C++ code are:
  - (I) Static function of a class can be called by class name using scope resolution operator i.e.
  - (II) Static function can receive both static and non-static data members of a class
  - (III) Static function is not the part of an object of a class
  - (1) I and II

(2). 1 only

(3) I and III

struct item

(4) I, II and III

Consider the function f defined below:

```
int data;
struct item * next;
};
int f(struct item *p)
return (
     (p == NULL) \parallel
     (p-\text{next} == \text{NULL}) \parallel
    ((P->data \le p->next->data) \&\& f(p->next))
    );
```

For a given linked list p, the function f returns 1 if and only if:

- (1) the list is empty or has exactly one element
- (2) the elements in the list are sorted in non-decreasing order of data value
- (3) the elements in the list are sorted in non-increasing order of data value
- (4) not all elements in the list have the same data value

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46.	What is the purpose of bin directory in L	inux environment?
	(1) Contains essential device files	(2) Contains essential binary commands
	(3) Containing configuration files	(4) Contains user home directories
47.	The maximum number of nodes in a tre may be equal is:	e for which post-order and pre-order traversal
	(1) 1	(2) 2
	(3) 3	(4) any number
48.	In a C programming language $x - = y +$	1 means:
	$(1) \ \ x = -x - y - 1$	(2) $x = x - y + 1$
	(3) $x = x - y - 1$	(4)  x = -x + y + 1
49.		and 4. The transfer function is linear, with the to 2. The inputs are 4,10,5, and 20 respectively
	(1) 76	(2) 238
1	(3) 123	(4) 119
50.	C++ abstract class can contain:	
,	(1) Pure virtual function	(2) Non-virtual function
	(3) Only pure virtual function	(4) Both pure virtual and non-virtual functio
51.	Which search is similar to minimax sea	rch?
•	(1) Hill-climbing search	(2) Depth-first search
	(3) Breadth-first search	(4) All of these
52.	Which of the following can be identified	ed as the cloud?
	(1) Intranet	(2) Hadoop
. , 2	(3) Web applications	(4) All of the above
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53.	In which ANN, loops are allow	ved ?	accompanied (10°)	
	(1) FeedForward ANN	(2) FeedBack /	ANN	
	(3) Both (1) and (2)	(4) None of the	Above	
54.	Choose the best matching betw	veen the Group 1 and their	characteristics in Group 2.	
	Group – 1	Group – 2		
	P Regular expression 1	. Syntax analysis		
	Q Pushdown automata 2	. Code generation		
	R Dutaflow analysis 3	. ' Lexical analysis	od rangely product	
	S Register allocation 4	. Code optimization		
	(1) P-3, Q-2, R-1, S-4	(2) P-3, Q-1, R	-4, S-2	
	(3) P-4, Q-2, R-1, S-3	(4) P-1, Q-2, R	-3, S-4	
55.	The total number of states requi	ired to automate the given	regular expression(00)*(11)	ĸ
	(1) 3	(2) 4	to g	
	(3) .5	(4) 6		
6.	Consider the following Syntaterminals {S, A} and terminals {		Scheme (SDTS), with no	n
	$S \rightarrow aA \{\{Print 1\}$			
,	$S \rightarrow a \{Print 2\}$		Your service of the s	
,	$A \rightarrow Sb \{Print 3\}$	physical and the second	the state of the s	
	(1) 1 3 2	(2) 2 2 3		
	(3) 2 3 1	(4) Syntax error	man i	

**57.** Which of the following is *not* a horn clause?

(1) p

(2)  $\phi p \vee q$ 

(3)  $p \rightarrow q$ 

(4)  $p \rightarrow \phi q$ 

58. What is recurrence for worst case of QuickSort and what is the time complexity in Worst case?

- (1) Recurrence is T(n) = T(n-2) + O(n) and time complexity is  $O(n^2)$
- (2) Recurrence is T(n) = T(n-1) + O(n) and time complexity is  $O(n^2)$
- (3) Recurrence is T(n) = 2T(n/2) + O(n) and time complexity is  $O(n \log n)$
- (4) Recurrence is T(n) = T(n/10) + T(9n/10) + O(n) and time complexity is O(nLogn)

59. How many states of a DFA can be converted from an NFA with n states?

(1) n

(2) n2

(3) 2n

(4) None of these

60. Consider the intermediate code given below:

- 1. i = 1
- 2. i = 1
- 3. t1=5\*i
- 4. t2 = t1 + j
- 5. t3 = 4 \* t2
- 6. t4 = t3
- 7. a[t4] = -1
- 8. j = j + 1
- 9. if  $j \le 5 \text{ goto}(3)$ 
  - 10. i = i + 1
  - 11. if i < 5 goto(2)

