

SET-“X”

(Total No. of printed pages : 31)

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

(PHD/URS-EE-DECEMBER-2022)

Sr. No. 10053

Code

A

COMPUTER SCIENCE

Time : 1¼ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (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 book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / 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 and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. 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 book-let itself. Answers MUST NOT be ticked in the Question book-let.
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 BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



X-132
A-9boc

SET-X
Code-A

Question No.	Questions	Answers
1.	<p>Which of the following is equal to the logical expression $(X \wedge Y) \rightarrow (Z \wedge X) \rightarrow (X=1)$?</p> <p>(1) Contradiction (2) Valid (3) First Order Logic (4) None of the above</p>	
2.	<p>The minimum number of colors needed to color a graph having n (>3) vertices and 2 edges is :-</p> <p>(1) 1 (2) 2 (3) 3 (4) 4</p>	
3.	<p>A graph with n vertices will definitely have a parallel edge or self-loop, if the total number of edges are :-</p> <p>(1) Less than $(n-1)$ (2) Greater than $(n-1)/2$ (3) Greater than $(n-1)$ (4) Greater than $n(n-1)/2$</p>	
4.	<p>A PERT network has 09 activities on its critical path. The standard deviation of each activity on the critical path is 03. The standard deviation of the critical path is :</p> <p>(1) 03 (2) 09 (3) 27 (4) 81</p>	
5.	<p>Two people : Amar and Akbar have picked 10 Mangoes, 15 Banana and 14 Apples. What is the number of ways they can divide the fruits between them :</p> <p>(1) 2640 (2) 2100 (3) 1638 (4) 1148</p>	

PHD/URS-EE-DEC-2022 (Computer Science) Code-A
(1)

Question No.	Questions
6.	<p>A six sided unbiased dice with 04 Green faces and 04 Blue faces is rolled seven times. Which of the following combinations is the most likely outcome of the experiment?</p> <p>(1) 03 Green faces and 04 Blue faces (2) 04 Green faces and 03 Blue faces (3) 05 Green faces and 02 Blue faces (4) 05 Green faces and 01 Blue face</p>
7.	<p>A bag contains 2 Pens, 3 Pencils and 4 Sharpeners. Item are drawn from the bag at random, one at a time, without replacement. The probability of drawing 2 Pen first followed by 3 Pencils and subsequently the 4 Sharpeners is :</p> <p>(1) 3/560 (2) 2/315 (3) 1/1260 (4) 1/2443</p>
8.	<p>In a graph, if $e = (u, v)$, then if means :-</p> <p>(1) u is adjacent to v but v is not adjacent to u (2) e begins at u and ends at v (3) u is predecessor and v is successor (4) both (2) and (3)</p>

Question No.	Questions
9.	<p>An examination consists of two papers; X and Y. The probability of failing in X is 0.3 and that in Y is 0.2. Given that a student has failed in Y, the probability of failing in X is 0.6. The probability of a student failing in both the papers is :-</p> <p>(1) 0.06 (2) 0.50 (3) 0.12 (4) 0.18</p>
10.	<p>Honda Automobile contracted to buy shock absorbers from two suppliers X and Y. X supplies 60% and Y supplies 40% of the shock absorbers. All shock absorbers are subjected to a quality test. The ones that pass the quality test are considered reliable. Of X's shock absorbers, 96% are reliable. Of Y's shock absorbers, 72% are reliable. The probability that a randomly chosen shock absorber, which is found to be reliable, is made by Y is :</p> <p>(1) 0.720 (2) 0.667 (3) 0.334 (4) 0.288</p>
11.	<p>Convert the following SOP expression to an equivalent POS expression :-</p> <p>$ABC + A\bar{B}\bar{C} + A\bar{B}C + AB\bar{C} + \bar{A}\bar{B}C$</p> <p>(1) $(A+B+C)(A+\bar{B}+C)(A+\bar{B}+\bar{C})$ (2) $(\bar{A}+\bar{B}+\bar{C})(A+\bar{B}+C)(A+\bar{B}+C)$ (3) $(\bar{A}+\bar{B}+\bar{C})(A+B+C)(\bar{A}+B+C)$ (4) $(A+B+C)(\bar{A}+B+\bar{C})(A+\bar{B}+C)$</p>

**SET-X
Code-A**

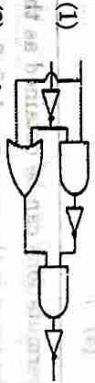

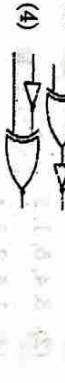

X-T32
A-9b0c

Question No.	Questions
12.	'Aging registers' are : (1) Registers which keep track of when the program was last accessed (2) Counters to keep track of last accessed instruction (3) Counters to keep track of the latest data structures referred (4) Counters which indicate how long ago their associated pages have been referenced
13.	Which circuit is generated from D-flip flop due to addition of an inverter by causing reduction in the number of inputs? (1) Gated JK - latch (2) Gated D - latch (3) Gated SR- latch (4) Gated T- latch
14.	The most efficient method followed by computers to multiply two unsigned numbers is :- (1) Booth algorithm (2) Restoring algorithm (3) Bit pair recording of multipliers (4) Non restoring algorithm
15.	In signed-magnitude binary division, if the dividend is $(11100)_2$ and divisor is $(10011)_2$ then the result is :- (1) $(01101)_2$ (2) $(10100)_2$ (3) $(11001)_2$ (4) $(01100)_2$

PHD/URS-EE-DEC-2022 (Computer Science) Code-A (4)

**SET-X
Code-A**

X-T32
A-9b0c

Question No.	Questions
16.	Consider an instruction pipeline with five stages without any branch prediction : Fetch Instruction (FI) Decode Instruction (DI), Fetch Operand (FO), Execute Instruction (EI) and Write Operand (WO). The stage delays for FI, DI, FO, EI and WO are 5 ns, 7ns, 10 ns, 8 ns and 6 ns, respectively. There are intermediate storage buffers after each stage and the delay of each buffer is 1 ns. A program consisting of 12 instructions $I_1, I_2, I_3, \dots, I_{12}$ is executed in this pipelined processor. Instruction I_4 is the only branch instruction and its branch target is I_7 . If the branch is taken during the execution of this program, then the time (in ns) needed to complete the program will be : (1) 256 (2) 128 (3) 265 (4) 165
17.	How many 3-to-8 line decoders, with an enable input, are needed to construct at 6-to-64 line decoder, without using any other logic gates? (1) 32 (2) 16 (3) 8 (4) 4
18.	Which one of the following circuits is not equivalent to a 2-input XNOR (exclusive NOR) gate? (1)  (2)  (3)  (4) 

PHD/URS-EE-DEC-2022 (Computer Science) Code-A (5)

Question No.	Questions
19.	<p>Which memory is difficult to interface with processor?</p> <p>(1) Static memory (2) ROM (3) Dynamic Memory (4) None of these</p>
20.	<p>Consider evaluating the following expression tree on a machine with load-store architecture, in which memory can be accessed only through load and store instructions. The variables a, b, c, d and e initially stored in memory. The binary operators used in this expression tree can be evaluated by the machine, only when the operands are in registers. The instructions produce result only in a register. If no intermediate results can be stored in memory, what will be the minimum number of registers needed to evaluate this expression?</p> <p>(1) 2 (2) 3 (3) 5 (4) 7</p>
21.	<p>Which one of the following permutations can be obtained as the output using stack assuming that the input is the sequence 1, 2, 3, 4, 5 in that order :-</p> <p>(1) 3, 4, 5, 2, 1 (2) 3, 4, 5, 1, 2 (3) 5, 4, 3, 1, 2 (4) 1, 5, 2, 3, 4</p>

Question No.	Questions
22.	<p>Following is C like pseudo code of a function that takes a Queue Q as an argument, and uses a stack S to do processing.</p> <pre>void fun (Queue *Q) { stack S; // Creates an empty stack S // Run while Q is not empty while (!isEmpty(Q)) { // dequeue an item from Q and push the dequeued item to S push (&S, dequeue (Q)); } // Run while Stack S is not empty while (!isEmpty(&S)) { // Pop an item from S and enqueue the popped item to Q enqueue(Q, pop (&S)); } }</pre> <p>(1) Removes the last from Q (2) Keeps the Q same as it was before the call (3) Reverses the Q (4) Makes Q empty</p>

Question No.	Questions	Options
23.	<p>Consider the following function implemented in C :-</p> <pre>void goto (int x, int y) { int *ptr; x = 0; ptr = &x; y = *ptr; *ptr = 1; print f ("%d, %d", x, y); }</pre> <p>The output of invoking goto (1, 1) will be which of the following :-</p>	<p>(1) 0, 0 (2) 1, 0 (3) 0, 1 (4) 1, 1</p>
24.	<p>What will be the output when you compile and run the following C code?</p> <pre>#include<stdio.h> int main () { static char *s[] = {"black", "white", "pink", "violet"}; char ** ptr[] = {s+3, s+2, s+1, s}, ***p; p = ptr; ++p; printf("%s", **p+1); return 0; }</pre>	<p>(1) ite (2) ack (3) ink (4) let</p>

Question No.	Questions	Options
25.	<p>What will be the output of the program?</p> <pre>#include<stdio.h> int main () { int i = 4, j = 8; printf("%d, %d, %d\n", i j & i i j & i, i ^ j); return 0; }</pre>	<p>(1) 112, 1, 2 (2) 12, 12, 12 (3) 32, 1, 12 (4) -64, 1, 12</p>
26.	<p>If a node in a BST has two sub-tree, then its in-order predecessor has :-</p>	<p>(1) no right child (2) no left child (3) two children (4) no child</p>
27.	<p>What will be the output of the following C program?</p> <pre>void count(int n) { static int d = 1; printf("%d", n); printf("%d", d); d++; if(n>1) count(n-1); printf("%d", d); } void main() { count(3); }</pre>	<p>(1) 312213444 (2) 312111333 (3) 3121112 (4) 3122134</p>

Question No.	Questions
28.	<p>In the array implementation of circular queue, which of the following operation takes linear time in the worst case?</p> <p>(1) To empty a queue (2) Deletion (3) Insertion (4) None</p>
29.	<p>Correct syntax to pass a Function Pointer as an argument</p> <p>(1) void pass(int (*fptr)(int, float, char)){} (2) void pass(*fptr)(int, float, char){} (3) void pass (int (*fptr)){} (4) void pass(*fptr){}</p>
30.	<p>Consider the following recursive C function that takes two arguments :- unsigned int join (unsigned int n, unsigned int r) { if (n > 0) return ((n%r) + join(n/r, r)); else return 0; }</p> <p>What is the return value of the function join when it is called as join (345, 10)?</p> <p>(1) 96 (2) 48 (3) 24 (4) 12</p>
31.	<p>A file is organized so that the ordering of data records is the same, as or close to the ordering of data entries in some index. Which one of the following is that Index?</p> <p>(1) Dense (2) Clustered (3) Sparse (4) Unclustered</p>