The number of nodes and edges in the control-flow-graph constructed for the above code, respectively, are :

- (1) 5 and 7
- (2) 6 and 7
- (3) 5 and 5
- (4) 7 and 8

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61.	Which one of the following is NOT desired in a good Software Requirement Specifications(SRS) document?			
	(1) Functional Requirements			
	(2) Non-Functional Requirements			
	(3) Goals of Implementation			
	(4) Algorithms for Software Implementation			
62.	Which of the following is a widely used and effective machine learning algorithm based on the idea of bagging?			
	(1) Decision Tree (2) Regression			
	(3) Classification (4) Random Forest			
63.	The transport layer protocols used for real time multimedia, file transfer, DNS and email, respectively are:			
	(1) TCP, UDP, UDP and TCP			
	(2) UDP, TCP, TCP and UDP			
	(3) UDP, TCP, UDP and TCP			
	(4) TCP, UDP, TCP and UDP			
64.	Which of the following protocols is used to map MAC address to IP address?			
	(1) ARP (2) RAPP			
	(3) DNS (4) None of the above			
65.	Packets of the same session may be routed through different paths in:			
	(1) TCP, but not UDP			
	(2) UDP, but not TCP			
	(3) TCP and UDP			
	(4) Neither TCP, nor UDP			
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labeled R. Determine how many times	are connected through two intermediate routers each packet has to visit the network layer and from S to D.
(1) Network layer – 4 times and Data lin	nk layer – 4 times
(2) Network layer – 4 times and Data lin	nk layer – 6 times
(3) Network layer – 2 times and Data lin	nk layer – 6 times
(4) None of the above	
Which of the following is/are example(s	) of stateful application layer protocols?
(i) HTTP	(ii) FTP
(iii) TCP	(iv) POP3
(1) (i) and (ii) only	(2) (ii) and (iii) only
(3) (ii) and (iv) only	(4) (iv) only
In project 802, the data link layer of sublayer.	consists of the sublayer and the
(1) LAN, MAC	(2) LLC, MAC
(3) CSMA, LLC	(4) LLC, PDU
If subnet addresses are 129.253.4.0,129 the subnet mask?	.253.8.0,129.253.12.0 and 129.253.16.0 What is
(1) 129.253.7.0	(2) 129.253.31.0
(3) 129.253.192.0	(4) 129.253,252.0
	dress?
*	(2) 32 bits
	(4) 64 bits
(5) 10 010	
	labeled R. Determine how many times the data link layer during a transmission  (1) Network layer – 4 times and Data lin  (2) Network layer – 4 times and Data lin  (3) Network layer – 2 times and Data lin  (4) None of the above  Which of the following is/are example(s  (i) HTTP  (iii) TCP  (1) (i) and (ii) only  (3) (ii) and (iv) only  In project 802, the data link layer on sublayer.  (1) LAN, MAC  (3) CSMA, LLC  If subnet addresses are 129.253.4.0,129 the subnet mask?

71. The set { 1, 2, 4, 7, 8,11,13, 14} is a group under multiplication modulo 15. The inverses of 4 and 7 are respectively:

(1) 3 and 13

(2) 2 and 11

(3) 4 and 13

(4) 8 and 14

72. Thread synchronization is required because:

- (1) all threads of a process share the same address space
- (2) all threads of a process share the same global variables
- (3) all threads of a process can share the same files
- (4) all of the mentioned

73. In the transfer of file between server and client, if the transmission rates along the path is 10 Mbps, 20 Mbps, 30 Mbps, 40 Mbps. The throughput is usually:

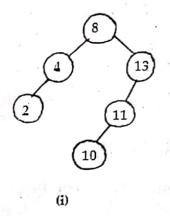
(1) 10 Mbps

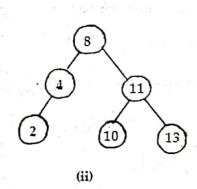
(2) 20 Mbps

(3) 40 Mbps

(4) 50 Mbps

74. Which of the below diagram is following AVL tree property?





(1) only i

(2) only ii

(3) Both i and ii

(4) i is not a binary search tree

75. A connected planar graph having 6 vertices, 7 edges contains ...... regions.

(1) 15

(2) 3

(3) 1

(4) 11

U	
76.	Which of the following statements are correct?
	S1: $\{02n \mid n \ge 1\}$ is a regular language S2: $\{0m \mid 0n \mid 0(m+n) \mid 1m \ge 1 \mid 1m \mid 1m \ge 1\}$ is a regular language
	(1) S2 Only (2) S1 Only (3) But of the Logo (4) Name of S1 and S2 is correct
	(3) Both SI and S2 (4) None of S1 and S2 is correct
77.	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'?
	(1) Each leaf node has a pointer to the next leaf node
	(2) Non-leaf nodes have pointers to data records
	(3) B+ Tree is a height-balanced tree
	(4) Key values in each node are kept in sorted order
78.	The Viewing plane or the projector is set up in which of the following position?
	(1) Perpendicular to x and aligned with y, z
	(2) Perpendicular to y and aligned with x, z
	(3) At origin
•	(4) Perpendicular to z and aligned with x, y
79.	What is the file size of a 640 by 480 pictures of 256 colours in a 8- bit resolution?
	(1) 128 KB (2) 300 KB
	(3) 900 KB (4) 1024 KB
80.	Which of the following is TRUE?  (1) Every relation in 3NF is also in BCNF

- (2) A relation R is in 3NF if every non prime attribute of R is fully functionally dependent on every key of R
- (3) Every relation in BCNF is also in 3NF
- (4) No relation can be in both BCNF and 3NF

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81	. What must be the base of the number	er, if expression 4 +2 =11 is true?
	(1) 7	(2) 6
	(3) 5	(4) 4
82	<ul> <li> input values will cause an A</li> <li>(1) At least one input is HIGH</li> <li>(3) All inputs are LOW</li> </ul>	ND logic gate to produce a HIGH output.  (2) At least one input is LOW  (4) All inputs are HIGH
83	. Which of the following set of gates	can be used in a Full-Adder?
	(1) Two half-adders and one OR ga	te
	(2) Two OR gates and one half-add	er -
	(3) One half-adder and two OR gate	<b>28</b>
	(4) One OR gate and one half-adder	and the second of the second o
84.	<ol> <li>(1) Deterministic finite automata(DI)</li> <li>(2) Deterministic push down automata(NPDA)</li> <li>(3) Deterministic single-tape Turing machine</li> <li>(4) Single-tape Turing machine and</li> </ol>	FA) and Non-deterministic finite automata (NFA) omata(DPDA) and Non-deterministic push downing machine and Non-deterministic single-tape multi-tape Turing machine
85.	A combinational logic circuit which more source through a single transmit	is used when it is desired to send data from two or ssion line is known as:
	(1) encoder	(2) decoder
-/	(3) multiplexer	(4) demultiplexer
86.	Which one of the following RAID storage?	levels provides the maximum reliability of data
	(1) RAID 10	(2) RAID 4
	(3) RAID 5	(4) RAID 6
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87.	How long is an IPv4 and IPv6 address re	spectively?
*	(1) 64 bits, 32 bits	(2) 32bits, 64 bits
	(3) 128bits, 32 bits	(4) 32 bits, 128 bits
88.	Which binary number represents 2' comp	plement of the Hexadecimal number DEAF?
	(1) 0010 0001 0101 0111	(2) 1101 1110 1010 1111
	(3) 0010 0001 0101 0011	(4) 0010 0001 0101 0001
89.	Which of the following services use TCI	??
	(i) DHCP (ii) SMTP (iii) HTTP (iv) TFT	TP (v) FTP
	(1) (i) and (ii)	(2) (ii), (iii) and (v)
	(3) (i), (ii) and (iv)	(4) (i), (iii) and (iv)
90.	<ul> <li>Identify the <i>correct</i> statement about the</li> <li>(1) XML must be used to produce XMI</li> <li>(2) XML can not specify or contain pres</li> <li>(3) XML is used to describe hierarchical</li> <li>(4) XML performs the conversion of applications.</li> </ul>	and HTML output. sentation information
91.		(2) $J = 1, K = 0$ (4) $J = 1, K = 1$
92.	In which 0SI layers does the FDDI proto	ocol operate?
	(I) Physical	(II) Data link
	(III) Network	t de la companya del companya de la companya del companya de la co
•	(1) I and II	(2) II and III
	(3) I and III	(4) None
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93	Number of flip-flops used in de	cade counter:
	(1) 3	(2) 2
	(3) 4	(4) None of these
94.	The Octal number equivalent of	the decimal number 489 is:
	(1) 750	(2) 752
	(3) 329	(4) 751
95.	If the size of the stack is 10 ar condition is known as:	d we try to add the 11th element in the stack then the
	(1) Underflow	(2) Garbage collection
	(3) Overflow	(4) None
96.	following can be valid host IDs	IP address on Ethernet: 172.16.2.1/23. Which of the on the LAN interface attached to the router? 8 (iii) 172.16.2.255 (iv) 172.16.3.0
	(1) (i) only	u ni migliodik Ka koj (Odmii mistrali + 15 )
1	(2) (ii) and (iii) only	r moligier is a responsible med testes, and a Chemist is grant. The minute interposition good is the control of component
	(3) (iii) and (iv) only	+ STAR GORD C
	(4) None of these	
97.	If the baud rate is 400 for a 4-PS	K signal, the bit rate is bps.
	(1) 1600	(2) 800
	(3) 400	(4) 100
98.	A binary search tree whose left unit is called	subtree and right subtree differ in height by at most 1
	(1) Lemma tree	(2) Red Black tree
	(3) AVL tree	(4) None of the above
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99. What will be the output of the following C code'?

```
#include <stdio.h>
int main()
{ int const a = 5;
a++;
printf("%d",a);
}
(1) 5 (2) 6
```

(3) Compile time error

- (4) Runtime error
- 100. Which of the following option is not correct?
  - (1) If the queue is implemented with a linked list, keeping track of a front pointer, Only rear pointers will change during an insertion into an non-empty queue.
  - (2) Queue data structure can be used to implement least recently used (LRU) page fault algorithm and Quick short algorithm.
  - (3) Queue data structure can be used to implement Quick short algorithm but not least recently used (LRU) page fault algorithm.
  - (4) Both (1) and (3)

An	swer Key of	Ph.D/URS	Entrance Exa	ım 2021-22
	(C	omputer Sc	ience/CSE)	
Q. No.	Α	В	С	
1	4	1	3	D 2
2	1	2	4	3
3	3	2	1	2
4	4	4		2
5	3	2	3	1
6	3	2	2	2
7	2	2	3	4
8	3	4	2	1
9	3	1	4	1
10	3		2	3
11	1	3	3	3
12	2	2	3	4
13	2	1 -	4	3
14	4	2	1	2
.5	2	3	2	2
6	2	2	3	1
.7	2	2	1	3
.8	4	1 .	4	2
.9		3 '	4	4
0	1	2 ·	2	3
1	3	4	3	2
2	3	3	4	2
3	4	2	1	1
4	1	2.	3	3
5	2	1.	4	2
6	3	2	3	2
	1	4	3	1
7	4	1	2	4
8	4	1	3	1
9	2	3	3	1
)	3	3 ·	3	2
1	2	4	2	1
2	1	3	1	2
3	3	2	2	2
1	2	2	3	4
5	2	1	2	2
j	1	3	2	2
	4	2	1	2
	1	4	3	4
	1	3	2	1
	2	2	4	3
	3	2	2	2
	4	1	2	1
	1	3	2	2
	3	2	2	3
	2	2	3	2
	3	1	3	2
	2	4	4	1
	4	1	2	3
	2	1	3	2
	3	2	2	4

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51				2
52	4	3	1	2
53	3	4		2
54	2	1	3	2
55	2	2	2	
56	1	3	2	3
57	3	1	1	3
58	2	4	4	4
59	4	4	1	2
60	3	2	1	3
61	2	3	2	2
	2	3	3	4
62	2	4	2	4
63	2	1	2	3
64	2	3	1	2
65	3	2	2	3
66	3	3	4	2
67	4	2	1	3
68	2	4	1	2
69	3	2	3	4
70	2	3	3	3
71	3	2	4	3
72	2	2	4	4
73	2	2	3	1
74	1	2	2	3
75	2	3	3	2
76	4	3	2	3
77	1	4	3	2
78	1	2	2	4
79	3	3	4	2
80	3	2	3	3
81	4	4	1	3
82	4	1	2	4
33	3	3	2	1
34	2	4	4	2
35	3	3	2	3
36	2	3	2	1
37	3	2	2	4
38	2	3	4	4
39	4	3	1	2
90	3	3 ,	3	3
1	2	4 -	4	4
2	1	4	3	1
3	2	3 ·	2	3
4	3	2	2	4
5	2	3	1	3
6	2	2 .	3	3
7	1	3	2	2
8	3	2 ·	4	3
9	2	4 .	3	3
00	4	3 ·	2	3

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