Question No.	Questions
32.	<p>Using Relational Algebra the query that finds customers, who have a balance of over 1000 is :-</p> <p>(1) Π Customer_name (σ balance > 1000 (Deposit)) (2) σ Customer_name (Π balance > 1000 (Deposit)) (3) Both of the above (4) None of the above</p>
33.	<p>Which of the following can be addressed by enforcing a referential integrity constraint?</p> <p>(1) All phone numbers must include the area code (2) Certain fields are required (such as the email address, or phone number) before the record is accepted (3) Information on the customer must be known before anything can be sold to that customer. (4) When entering an order quantity, the user must input a number and not some text (i.e., 12 rather than 'a dozen')</p>
34.	<p>Consider the following transactions with data items P and Q initialized to zero :</p> <p>T1 : read (P) ; read (Q) ; if P = 0 then Q := Q + 1 ; write (Q) ; T2 : read (Q) ; read (P) ; if Q = 0 then P := P + 1 ; write (P) ;</p> <p>Any non-serial interleaving of T1 and T2 for concurrent execution leads to:-</p> <p>(1) A serializable schedule (2) A conflict serializable schedule (3) A schedule for which a precedence graph cannot be drawn (4) A schedule that is not conflict serializable</p>

Question No.	Questions	Options
35.	Which normalization form is based on the transitive dependency?	(1) 1 NF (2) 2 NF (3) 3 NF (4) 4 NF
36.	Which normal form deals with multivalued dependency?	(1) 1 NF (2) 2 NF (3) 3 NF (4) 4 NF
37.	Which of the following is known as minimal super key?	(1) Primary Key (2) Candidate Key (3) Foreign Key (4) Unique Key
38.	Which of the following will be the maximum children of a B-tree of order n?	(1) n/2 (2) n + 1 (3) n (4) n - 1
39.	Which of the following can replace the below query? SELECT name, course_id FROM instructor, teacher WHERE instructor_ID = teacher_ID;	(1) select name, course_id from instructor natural join teacher; (2) select name, course_id from teacher, instructor where instructor_id = course_id; (3) select name, course_id from instructor (4) select course_id from instructor join teacher

Question No.	Questions	Options															
40.	NATURAL JOIN can also be termed as	(1) Combination of Union and Cartesian Product (2) Combination of Selection and Cartesian Product (3) Combination of Projection and Cartesian Product (4) Combination of Union and Projection															
41.	A multithreaded program P executes with x number of threads and uses y number of locks for ensuring mutual exclusion while operating on shared memory locations. All locks in the program are non-re-entrant, i.e., if a thread holds a lock l, then it cannot re-acquire lock l without releasing it. If a thread is unable to acquire a lock, it blocks until the lock becomes available. The minimum value of x and the minimum value of y together for which execution of P can result in a deadlock are :-	(1) x = 1, y = 2 (2) x = 1, y = 1 (3) x = 2, y = 1 (4) x = 2, y = 2															
42.	An Operating System uses Shortest Remaining Time first (SRTF) process scheduling algorithm. Consider the arrival times and execution times for the following processes :-	<table border="1"> <thead> <tr> <th>Process</th> <th>Execution Time</th> <th>Arrival Time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>20</td> <td>0</td> </tr> <tr> <td>P2</td> <td>25</td> <td>15</td> </tr> <tr> <td>P3</td> <td>10</td> <td>30</td> </tr> <tr> <td>P4</td> <td>15</td> <td>45</td> </tr> </tbody> </table> <p>What is the total waiting time for process P2?</p>	Process	Execution Time	Arrival Time	P1	20	0	P2	25	15	P3	10	30	P4	15	45
Process	Execution Time	Arrival Time															
P1	20	0															
P2	25	15															
P3	10	30															
P4	15	45															

Question No.	Questions
43.	<p>Consider a main memory with five page frames and the following sequence of page references: 3, 8, 2, 3, 9, 1, 6, 3, 8, 9, 3, 6, 2, 1, 3. Which one of the following is true with respect to page replacement policies First In First Out (FIFO) and Least Recently Used (LRU)?</p> <p>(1) LRU incurs 2 more page faults than FIFO (2) Both incur the same number of page faults (3) FIFO incurs 1 more page faults than LRU (4) FIFO incurs 2 more page faults than LRU</p>
44.	<p>Which of the following is shared by threads of a process?</p> <p>(1) neither global variables nor heap (2) heap but not global variables (3) both heap and global variables (4) global variables but not heap</p>
45.	<p>Whenever a process need I/O to or from a disk, it issues :-</p> <p>(1) a system call to the operating system (2) a system call to the CPU (3) a system call to the kernel (4) a system call to the specific API</p>
46.	<p>A computer has twenty physical page frames which contain pages numbered 101 through 120. Now, a program accesses the pages numbered 1, 2, 100 in that order, and repeats the access sequence thrice. Which one of the following page replacement policies experiences the same number of page faults as the optimal page replacement policy for this program?</p> <p>(1) First-in-first-out (2) Most-recently-used (3) Last-in-first-out (4) Least-recently-used</p>

Question No.	Questions
47.	<p>Thread pools help in :-</p> <p>(1) servicing multiple requests using one thread (2) servicing a single request using multiple threads from the pool (3) faster servicing of requests with an existing threads rather than waiting to create a new thread. (4) None of the above</p>
48.	<p>Consider a swapping system in which memory consists of the following hole sizes in memory order:</p> <p>H0 H1 H2 H3 H4 H5 H6 H7 10K 4 KB 20 KB 18 KB 7KB 9 KB 12 KB 15 KB</p> <p>and a successive segment request of 12 KB, 10 KB, 9 KB. Which of the following sentences is/are true?</p> <p>(1) First fit algorithm allocates H2, H0, H3 for the mentioned request (2) Best fit algorithm allocates H2, H0, H3 for the mentioned request (3) First fit algorithm allocates H2, H6, H7 for the mentioned request (4) Worst fit algorithm allocates H2, H3, H6 for the mentioned request</p>
49.	<p>What are the characteristics of Host based IDS?</p> <p>(1) Log are analyzed to detect tails of intrusion (2) The host operating system logs in the audit information (3) Logs includes logins, file opens, and program executions (4) All of the above</p>

Question No.	Questions
50.	<p>What are the characteristics of stack based IDS?</p> <ol style="list-style-type: none"> (1) It is programmed to interpret a certain series of packets (2) It models the normal usage of the network as a noise characterization (3) They are integrated closely with the TCP/IP stack watch packets (4) The host operating system logs in the audit information
51.	<p>Which of the following is the System Development?</p> <ol style="list-style-type: none"> (1) It is development of SRS of a system (2) Process of successive changes of system from new and changed requirement (3) Both (1) and (2) (4) None of the above
52.	<p>Which method recommends that very frequent system builds should be carried out with automated testing to discover software problems?</p> <ol style="list-style-type: none"> (1) Agile method (2) Large systems method (3) Parallel compilation method (4) All of the above
53.	<p>Which of the following is not a major design consideration of the system?</p> <ol style="list-style-type: none"> (1) Data integrity constant (2) Availability of technically qualified personal to carry out design and development (3) Frequency of record updates (4) Response time required

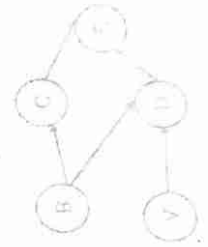
Question No.	Questions
54.	<p>What is the main difference between program testing and system testing?</p> <ol style="list-style-type: none"> (1) System testing is tough and program testing is easy (2) Program testing is more comprehensive than system testing (3) System testing focuses on testing the interfaces between programs, program testing focuses on individual programs. (4) None of the above
55.	<p>Which of the following is the major drawback of RAD model :-</p> <ol style="list-style-type: none"> (1) It requires highly skilled developers/designers (2) It increases the component reusability (3) It necessitates customers feedbacks (4) Both (a) and (b)
56.	<p>Which of the following models doesn't necessitate defining requirements at the earliest in the lifecycle?</p> <ol style="list-style-type: none"> (1) Spiral and Prototyping (2) RAD and Waterfall (3) Prototyping and Waterfall (4) Spiral and RAD
57.	<p>Which of the following is the main intent of project metrics?</p> <ol style="list-style-type: none"> (1) To minimize the development schedule (2) To evaluate the ongoing project's quality on a daily basis (3) Both (1) and (2) (4) None of the above

Question No.	Questions
58.	<p>Which of the following does not complement the decomposition techniques but offers a potential estimation approach for their impersonal growth?</p> <p>(1) Empirical estimation models (2) Decomposition techniques (3) Automated estimation tools (4) Both empirical estimation models and automated estimation tools</p>
59.	<p>In CMM, the life-cycle activities of requirements analysis, design, code, and test are described in which of the following?</p> <p>(1) Software subcontract Management (2) Software Quality Assurance (3) Software Quality Management (4) Software Product Engineering</p>
60.	<p>Which of the following is an incorrect activity for the configuration management of a software system?</p> <p>(1) Change management (2) System management (3) Internship management (4) Version management</p>
61.	<p>A binary tree T has 20 leaves. What will be the number of nodes in T having two children?</p> <p>(1) 17 (2) 18 (3) 19 (4) 20</p>

Question No.	Questions
62.	<p>Let $G = (V, E)$ be any connected undirected edge-weighted graph. The weight of the edges in E are positive and distinct. Consider the following statements :-</p> <p>(i) Minimum Spanning Tree of G is always unique (ii) Shortest path between any two vertices of G is always unique. Which of the above statements is necessarily true?</p> <p>(1) (i) only (2) (ii) only (3) Neither (i) nor (ii) (4) Both (i) and (ii)</p>
63.	<p>Let T be a binary search tree with 15 nodes. The minimum and maximum possible heights of T are. (Please note that the height of a tree with a single node is 0)</p> <p>(1) 5 and 14 respectively (2) 14 and 5 respectively (3) 3 and 14 respectively (4) 14 and 3 respectively</p>
64.	<p>If the address of A [1][1] and A [2] [1] are 1000 and 1010 respectively and each element occupies 2 bytes then the array has been stored in which order?</p> <p>(1) column major (2) row major (3) matrix major (4) none of these</p>
65.	<p>The number of distinct binary trees with 3 nodes, which when traversed in post order gives the sequence A, B, C is :-</p> <p>(1) 3 (2) 9 (3) 5 (4) 7</p>

Question No.	Questions
66.	<p>The height of a tree is the length of the longest root-to-leaf path in it. The maximum and minimum number of nodes in a binary tree of height 5 are :-</p> <p>(1) 63 and 6 respectively (2) 64 and 5 respectively (3) 32 and 6 respectively (4) 31 and 5 respectively</p>
67.	<p>Consider a hash table of size seven, with starting index zero, and a hash function $(3x + 4) \text{ mod } 7$. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that ' _ ' denotes an empty location in the table.</p> <p>(1) 8, _ , _ , _ , _ , _ , 10 (2) 1, 8, 10, _ , _ , _ , 3 (3) 1, _ , _ , _ , _ , _ , 3 (4) 1, 10, 8, _ , _ , _ , 3</p>
68.	<p>From a complete graph having n nodes and e edges, we can construct a spanning tree by removing maximum _____ edges :-</p> <p>(1) $n - e + 1$ (2) $e - n + 1$ (3) $n + e - 1$ (4) $e - n - 1$</p>

Question No.	Questions
69.	<p>In the following DAG, find out the number of required stacks in order to represent it in a Graph Structured Stack :-</p> <pre> graph TD A((A)) --> B((B)) A((A)) --> D((D)) B((B)) --> C((C)) D((D)) --> E((E)) </pre> <p>(1) 1 (2) 2 (3) 3 (4) 4</p>
70.	<p>What will be the Time Complexity to check if an edge exists between two vertices?</p> <p>(1) $O(V^*V)$ (2) $O(V + E)$ (3) $O(1)$ (4) $O(E)$</p>
71.	<p>Let $\langle M \rangle$ be the encoding of a Turing machine as a string over $\Sigma = \{0, 1\}$. Let $L = \{ \langle M \rangle \mid M \text{ is Turing machine that accepts a string of length } 2018 \}$.</p> <p>(1) decidable and recursively enumerable (2) decidable but not recursively enumerable (3) Un-decidable but recursively enumerable (4) Un-decidable and not recursively enumerable</p>

Question No.	Questions
72.	<p>The recurrence relation capturing the optimal execution time of the towers of Hanoi problem with n discs will be, which of the following :-</p> <p>(1) $T(n) = 2T(n-1) + 1$ (2) $T(n) = 2T(n-2) + 2$ (3) $T(n) = 2T(n-1) + n$ (4) $T(n) = 2T(n/2) + 1$</p> 
78.	<p>If $L1$ and $L2$ are regular languages, which among the following is an exception?</p> <p>(1) $L1 - L2$ (2) $L1 \cup L2$ (3) $L1 \cap L2$ (4) All of the above</p>
74.	<p>Let $W(n)$ and $A(n)$ denote respectively, the worst case and average case running time of an algorithm executed on an input of size n. Which of the following is always true?</p> <p>(1) $A(n) = \Omega(W(n))$ (2) $A(n) = O(W(n))$ (3) $A(n) = o(W(n))$ (4) $A(n) = \Theta(W(n))$</p>

Question No.	Questions
75.	<p>An array n numbers is given, where n is an even number. The maximum as well as the minimum of these n numbers needs to be determined. Which of the following is true about the number of comparisons needed?</p> <p>(1) At most $1.5n - 2$ comparisons are needed (2) At least $n \log_2 n$ comparisons are needed (3) At least $2n - c$ comparisons, for some constant, c are needed (4) None of the above</p>
76.	<p>Consider a hash table with 9 slots. The hash function is $h(k) = k \bmod 9$. The collisions are resolved by chaining. The following 9 keys are inserted in the order: 5, 28, 19, 15, 20, 33, 12, 17, 10. The maximum, minimum, and average chain lengths in the hash table, respectively, will be which of the following?</p> <p>(1) 3, 3 and 3 (2) 3, 0 and 1 (3) 0, 1 and 3 (4) 3, 2 and 0</p>
77.	<p>The number of states in the minimal deterministic finite automaton corresponding to the regular expression $(0 + 1)^* (10)$ will be which of the following?</p> <p>(1) 2 (2) 3 (3) 4 (4) 5</p>

Question No.	Questions
76.	<p>A canonical set of items is given below:- $S \rightarrow L > R$ $Q \rightarrow R$</p> <p>On input symbol < the set has, which of the following?</p> <p>(1) a reduce-reduce conflict but not a shift-reduce conflict (2) neither a shift-reduce nor a reduce-reduce conflict (3) a shift-reduce conflict and a reduce-reduce conflict (4) a shift-reduce conflict but not a reduce-reduce conflict</p>
77.	<p>YACC builds up, which of the following?</p> <p>(1) LALR parsing table (2) SLR parsing table (3) Canonical LR parsing table (4) None of these</p>
78.	<p>For the expression grammar $E \rightarrow E^* F I F + E I F$ $F \rightarrow F - I id$</p> <p>Which of the following statement holds true?</p> <p>(1) Precedence of - is higher * (2) Precedence of * is higher + (3) + and - have same precedence (4) Precedence of + is higher *</p>

Question No.	Questions
81.	<p>Consider a network with five nodes, N1 to N5, as shown below</p> <pre> graph TD N1((N1)) --- 3 N2((N2)) N2 --- 6 N3((N3)) N3 --- 2 N4((N4)) N4 --- 4 N5((N5)) </pre> <p>The network uses a Distance Vector Routing Protocol. Once, the Route have stabilized, the distance vectors at different nodes are as under :</p> <p>N1: (0, 1, 7, 8, 4) N2: (1, 0, 6, 7, 3) N3: (7, 6, 0, 2, 6) N4: (8, 7, 2, 0, 4) N5: (4, 3, 6, 4, 0)</p> <p>Each distance vector is the distance of best known path at that instance to nodes, N1 to N5, where the distance to itself is 0. Also, all links are symmetric and the cost is identical in both the directions. In each round, all nodes exchange their distance vectors with their respective neighbors. Then all nodes update the distance vectors. In between two rounds, any change in cost of a link will cause the two incident nodes to change only that entry in their distance vectors. The cost of link N2-N3 reduces to 2 (in both directions). After the next round updates. What will be the new distance vector at node, N3?</p> <p>(1) (6, 4, 1, 0, 2) (2) (3, 2, 0, 2, 5) (3) (7, 2, 0, 6, 3) (4) (3, 1, 6, 0, 2)</p>

**SET-X
Code-A**

Question No.	Questions
82.	<p>Host A sends a UDP datagram containing 8880 bytes of user data to host B over an Ethernet LAN. Ethernet frames may carry data up to 1500 bytes (i.e. MTU = 1500 bytes). Size of UDP header is 8 bytes and size of IP header is 20 bytes. There is no option field in IP header. How many total number of IP fragments will be transmitted and what will be the contents of offset field in the last fragment?</p> <p>(1) 7 and 8880 (2) 7 and 1110 (3) 5 and 6400 (4) 8 and 6625</p>
83.	<p>Consider a source computer (S) transmitting a file of size 10^6 bits to a destination computer (D) over a network of two routers (R_1 and R_2) and three links (L_1, L_2, and L_3). L_1 connects S to R_1; L_2 connects R_1 to R_2; and L_3 connects R_2 to D. Let each link be of length 100 km. Assume signals travel over each link at a speed of 10^8 meters per second. Assume that the link bandwidth on each link is 1Mbps. Let the file be broken down into 1000 packets each of size 1000 bits. Find the total sum of transmission and propagation delays in transmitting the file from S to D?</p> <p>(1) 1000 ms (2) 1005 ms (3) 1010 ms (4) 1015 ms</p>
84.	<p>Which of these are the features present in IPv4 but not in IPv6?</p> <p>(1) Options (2) Fragmentation (3) Header checksum (4) All of the above</p>
85.	<p>Which of the following is used in wireless LAN?</p> <p>(1) time division multiplexing (2) space division multiplexing (3) orthogonal frequency division multiplexing (4) none of the mentioned</p>

**SET-X
Code-A**

Question No.	Questions
86.	<p>Which of the following is/are example(s) of state-full application layer protocols?</p> <p>(i) HTTP (ii) FTP (iii) TCP (iv) POP3</p> <p>(1) (i) and (ii) only (2) (ii) and (iv) only (3) (ii) and (iii) only (4) (iv) only</p>
87.	<p>A serial transmission T1 uses 8 information bits, 2 start bits, 1 stop bit and 1 parity bit for each character. A synchronous transmission T2 uses 3 eight bit sync characters followed by 30 eight bit information characters. If the bit rate is 1200 bits/second in both cases, what are the transfer rates of T1 and T2?</p> <p>(1) 60 characters/sec, 146 characters/sec (2) 80 characters/sec, 233 characters/sec (3) 100 characters/sec, 136 characters/sec (4) 100 characters/sec, 153 characters/sec</p>
88.	<p>Which of the following is required by Cloud Computing?</p> <p>(1) That the identity be authenticated (2) That the authentication be portable (3) That you establish an identity (4) All of the above</p>

SET-X
Code-A

Question No.	Questions
80.	Which of the following is the Virtual machine conversion cloud? (1) Amazon Cloud Watch (2) AbxCloud (3) BMC Cloud Computing Initiative (4) None of the above
89.	Which of the following language preferred for IoT analytics? (1) Python (2) DHTML (3) PHP (4) Java Script
91.	The values of the set membership is represented by which of the following? (1) Discrete Set (2) Probabilities (3) Degree of truth (4) Both Degree of truth & Probabilities
92.	Which of the following search uses only the linear space for searching? (1) Best-first search (2) Depth-first search (3) Recursive best-first search (4) None of the mentioned
98.	What is the heuristic function of greedy best-first search? (1) $f(n) = h(n)$ (2) $f(n) = h(n)$ (3) $f(n) < h(n)$ (4) $f(n) > h(n)$

SET-X
Code-A

Question No.	Questions
94.	Which search is equal to Minimax search but eliminates the branches that can't influence the final decision? (1) Breadth-first search (2) Alpha-beta pruning (3) Depth-first-search (4) None of the above
95.	Which of the following is called as transposition table? (1) Next value in the search (2) Hash table of next seen positions (3) Hash table of previously seen positions (4) None of the above
96.	Which of the following search is complete and optimal when $h(n)$ is consistent? (1) A * search (2) Best-first search (3) Depth-first search (4) Both Best-first & Depth-first search
97.	If A and B are two fuzzy sets with the following membership functions :- $\mu_A(x) = \{0.2, 0.5, 0.6, 0.1, 0.9\}$ $\mu_B(x) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ then what will be the value of $\mu_{A \cap B}$? (1) $\{0.2, 0.5, 0.6, 0.7, 0.9\}$ (2) $\{0.2, 0.5, 0.2, 0.1, 0.8\}$ (3) $\{0.1, 0.5, 0.2, 0.1, 0.8\}$ (4) $\{0.1, 0.5, 0.6, 0.1, 0.8\}$
98.	How many types of polymerases are there in basic classification? (1) 1 (2) 2 (3) 3 (4) 5

Question No.	Questions
99.	<p>Why are researchers take more interest in linearly separable problems of neural network?</p> <p>(1) Because they are the only mathematical functions you can draw (2) Because they are the only class of problem that Perceptron can solve successfully (3) Because they are the only mathematical functions that are continue (4) Because they are the only class of problem that network can solve successfully</p>
100.	<p>Having multiple perceptrons can actually solve the XOR problem satisfactorily - this is because of the fact that each perceptron can partition off a linear part of the space itself, and they can then combine their results. Which of the following is correct?</p> <p>(1) False - just having a single perceptron is enough (2) False - perceptrons are mathematically incapable of solving linearly inseparable functions, no matter what you do (3) True - perceptrons can do this but are unable to learn to do it - they have to be explicitly hand-coded. (4) True - this work always, and these multiple perceptrons learn to classify even complex problems.</p>

SET-“X”

(Total No. of printed pages : 31)

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

(PHD/URS-EE-DECEMBER-2022)

Code

B

COMPUTER SCIENCE

Sr. No. **10054**

Time : 1¼ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (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 book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / 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 and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. 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 book-let itself. Answers MUST NOT be ticked in the Question book-let.
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 BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



SET-X
Code-B

Question No.	Questions
1.	<p>Let $\langle M \rangle$ be the encoding of a Turing machine as a string over $\Sigma = \{0, 1\}$. Let $L = \{ \langle M \rangle \mid M \text{ is Turing machine that accepts a string of length } 2018 \}$.</p> <p>(1) decidable and recursively enumerable (2) decidable but not recursively enumerable (3) Un-decidable but recursively enumerable (4) Un-decidable and not recursively enumerable</p>
2.	<p>The recurrence relation capturing the optimal execution time of the <i>towers of Hanoi</i> problem with n discs will be, which of the following :-</p> <p>(1) $T(n) = 2T(n-1) + 1$ (2) $T(n) = 2T(n-2) + 2$ (3) $T(n) = 2T(n-1) + n$ (4) $T(n) = 2T(n/2) + 1$</p>
3.	<p>If L_1 and L_2 are regular languages, which among the following is an exception?</p> <p>(1) $L_1 - L_2$ (2) $L_1 \cup L_2$ (3) $L_1 \cap L_2$ (4) All of the above</p>

SET-X
Code-B

Question No.	Questions
4.	<p>Let $W(n)$ and $A(n)$ denote respectively, the worst case and average case running time of an algorithm executed on an input of size n. Which of the following is always true?</p> <p>(1) $A(n) = \Omega(W(n))$ (2) $A(n) = O(W(n))$ (3) $A(n) = o(W(n))$ (4) $A(n) = \Theta(W(n))$</p>
5.	<p>An array n numbers is given, where n is an even number. The maximum as well as the minimum of these n numbers needs to be determined. Which of the following is true about the number of comparisons needed?</p> <p>(1) At most $1.5n - 2$ comparisons are needed (2) At least $n \log_2 n$ comparisons are needed (3) At least $2n - c$ comparisons, for some constant, c are needed (4) None of the above</p>
6.	<p>Consider a hash table with 9 slots. The hash function is $h(k) = k \bmod 9$. The collisions are resolved by chaining. The following 9 keys are inserted in the order: 5, 28, 19, 15, 20, 33, 12, 17, 10. The maximum, minimum, and average chain lengths in the hash table, respectively, will be which of the following?</p> <p>(1) 3, 3 and 3 (2) 3, 0 and 1 (3) 0, 1 and 3 (4) 3, 2 and 0</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B (2)

SET-X
Code-B

Question No.	Questions
7.	<p>The number of states in the minimal deterministic finite automaton corresponding to the regular expression $(0 + 1)^* (10)$ will be which of the following?</p> <p>(1) 2 (2) 3 (3) 4 (4) 5</p>
8.	<p>A canonical set of items is given below:- $S \rightarrow L > R$ $Q \rightarrow R$ On input symbol $<$ the set has, which of the following?</p> <p>(1) a reduce-reduce conflict but not a shift-reduce conflict (2) neither a shift-reduce nor a reduce-reduce conflict (3) a shift-reduce conflict and a reduce-reduce conflict (4) a shift-reduce conflict but not a reduce-reduce conflict</p>
9.	<p>YACC builds up, which of the following?</p> <p>(1) LALR parsing table (2) SLR parsing table (3) Canonical LR parsing table (4) None of these</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B (3)

SET-X
Code-B

Question No.	Questions
10.	<p>For the expression grammar $E \rightarrow E * F \mid F + E \mid F$ $F \rightarrow F - I \mid I$</p> <p>Which of the following statement holds true?</p> <p>(1) Precedence of $-$ is higher *</p> <p>(2) Precedence of $*$ is higher +</p> <p>(3) $+$ and $-$ have same precedence</p> <p>(4) Precedence of $+$ is higher *</p>
11.	<p>Which of the following is the System Development?</p> <p>(1) It is development of SRS of a system</p> <p>(2) Process of successive changes of system from new and changed requirement</p> <p>(3) Both (1) and (2)</p> <p>(4) None of the above</p>
12.	<p>Which method recommends that very frequent system builds should be carried out with automated testing to discover software problems?</p> <p>(1) Agile method</p> <p>(2) Large systems method</p> <p>(3) Parallel compilation method</p> <p>(4) All of the above</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(4)

SET-X
Code-B

Question No.	Questions
13.	<p>Which of the following is not a major design consideration of the system?</p> <p>(1) Data integrity constant</p> <p>(2) Availability of technically qualified personal to carry out design and development</p> <p>(3) Frequency of record updates</p> <p>(4) Response time required</p>
14.	<p>What is the main difference between program testing and system testing?</p> <p>(1) System testing is tough and program testing is easy</p> <p>(2) Program testing is more comprehensive than system testing</p> <p>(3) System testing focuses on testing the interfaces between programs, program testing focuses on individual programs.</p> <p>(4) None of the above</p>
15.	<p>Which of the following is the major drawback of RAD model :-</p> <p>(1) It requires highly skilled developers/designers</p> <p>(2) It increases the component reusability</p> <p>(3) It necessitates customers feedbacks</p> <p>(4) Both (a) and (b)</p>
16.	<p>Which of the following models doesn't necessitate defining requirements at the earliest in the lifecycle?</p> <p>(1) Spiral and Prototyping</p> <p>(2) RAD and Waterfall</p> <p>(3) Prototyping and Waterfall</p> <p>(4) Spiral and RAD</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(5)

SET-X
Code-B

Question No.	Questions
17.	<p>Which of the following is the main intent of project metrics?</p> <p>(1) To minimize the development schedule (2) To evaluate the ongoing project's quality on a daily basis (3) Both (1) and (2) (4) None of the above</p>
18.	<p>Which of the following does not complement the decomposition techniques but offers a potential estimation approach for their impersonal growth?</p> <p>(1) Empirical estimation models (2) Decomposition techniques (3) Automated estimation tools (4) Both empirical estimation models and automated estimation tools</p>
19.	<p>In CMM, the life-cycle activities of requirements analysis, design, code, and test are described in which of the following?</p> <p>(1) Software subcontract Management (2) Software Quality Assurance (3) Software Quality Management (4) Software Product Engineering</p>
20.	<p>Which of the following is an incorrect activity for the configuration management of a software system?</p> <p>(1) Change management (2) System management (3) Internship management (4) Version management</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(6)

SET-X
Code-B

Question No.	Questions
21.	<p>A file is organized so that the ordering of data records is the same, as or close to the ordering of data entries in some index. Which one of the following is that Index?</p> <p>(1) Dense (2) Clustered (3) Sparse (4) Unclustered</p>
22.	<p>Using Relational Algebra the query that finds customers, who have a balance of over 1000 is :-</p> <p>(1) Π Customer_name (σ balance > 1000 (Deposit)) (2) σ Customer_name (Π balance > 1000 (Deposit)) (3) Both of the above (4) None of the above</p>
23.	<p>Which of the following can be addressed by enforcing a referential integrity constraint?</p> <p>(1) All phone numbers must include the area code (2) Certain fields are required (such as the email address, or phone number) before the record is accepted (3) Information on the customer must be known before anything can be sold to that customer. (4) When entering an order quantity, the user must input a number and not some text (i.e., 12 rather than 'a dozen')</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(7)

SET-X
Code-B

Question No.	Questions
24.	<p>Consider the following transactions with data items P and Q initialized to zero :</p> <p>T1 : read (P) ; read (Q) ; if P = 0 then Q := Q + 1 ; write (Q) ;</p> <p>T2 : read (Q) ; read (P) ; if Q = 0 then P := P + 1 ; Write (P) ;</p> <p>Any non-serial interleaving of T1 and T2 for concurrent execution leads to:-</p> <p>(1) A serializable schedule (2) A conflict serializable schedule (3) A schedule for which a precedence graph cannot be drawn (4) A schedule that is not conflict serializable</p>
25.	<p>Which normalization form is based on the transitive dependency?</p> <p>(1) 1NF (2) 2NF (3) 3NF (4) 4NF</p>
26.	<p>Which normal form deals with multivalued dependency?</p> <p>(1) 1NF (2) 2NF (3) 3NF (4) 4NF</p>
27.	<p>Which of the following is known as minimal super key?</p> <p>(1) Primary Key (2) Candidate Key (3) Foreign Key (4) Unique Key</p>

PHD/URS-FE-DEC-2022 (Computer Science) Code-B

(8)





SET-X
Code-B

Question No.	Questions
28.	<p>Which of the following will be the maximum children of a B-tree of order n?</p> <p>(1) $n/2$ (2) $n+1$ (3) n (4) $n-1$</p>
29.	<p>Which of the following can replace the below query?</p> <p>SELECT name, course_id FROM instructor, teacher WHERE instructor.ID = teacher.ID;</p> <p>(1) select name, course_id from instructor natural join teacher; (2) select name, course_id from teacher, instructor where instructor_id = course_id; (3) select name, course_id from instructor (4) select course_id from instructor join teacher</p>
30.	<p>NATURAL JOIN can also be termed as</p> <p>(1) Combination of Union and Cartesian Product (2) Combination of Selection and Cartesian Product (3) Combination of Projection and Cartesian Product (4) Combination of Union and Projection</p>
31.	<p>Convert the following SOP expression to an equivalent POS expression :-</p> <p>$ABC + A\bar{B}\bar{C} + A\bar{B}C + AB\bar{C} + A\bar{B}C$</p> <p>(1) $(A+B+C)(A+\bar{B}+C)(A+\bar{B}+\bar{C})$ (2) $(\bar{A}+\bar{B}+\bar{C})(A+\bar{B}+C)(A+\bar{B}+C)$ (3) $(\bar{A}+\bar{B}+\bar{C})(A+B+\bar{C})(\bar{A}+B+C)$ (4) $(A+B+C)(\bar{A}+B+\bar{C})(A+\bar{B}+C)$</p>

PHD/URS-FE-DEC-2022 (Computer Science) Code-B

(9)

Question No.	Questions
32.	<p>'Aging registers' are : -</p> <p>(1) Registers which keep track of when the program was last accessed</p> <p>(2) Counters to keep track of last accessed instruction</p> <p>(3) Counters to keep track of the latest data structures referred</p> <p>(4) Counters which indicate how long ago their associated pages have been referenced</p>
33.	<p>Which circuit is generated from D-flip flop due to addition of an inverter by causing reduction in the number of inputs?</p> <p>(1) Gated JK - latch</p> <p>(2) Gated D - latch</p> <p>(3) Gated SR- latch</p> <p>(4) Gated T- latch</p>
34.	<p>The most efficient method followed by computers to multiply two unsigned numbers is : -</p> <p>(1) Booth algorithm</p> <p>(2) Restoring algorithm</p> <p>(3) Bit pair recording of multipliers</p> <p>(4) Non restoring algorithm</p>
35.	<p>In signed-magnitude binary division, if the dividend is $(11100)_2$ and divisor is $(10011)_2$, then the result is : -</p> <p>(1) $(01101)_2$</p> <p>(2) $(10100)_2$</p> <p>(3) $(11001)_2$</p> <p>(4) $(01100)_2$</p>

Question No.	Questions
36.	<p>Consider an instruction pipeline with five stages without any branch prediction : Fetch Instruction (FI) Decode Instruction (DI), Fetch Operand (FO), Execute Instruction (EI) and Write Operand (WO). The stage delays for FI, DI, FO, EI and WO are 5 ns, 7ns, 10 ns, 8 ns and 6 ns, respectively. There are intermediate storage buffers after each stage and the delay of each buffer is 1 ns. A program consisting of 12 instructions I_1, I_2, \dots, I_{12} is executed in this pipelined processor. Instruction I_4 is the only branch instruction and its branch target is I_9. If the branch is taken during the execution of this program, then the time (in ns) needed to complete the program will be :</p> <p>(1) 256</p> <p>(2) 128</p> <p>(3) 265</p> <p>(4) 165</p>
37.	<p>How many 3-to-8 line decoders, with an enable input, are needed to construct at 6-to-64 line decoder, without using any other logic gates?</p> <p>(1) 32</p> <p>(2) 16</p> <p>(3) 8</p> <p>(4) 4</p>
38.	<p>Which one of the following circuits is not equivalent to a 2-input XNOR (exclusive NOR) gate?</p> <p>(1) </p> <p>(2) </p> <p>(3) </p> <p>(4) </p>

**SET-X
Code-B**

Question No.	Questions
39.	<p>Which memory is difficult to interface with processor?</p> <p>(1) Static memory (2) ROM (3) Dynamic Memory (4) None of these</p>
40.	<p>Consider evaluating the following expression tree on a machine with load-store architecture, in which memory can be accessed only through load and store instructions. The variables a, b, c, d and e initially stored in memory. The binary operators used in this expression tree can be evaluated by the machine, only when the operands are in registers. The instructions produce result only in a register. If no intermediate results can be stored in memory, what will be the minimum number of registers needed to evaluate this expression?</p> <p>(1) 2 (2) 3 (3) 5 (4) 7</p>
41.	<p>The values of the set membership is represented by which of the following?</p> <p>(1) Discrete Set (2) Probabilities (3) Degree of truth (4) Both Degree of truth & Probabilities</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(12)

**SET-X
Code-B**

Question No.	Questions
42.	<p>Which of the following search uses only the linear space for searching?</p> <p>(1) Best-First search (2) Depth-first search (3) Recursive best-first search (4) None of the mentioned</p>
43.	<p>What is the heuristic function of greedy best-first search?</p> <p>(1) $f(n) = h(n)$ (2) $f(n) = h(n)$ (3) $f(n) < h(n)$ (4) $f(n) > h(n)$</p>
44.	<p>Which search is equal to Minimax search but eliminates the branches that can't influence the final decision?</p> <p>(1) Breadth-first search (2) Alpha-beta pruning (3) Depth-first-search (4) None of the above</p>
45.	<p>Which of the following is called as transposition table?</p> <p>(1) Next value in the search (2) Hash table of next seen positions (3) Hash table of previously seen positions (4) None of the above</p>
46.	<p>Which of the following search is complete and optimal when $h(n)$ is consistent?</p> <p>(1) A* search (2) Best-first search (3) Depth-first search (4) Both Best-first & Depth-first search</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(13)

**SET-X
Code-B**

Question No.	Questions
47.	<p>If A and B are two fuzzy sets with the following membership functions :- $\mu_A(x) = \{0.2, 0.5, 0.6, 0.1, 0.9\}$ $\mu_B(x) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ then what will be the value of $\mu_{A \cap B}$?</p> <p>(1) $\{0.2, 0.5, 0.6, 0.7, 0.9\}$ (2) $\{0.2, 0.5, 0.2, 0.1, 0.8\}$ (3) $\{0.1, 0.5, 0.2, 0.1, 0.8\}$ (4) $\{0.1, 0.5, 0.6, 0.1, 0.8\}$</p>
48.	<p>How many types of polymerases are there in basic classification?</p> <p>(1) 1 (2) 2 (3) 3 (4) 5</p>
49.	<p>Why are researchers take more interest in linearly separable problems of neural network?</p> <p>(1) Because they are the only mathematical functions you can draw (2) Because they are the only class of problem that Perceptron can solve successfully (3) Because they are the only mathematical functions that are continue (4) Because they are the only class of problem that network can solve successfully</p>
50.	<p>Having multiple perceptrons can actually solve the XOR problem satisfactorily - this is because of the fact that each perceptron can partition off a linear part of the space itself, and they can then combine their results. Which of the following is correct?</p> <p>(1) False - just having a single perceptron is enough (2) False - perceptrons are mathematically incapable of solving linearly inseparable functions, no matter what you do (3) True - perceptrons can do this but are unable to learn to do it - they have to be explicitly hand-coded. (4) True - this work always, and these multiple perceptrons learn to classify even complex problems.</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(14)

**SET-X
Code-B**

Question No.	Questions
51.	<p>A binary tree T has 20 leaves. What will be the number of nodes in T having two children?</p> <p>(1) 17 (2) 18 (3) 19 (4) 20</p>
52.	<p>Let $G = (V, E)$ be any connected undirected edge-weighted graph. The weight of the edges in E are positive and distinct. Consider the following statements :-</p> <p>(i) Minimum Spanning Tree of G is always unique (ii) Shortest path between any two vertices of G is always unique. Which of the above statements is necessarily true?</p> <p>(1) (i) only (2) (ii) only (3) Neither (i) nor (ii) (4) Both (i) and (ii)</p>
53.	<p>Let T be a binary search tree with 15 nodes. The minimum and maximum possible heights of T are: (Please note that the height of a tree with a single node is 0)</p> <p>(1) 5 and 14 respectively (2) 14 and 5 respectively (3) 3 and 14 respectively (4) 14 and 3 respectively</p>
54.	<p>If the address of A [1][1] and A [2][1] are 1000 and 1010 respectively and each element occupies 2 bytes then the array has been stored in which order?</p> <p>(1) column major (2) row major (3) matrix major (4) none of these</p>
55.	<p>The number of distinct binary trees with 3 nodes, which when traversed in post order gives the sequence A, B, C is :-</p> <p>(1) 3 (2) 9 (3) 5 (4) 7</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(15)

Question No.	Questions
56.	<p>The height of a tree is the length of the longest root-to-leaf path in it. The maximum and minimum number of nodes in a binary tree of height 5 are :-</p> <p>(1) 63 and 6 respectively (2) 64 and 5 respectively (3) 32 and 6 respectively (4) 31 and 5 respectively</p>
57.	<p>Consider a hash table of size seven, with starting index zero, and a hash function $(3x + 4) \bmod 7$. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.</p> <p>(1) 8, _, _, _, _, _, 10 (2) 1, 8, 10, _, _, 3 (3) 1, _, _, _, _, 3 (4) 1, 10, 8, _, _, 3</p>
58.	<p>From a complete graph having n nodes and e edges, we can construct a spanning tree by removing maximum ___ edges :-</p> <p>(1) $n - e + 1$ (2) $e - n + 1$ (3) $n + e - 1$ (4) $e - n - 1$</p>
59.	<p>In the following DAG, find out the number of required stacks in order to represent it in a Graph Structured Stack :-</p> <div style="text-align: center;"> <pre> graph TD A((A)) --> B((B)) A((A)) --> D((D)) B((B)) --> C((C)) D((D)) --> E((E)) </pre> </div> <p>(1) 1 (2) 2 (3) 3 (4) 4</p>

Question No.	Questions
60.	<p>What will be the Time Complexity to check if an edge exists between two vertices?</p> <p>(1) $O(V^*V)$ (2) $O(V + E)$ (3) $O(1)$ (4) $O(E)$</p>
61.	<p>Consider a network with five nodes, N1 to N5, as shown below</p> <div style="text-align: center;"> <pre> graph TD N1((N1)) --- 6 N2((N2)) N2((N2)) --- 2 N3((N3)) N2((N2)) --- 3 N5((N5)) N5((N5)) --- 4 N4((N4)) </pre> </div> <p>The network uses a Distance Vector Routing Protocol. Once, the Route have stabilized, the distance vectors at different nodes are as under :</p> <p>N1: (0, 1, 7, 8, 4) N2: (1, 0, 6, 7, 3) N3: (7, 6, 0, 2, 6) N4: (8, 7, 2, 0, 4) N5: (4, 3, 6, 4, 0)</p> <p>Each distance vector is the distance of best known path at that instance to nodes, N1 to N5, where the distance to itself is 0. Also, all links are symmetric and the cost is identical in both the directions. In each round, all nodes exchange their distance vectors with their respective neighbors. Then all nodes update the distance vectors. In between two rounds, any change in cost of a link will cause the two incident nodes to change only that entry in their distance vectors. The cost of link N2-N3 reduces to 2 (in both directions). After the next round updates. What will be the new distance vector at node, N3?</p> <p>(1) (6, 4, 1, 0, 2) (2) (3, 2, 0, 2, 5) (3) (7, 2, 0, 6, 3) (4) (3, 1, 6, 0, 2)</p>

SET-X
Code-B

Question No.	Questions
62.	Host A sends a UDP datagram containing 8880 bytes of user data to host B over an Ethernet LAN. Ethernet frames may carry data up to 1500 bytes (i.e. MTU = 1500 bytes). Size of UDP header is 8 bytes and size of IP header is 20 bytes. There is no option field in IP header. How many total number of IP fragments will be transmitted and what will be the contents of offset field in the last fragment? (1) 7 and 8880 (2) 7 and 1110 (3) 5 and 6400 (4) 8 and 6625
63.	Consider a source computer (S) transmitting a file of size 10^6 bits to a destination computer (D) over a network of two routers (R_1 and R_2) and three links (L_1 , L_2 and L_3). L_1 connects S to R_1 ; L_2 connects R_1 to R_2 ; and L_3 connects R_2 to D. Let each link be of length 100 km. Assume signals travel over each link at a speed of 10^8 meters per second. Assume that the link bandwidth on each link is 1Mbps. Let the file be broken down into 1000 packets each of size 1000 bits. Find the total sum of transmission and propagation delays in transmitting the file from S to D? (1) 1000 ms (2) 1005 ms (3) 1010 ms (4) 1015 ms
64.	Which of these are the features present in IPv4 but not in IPv6? (1) Options (2) Fragmentation (3) Header checksum (4) All of the above
65.	Which of the following is used in wireless LAN? (1) time division multiplexing (2) space division multiplexing (3) orthogonal frequency division multiplexing (4) none of the mentioned

SET-X
Code-B

Question No.	Questions
66.	Which of the following is/are example(s) of state-full application layer protocols? (i) HTTP (ii) FTP (iii) TCP (iv) POP3 (1) (i) and (ii) only (2) (ii) and (iv) only (3) (ii) and (iii) only (4) (iv) only
67.	A serial transmission T1 uses 8 information bits, 2 start bits, 1 stop bit and 1 parity bit for each character. A synchronous transmission T2 uses 3 eight bit sync characters followed by 30 eight bit information characters. If the bit rate is 1200 bits/second in both cases. what are the transfer rates of T1 and T2? (1) 60 characters/sec, 146 characters/sec (2) 80 characters/sec, 233 characters/sec (3) 100 characters/sec, 136 characters/sec (4) 100 characters/sec, 153 characters/sec
68.	Which of the following is required by Cloud Computing? (1) That the identity be authenticated (2) That the authentication be portable (3) That you establish an identity (4) All of the above

SET-X
Code-B

Question No.	Questions
69.	Which of the following is the Virtual machine conversion cloud? (1) Amazon Cloud Watch (2) AbiCloud (3) BMC Cloud Computing Initiative (4) None of the above
70.	Which of the following language preferred for IoT analytics? (1) Python (2) DHTML (3) PHP (4) Java Script
71.	A multithreaded program P executes with x number of threads and uses y number of locks for ensuring mutual exclusion while operating on shared memory locations. All locks in the program are <i>non-re-entrant</i> , i.e., if a thread holds a lock l, then it cannot re-acquire lock l without releasing it. If a thread is unable to acquire a lock, it blocks until the lock becomes available. The <i>minimum</i> value of x and the <i>minimum</i> value of y together for which execution of P can result in a deadlock are :- (1) x = 1, y = 2 (2) x = 1, y = 1 (3) x = 2, y = 1 (4) x = 2, y = 2

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(20)

SET-X
Code-B

Question No.	Questions															
72.	An Operating System uses Shortest Remaining Time first (SRTF) process scheduling algorithm. Consider the arrival times and execution times for the following processes :- <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Process</th> <th>Execution Time</th> <th>Arrival Time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>20</td> <td>0</td> </tr> <tr> <td>P2</td> <td>25</td> <td>15</td> </tr> <tr> <td>P3</td> <td>10</td> <td>30</td> </tr> <tr> <td>P4</td> <td>15</td> <td>45</td> </tr> </tbody> </table> What is the total waiting time for process P2? (1) 55 (2) 40 (3) 15 (4) 05	Process	Execution Time	Arrival Time	P1	20	0	P2	25	15	P3	10	30	P4	15	45
Process	Execution Time	Arrival Time														
P1	20	0														
P2	25	15														
P3	10	30														
P4	15	45														
73.	Consider a main memory with five page frames and the following sequence of page references: 3, 8, 2, 3, 9, 1, 6, 3, 8, 9, 3, 6, 2, 1, 3. Which one of the following is true with respect to page replacement policies First In First Out (FIFO) and Least Recently Used (LRU)? (1) LRU incurs 2 more page faults than FIFO (2) Both incur the same number of page faults (3) FIFO incurs 1 more page faults than LRU (4) FIFO incurs 2 more page faults than LRU															
74.	Which of the following is shared by threads of a process? (1) neither global variables nor heap (2) heap but not global variables (3) both heap and global variables (4) global variables but not heap															

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(21)

**SET-X
Code-B**

Question No.	Questions
75.	<p>Whenever a process need I/O to or from a disk, it issues :-</p> <p>(1) a system call to the operating system (2) a system call to the CPU (3) a system call to the kernel (4) a system call to the specific API</p>
76.	<p>A computer has twenty physical page frames which contain pages numbered 101 through 120. Now, a program accesses the pages numbered 1, 2, 100 in that order, and repeats the access sequence thrice. Which one of the following page replacement policies experiences the same number of page faults as the optimal page replacement policy for this program?</p> <p>(1) First-in-first-out (2) Most-recently-used (3) Last-in-first-out (4) Least-recently-used</p>
77.	<p>Thread pools help in :-</p> <p>(1) servicing multiple requests using one thread (2) servicing a single request using multiple threads from the pool (3) faster servicing of requests with an existing threads rather than waiting to create a new thread. (4) None of the above</p>

**SET-X
Code-B**

Question No.	Questions
78.	<p>Consider a swapping system in which memory consists of the following hole sizes in memory order:</p> <p>H0 H1 H2 H3 H4 H5 H6 H7 10 K 4 KB 20 KB 18 KB 7KB 9 KB 12 KB 15 KB</p> <p>and a successive segment request of 12 KB, 10 KB, 9 KB. Which of the following sentences is/are true?</p> <p>(1) First fit algorithm allocates H2, H0, H3 for the mentioned request (2) Best fit algorithm allocates H2, H0, H3 for the mentioned request (3) First fit algorithm allocates H2, H6, H7 for the mentioned request (4) Worst fit algorithm allocates H2, H3, H6 for the mentioned request</p>
79.	<p>What are the characteristics of Host based IDS?</p> <p>(1) Log are analyzed to detect tails of intrusion (2) The host operating system logs in the audit information (3) Logs includes logins, file opens, and program executions (4) All of the above</p>
80.	<p>What are the characteristics of stack based IDS?</p> <p>(1) It is programmed to interpret a certain series of packets (2) It models the normal usage of the network as a noise characterization (3) They are integrated closely with the TCP/IP stack watch packets (4) The host operating system logs in the audit information</p>
81.	<p>Which one of the following permutations can be obtained as the output using stack assuming that the input is the sequence 1, 2, 3, 4, 5 in that order :-</p> <p>(1) 3, 4, 5, 2, 1 (2) 3, 4, 5, 1, 2 (3) 5, 4, 3, 1, 2 (4) 1, 5, 2, 3, 4</p>

**SET-X
Code-B**

Question No.	Questions
82.	<p>Following is C like pseudo code of a function that takes a Queue Q as an argument, and uses a stack S to do processing.</p> <pre>void fun (Queue *Q) { stack S; // Creates an empty stack S // Run while Q is not empty while (!isEmpty(Q)) { // deQueue an item from Q and push the dequeued item to S push (&S, deQueue (Q)); } // Run while Stack S is not empty while (!isEmpty(&S)) { // Pop an item from S and enqueue the popped item to Q enqueue(Q, pop (&S)); } }</pre> <p>(1) Removes the last from Q (2) Keeps the Q same as it was before the call (3) Reverses the Q (4) Makes Q empty</p>

**SET-X
Code-B**

Question No.	Questions
83.	<p>Consider the following function implemented in C :-</p> <pre>void goto (int x, int y) { int *ptr; x = 0; ptr = &x; y = *ptr; *ptr = 1; printf ("%d, %d", x, y); }</pre> <p>The output of invoking goto (1, 1) will be which of the following :-</p> <p>(1) 0, 0 (2) 1, 0 (3) 0, 1 (4) 1, 1</p>
84.	<p>What will be the output when you compile and run the following C code?</p> <pre>#include <stdio.h> int main () { static char *s[] = {"black", "white", "pink", "violet"}; char ** ptr[] = {s+3, s+2, s+1, s}, ***p; p = ptr; ++p; printf ("%s", **p+1); return 0; }</pre> <p>(1) ite (2) ack (3) ink (4) let</p>

**SET-X
Code-B**

Question No.	Questions
85.	<p>What will be the output of the program?</p> <pre>#include<stdio.h> int main () { int i = 4, j = 8; printf("%d, %d, %d\n", i j&j i, i j&i, i^j); return 0; }</pre> <p>(1) 112, 1, 2 (2) 12, 12, 12 (3) 32, 1, 12 (4) -64, 1, 12</p>
86.	<p>If a node in a BST has two sub-tree, then its in-order predecessor has :-</p> <p>(1) no right child (2) no left child (3) two children (4) no child</p>
87.	<p>What will be the output of the following C program?</p> <pre>void count(int n) { static int d = 1; printf("%d", n); printf("%d", d); d++; if(n>1) count(n-1); printf("%d", d); } void main() { count(3); } (1) 312213444 (2) 312111333 (3) 3121112 (4) 3122134</pre>

**SET-X
Code-B**

Question No.	Questions
88.	<p>In the array implementation of circular queue, which of the following operation takes linear time in the worst case?</p> <p>(1) To empty a queue (2) Deletion (3) Insertion (4) None</p>
89.	<p>Correct syntax to pass a Function Pointer as an argument</p> <p>(1) void pass(int (*fptr)(int, float, char)){} (2) void pass(*fptr)(int, float, char){} (3) void pass (int (*fptr)){} (4) void pass(*fptr){}</p>
90.	<p>Consider the following recursive C function that takes two arguments :- unsigned int join (unsigned int n, unsigned int r) { if (n > 0) return ((n%r) + join(n/r, r)); else return 0; }</p> <p>What is the return value of the function join when it is called as join (345, 10)?</p> <p>(1) 96 (2) 48 (3) 24 (4) 12</p>
91.	<p>Which of the following is equal to the logical expression. $(X \wedge Y) \rightarrow (Z \wedge X) \rightarrow (X \equiv 1)$?</p> <p>(1) Contradiction (2) Valid (3) First Order Logic (4) None of the above</p>

**SET-X
Code-B**

Question No.	Questions
92.	The minimum number of colors needed to color a graph having $n (>3)$ vertices and 2 edges is :- (1) 1 (2) 2 (3) 3 (4) 4
93.	A graph with n vertices will definitely have a parallel edge or self-loop, if the total number of edges are :- (1) Less than $(n-1)$ (2) Greater than $(n-1)/2$ (3) Greater than $(n-1)$ (4) Greater than $n(n-1)/2$
94.	A PERT network has 09 activities on its critical path. The standard deviation of each activity on the critical path is 03. The standard deviation of the critical path is : (1) 03 (2) 09 (3) 27 (4) 81
95.	Two people : Amar and Akbar have picked 10 Mangoes, 15 Banana and 14 Apples. What is the number of ways they can divide the fruits between them : (1) 2640 (2) 2100 (3) 1638 (4) 1148

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(28)

**SET-X
Code-B**

Question No.	Questions
96.	A six sided unbiased dice with 04 Green faces and 04 Blue faces is rolled seven times. Which of the following combinations is the most likely outcome of the experiment? (1) 03 Green faces and 04 Blue faces (2) 04 Green faces and 03 Blue faces (3) 05 Green faces and 02 Blue faces (4) 05 Green faces and 01 Blue face
97.	A bag contains 2 Pens, 3 Pencils and 4 Sharpeners. Item are drawn from the bag at random, one at a time, without replacement. The probability of drawing 2 Pen first followed by 3 Pencils and subsequently the 4 Sharpeners is : (1) 3/560 (2) 2/315 (3) 1/1260 (4) 1/2443
98.	In a graph, if $e = (u, v)$, then if means :- (1) u is adjacent to v but v is not adjacent to u (2) e begins at u and ends at v (3) u is predecessor and v is successor (4) both (2) and (3)

PHD/URS-EE-DEC-2022 (Computer Science) Code-B
(29)

F-1732
S-4000

SET-X
Code-B

Question No.	Questions
99.	<p>An examination consists of two papers; X and Y. The probability of failing in X is 0.3 and that in Y is 0.2. Given that a student has failed in Y, the probability of failing in X is 0.6. The probability of a student failing in both the papers is :-</p> <p>(1) 0.06 (2) 0.50 (3) 0.12 (4) 0.18</p>
100.	<p>Honda Automobile contracted to buy shock absorbers from two suppliers X and Y. X supplies 60% and Y supplies 40% of the shock absorbers. All shock absorbers are subjected to a quality test. The ones that pass the quality test are considered reliable. Of X's shock absorbers, 96% are reliable. Of Y's shock absorbers, 72% are reliable. The probability that a randomly chosen shock absorber, which is found to be reliable, is made by Y is :</p> <p>(1) 0.720 (2) 0.667 (3) 0.334 (4) 0.288</p>

SET-“X”

(Total No. of printed pages : 31)

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

(PHD/URS-EE-DECEMBER-2022)

Code

C

COMPUTER SCIENCE

Sr. No. 10059

Time : 1¼ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (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 book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / 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 and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will 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 book-let itself. Answers MUST NOT be ticked in the Question book-let.
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 BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Question No.	Questions															
1.	<p>A multithreaded program P executes with x number of threads and uses y number of locks for ensuring mutual exclusion while operating on shared memory locations. All locks in the program are <i>non-re-entrant</i>, i.e., if a thread holds a lock l, then it cannot re-acquire lock l without releasing it. If a thread is unable to acquire a lock, it blocks until the lock becomes available. The <i>minimum</i> value of x and the <i>minimum</i> value of y together for which execution of P can result in a deadlock are :-</p> <p>(1) $x = 1, y = 2$ (2) $x = 1, y = 1$ (3) $x = 2, y = 1$ (4) $x = 2, y = 2$</p>															
2.	<p>An Operating System uses Shortest Remaining Time first (SRTF) process scheduling algorithm. Consider the arrival times and execution times for the following processes :-</p> <table border="1" data-bbox="638 1299 933 1836"> <thead> <tr> <th>Process</th> <th>Execution Time</th> <th>Arrival Time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>20</td> <td>0</td> </tr> <tr> <td>P2</td> <td>25</td> <td>15</td> </tr> <tr> <td>P3</td> <td>10</td> <td>30</td> </tr> <tr> <td>P4</td> <td>15</td> <td>45</td> </tr> </tbody> </table> <p>What is the total waiting time for process P2?</p> <p>(1) 55 (2) 40 (3) 15 (4) 05</p>	Process	Execution Time	Arrival Time	P1	20	0	P2	25	15	P3	10	30	P4	15	45
Process	Execution Time	Arrival Time														
P1	20	0														
P2	25	15														
P3	10	30														
P4	15	45														
3.	<p>Consider a main memory with five page frames and the following sequence of page references: 3, 8, 2, 3, 9, 1, 6, 3, 8, 9, 3, 6, 2, 1, 3. Which one of the following is true with respect to page replacement policies First In First Out (FIFO) and Least Recently Used (LRU)?</p> <p>(1) LRU incurs 2 more page faults than FIFO (2) Both incur the same number of page faults (3) FIFO incurs 1 more page faults than LRU (4) FIFO incurs 2 more page faults than LRU</p>															

SET-X
Code-C

Question No.	Questions
4.	<p>Which of the following is shared by threads of a process?</p> <p>(1) neither global variables nor heap (2) heap but not global variables (3) both heap and global variables (4) global variables but not heap</p>
5.	<p>Whenever a process need I/O to or from a disk, it issues :-</p> <p>(1) a system call to the operating system (2) a system call to the CPU (3) a system call to the kernel (4) a system call to the specific API</p>
6.	<p>A computer has twenty physical page frames which contain pages numbered 101 through 120. Now, a program accesses the pages numbered 1, 2, 100 in that order, and repeats the access sequence thrice. Which one of the following page replacement policies experiences the same number of page faults as the optimal page replacement policy for this program?</p> <p>(1) First-in-first-out (2) Most-recently-used (3) Last-in-first-out (4) Least-recently-used</p>
7.	<p>Thread pools help in :-</p> <p>(1) servicing multiple requests using one thread (2) servicing a single request using multiple threads from the pool (3) faster servicing of requests with an existing threads rather than waiting to create a new thread. (4) None of the above</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-C
(2)

SET-X
Code-C

Question No.	Questions
8.	<p>Consider a swapping system in which memory consists of the following hole sizes in memory order:</p> <p>H0 H1 H2 H3 H4 H5 H6 H7 10K 4KB 20KB 18KB 7KB 9KB 12KB 15KB</p> <p>and a successive segment request of 12 KB, 10 KB, 9 KB. Which of the following sentences is/are true?</p> <p>(1) First fit algorithm allocates H2, H0, H3 for the mentioned request (2) Best fit algorithm allocates H2, H0, H3 for the mentioned request (3) First fit algorithm allocates H2, H6, H7 for the mentioned request (4) Worst fit algorithm allocates H2, H3, H6 for the mentioned request</p>
9.	<p>What are the characteristics of Host based IDS?</p> <p>(1) Log are analyzed to detect tails of intrusion (2) The host operating system logs in the audit information (3) Logs includes logins, file opens, and program executions (4) All of the above</p>
10.	<p>What are the characteristics of stack based IDS?</p> <p>(1) It is programmed to interpret a certain series of packets (2) It models the normal usage of the network as a noise characterization (3) They are integrated closely with the TCP/IP stack watch packets (4) The host operating system logs in the audit information</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-C
(3)

Question No.	Questions
11.	<p>Which one of the following permutations can be obtained as the output using stack assuming that the input is the sequence 1, 2, 3, 4, 5 in that order :-</p> <p>(1) 3, 4, 5, 2, 1 (2) 3, 4, 5, 1, 2 (3) 5, 4, 3, 1, 2 (4) 1, 5, 2, 3, 4</p>
12.	<p>Following is C like pseudo code of a function that takes a Queue Q as an argument, and uses a stack S to do processing.</p> <pre>void fun (Queue *Q) { stack S; // Creates an empty stack S // Run while Q is not empty while (!isEmpty(Q)) { // dequeue an item from Q and push the dequeued item to S push (&S, dequeue (Q)); } // Run while Stack S is not empty while (!isEmpty(&S)) { // Pop an item from S and enqueue the popped item to Q enqueue(Q, pop (&S)); } }</pre> <p>(1) Removes the last from Q (2) Keeps the Q same as it was before the call (3) Reverses the Q (4) Makes Q empty</p>

Question No.	Questions
13.	<p>Consider the following function implemented in C :-</p> <pre>void goto (int x, int y) { int *ptr; x = 0; ptr = &x; y = *ptr; *ptr = 1; printf ("%d, %d", x, y); }</pre> <p>The output of invoking goto (1, 1) will be which of the following :-</p> <p>(1) 0, 0 (2) 1, 0 (3) 0, 1 (4) 1, 1</p>
14.	<p>What will be the output when you compile and run the following C code?</p> <pre>#include<stdio.h> int main () { static char *s[] = {"black", "white", "pink", "violet"}; char ** ptr[] = {s+3, s+2, s+1, s}, ***p; p = ptr; ++p; printf("%s", **p+1); return 0; }</pre> <p>(1) ite (2) ack (3) ink (4) let</p>

Question No.	Questions
15.	<p>What will be the output of the program?</p> <pre>#include<stdio.h> int main () { int i = 4, j = 8; printf("%d, %d, %d\n", i j&j i, i j&j i, i^j); return 0; }</pre> <p>(1) 112, 1, 2 (2) 12, 12, 12 (3) 32, 1, 12 (4) -64, 1, 12</p>
16.	<p>If a node in a BST has two sub-tree, then its in-order predecessor has :-</p> <p>(1) no right child (2) no left child (3) two children (4) no child</p>
17.	<p>What will be the output of the following C program?</p> <pre>void count(int n) { static int d = 1; printf("%d", n); printf("%d", d); d++; if(n>1) count(n-1); printf("%d", d); } void main() { count(3); }</pre> <p>(1) 312213444 (2) 312111333 (3) 3121112 (4) 3122134</p>

Question No.	Questions
18.	<p>In the array implementation of circular queue, which of the following operation takes linear time in the worst case?</p> <p>(1) To empty a queue (2) Deletion (3) Insertion (4) None</p>
19.	<p>Correct syntax to pass a Function Pointer as an argument</p> <p>(1) void pass(int (*fptr)(int, float, char)){} (2) void pass(*fptr)(int, float, char){} (3) void pass (int (*fptr)){} (4) void pass(*fptr){}</p>
20.	<p>Consider the following recursive C function that takes two arguments :-</p> <pre>unsigned int join (unsigned int n, unsigned int r) { if (n > 0) return ((n%r) + join(n/r, r)); else return 0; }</pre> <p>What is the return value of the function join when it is called as join (345, 10)?</p> <p>(1) 96 (2) 48 (3) 24 (4) 12</p>
21.	<p>Which of the following is equal to the logical expression.</p> <p>$(X \wedge Y) \rightarrow (Z \vee X) \rightarrow (X \equiv 1)?$</p> <p>(1) Contradiction (2) Valid (3) First Order Logic (4) None of the above</p>

Question No.	Questions
22.	The minimum number of colors needed to color a graph having $n (>3)$ vertices and 2 edges is :- (1) 1 (2) 2 (3) 3 (4) 4
23.	A graph with n vertices will definitely have a parallel edge or self-loop, if the total number of edges are :- (1) Less than $(n-1)$ (2) Greater than $(n-1)/2$ (3) Greater than $(n-1)$ (4) Greater than $n(n-1)/2$
24.	A PERT network has 09 activities on its critical path. The standard deviation of each activity on the critical path is 03. The standard deviation of the critical path is :- (1) 03 (2) 09 (3) 27 (4) 81
25.	Two people : Amar and Akbar have picked 10 Mangoes, 15 Banana and 14 Apples. What is the number of ways they can divide the fruits between them : (1) 2640 (2) 2100 (3) 1638 (4) 1148
26.	A six sided unbiased dice with 04 Green faces and 04 Blue faces is rolled seven times. Which of the following combinations is the most likely outcome of the experiment? (1) 03 Green faces and 04 Blue faces (2) 04 Green faces and 03 Blue faces (3) 05 Green faces and 02 Blue faces (4) 05 Green faces and 01 Blue face

Question No.	Questions
27.	A bag contains 2 Pens, 3 Pencils and 4 Sharpener. Item are drawn from the bag at random, one at a time, without replacement. The probability of drawing 2 Pen first followed by 3 Pencils and subsequently the 4 Sharpener is : (1) 3/560 (2) 2/315 (3) 1/1260 (4) 1/2443
28.	In a graph, if $e = (u, v)$, then it means :- (1) u is adjacent to v but v is not adjacent to u (2) e begins at u and ends at v (3) u is predecessor and v is successor (4) both (2) and (3)
29.	An examination consists of two papers; X and Y. The probability of failing in X is 0.3 and that in Y is 0.2. Given that a student has failed in Y, the probability of failing in X is 0.6. The probability of a student failing in both the papers is :- (1) 0.06 (2) 0.50 (3) 0.12 (4) 0.18
30.	Honda Automobile contracted to buy shock absorbers from two suppliers X and Y. X supplies 60% and Y supplies 40% of the shock absorbers. All shock absorbers are subjected to a quality test. The ones that pass the quality test are considered reliable. Of X's shock absorbers, 96% are reliable. Of Y's shock absorbers, 72% are reliable. The probability that a randomly chosen shock absorber, which is found to be reliable, is made by Y is : (1) 0.720 (2) 0.667 (3) 0.334 (4) 0.288

Question No.	Questions
31.	The values of the set membership is represented by which of the following? (1) Discrete Set (2) Probabilities (3) Degree of truth (4) Both Degree of truth & Probabilities
32.	Which of the following search uses only the linear space for searching? (1) Best-first search (2) Depth-first search (3) Recursive best-first search (4) None of the mentioned
33.	What is the heuristic function of greedy best-first search? (1) $f(n) = h(n)$ (2) $f(n) = h(n)$ (3) $f(n) < h(n)$ (4) $f(n) > h(n)$
34.	Which search is equal to MiniMax search but eliminates the branches that can't influence the final decision? (1) Breadth-first search (2) Alpha-beta pruning (3) Depth-first-search (4) None of the above
35.	Which of the following is called as transposition table? (1) Next value in the search (2) Hash table of next seen positions (3) Hash table of previously seen positions (4) None of the above

Question No.	Questions
36.	Which of the following search is complete and optimal when $h(n)$ is consistent? (1) A* search (2) Best-first search (3) Depth-first search (4) Both Best-first & Depth-first search
37.	If A and B are two fuzzy sets with the following membership functions :- $\mu_A(x) = \{0.2, 0.5, 0.6, 0.1, 0.9\}$ $\mu_B(x) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ then what will be the value of $\mu_{A \cap B}$? (1) $\{0.2, 0.5, 0.6, 0.7, 0.9\}$ (2) $\{0.2, 0.5, 0.2, 0.1, 0.8\}$ (3) $\{0.1, 0.5, 0.2, 0.1, 0.8\}$ (4) $\{0.1, 0.5, 0.6, 0.1, 0.8\}$
38.	How many types of polymerases are there in basic classification? (1) 1 (2) 2 (3) 3 (4) 5
39.	Why are researchers take more interest in linearly separable problems of neural network? (1) Because they are the only mathematical functions you can draw (2) Because they are the only class of problem that Perceptron can solve successfully (3) Because they are the only mathematical functions that are continue (4) Because they are the only class of problem that network can solve successfully

Question No.	Questions
40.	<p>Having multiple perceptrons can actually solve the XOR problem satisfactorily - this is because of the fact that each perceptron can partition off a linear part of the space itself, and they can then combine their results. Which of the following is correct?</p> <p>(1) False - just having a single perceptron is enough (2) False - perceptrons are mathematically incapable of solving linearly inseparable functions, no matter what you do (3) True - perceptrons can do this but are unable to learn to do it - they have to be explicitly hand-coded. (4) True - this work always, and these multiple perceptrons learn to classify even complex problems.</p>
41.	<p>A binary tree T has 20 leaves. What will be the number of nodes in T having two children?</p> <p>(1) 17 (2) 18 (3) 19 (4) 20</p>
42.	<p>Let $G = (V, E)$ be any connected undirected edge-weighted Graph. The weight of the edges in E are positive and distinct. Consider the following statements :-</p> <p>(i) Minimum Spanning Tree of G is always unique (ii) Shortest path between any two vertices of G is always unique. Which of the above statements is necessarily true?</p> <p>(1) (i) only (2) (ii) only (3) Neither (i) nor (ii) (4) Both (i) and (ii)</p>

Question No.	Questions
43.	<p>Let T be a binary search tree with 15 nodes. The minimum and maximum possible heights of T are: (Please note that the height of a tree with a single node is 0)</p> <p>(1) 5 and 14 respectively (2) 14 and 5 respectively (3) 3 and 14 respectively (4) 14 and 3 respectively</p>
44.	<p>If the address of $A[1][1]$ and $A[2][1]$ are 1000 and 1010 respectively and each element occupies 2 bytes then the array has been stored in which order?</p> <p>(1) column major (2) row major (3) matrix major (4) none of these</p>
45.	<p>The number of distinct binary trees with 3 nodes, which when traversed in post order gives the sequence A, B, C is :-</p> <p>(1) 3 (2) 9 (3) 5 (4) 7</p>
46.	<p>The height of a tree is the length of the longest root-to-leaf path in it. The maximum and minimum number of nodes in a binary tree of height 5 are :-</p> <p>(1) 63 and 6 respectively (2) 64 and 5 respectively (3) 32 and 6 respectively (4) 31 and 5 respectively</p>

Question No.	Questions
47.	<p>Consider a hash table of size seven, with starting index zero, and a hash function $(3x + 4) \bmod 7$. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.</p> <p>(1) 8, _, _, _, _, _, 10 (2) 1, 8, 10, _, _, _, 3 (3) 1, _, _, _, _, _, 3 (4) 1, 10, 8, _, _, _, 3</p>
48.	<p>From a complete graph having n nodes and e edges, we can construct a spanning tree by removing maximum _____ edges :-</p> <p>(1) $n - e + 1$ (2) $e - n + 1$ (3) $n + e - 1$ (4) $e - n - 1$</p>
49.	<p>In the following DAG, find out the number of required stacks in order to represent it in a Graph Structured Stack :-</p> <div style="text-align: center;"> <pre> graph TD A((A)) --> B((B)) A((A)) --> D((D)) B((B)) --> C((C)) D((D)) --> E((E)) </pre> </div> <p>(1) 1 (2) 2 (3) 3 (4) 4</p>

Question No.	Questions
50.	<p>What will be the Time Complexity to check if an edge exists between two vertices?</p> <p>(1) $O(V^*V)$ (2) $O(V + E)$ (3) $O(1)$ (4) $O(E)$</p>
51.	<p>A file is organized so that the ordering of data records is the same, as or close to the ordering of data entries in some index. Which one of the following is that Index?</p> <p>(1) Dense (2) Clustered (3) Sparse (4) Unclustered</p>
52.	<p>Using Relational Algebra the query that finds customers, who have a balance of over 1000 is :-</p> <p>(1) Π Customer_name (σ balance > 1000 (Deposit)) (2) σ Customer_name (Π balance > 1000 (Deposit)) (3) Both of the above (4) None of the above</p>
53.	<p>Which of the following can be addressed by enforcing a referential integrity constraint?</p> <p>(1) All phone numbers must include the area code (2) Certain fields are required (such as the email address, or phone number) before the record is accepted (3) Information on the customer must be known before anything can be sold to that customer. (4) When entering an order quantity, the user must input a number and not some text (i.e., 12 rather than 'a dozen')</p>

Question No.	Questions
54.	<p>Consider the following transactions with data items P and Q initialized to zero :</p> <p>T1 : read (P) ; read (Q) ; if P = 0 then Q := Q + 1 ; write (Q) ;</p> <p>T2 : read (Q) ; read (P) ; if Q = 0 then P := P + 1 ; Write (P) ;</p> <p>Any non-serial interleaving of T1 and T2 for concurrent execution leads to:-</p> <p>(1) A serializable schedule (2) A conflict serializable schedule (3) A schedule for which a precedence graph cannot be drawn (4) A schedule that is not conflict serializable</p>
55.	<p>Which normalization form is based on the transitive dependency?</p> <p>(1) 1 NF (2) 2 NF (3) 3 NF (4) 4 NF</p>
56.	<p>Which normal form deals with multivalued dependency?</p> <p>(1) 1 NF (2) 2 NF (3) 3 NF (4) 4 NF</p>
57.	<p>Which of the following is known as minimal super key?</p> <p>(1) Primary Key (2) Candidate Key (3) Foreign Key (4) Unique Key</p>

Question No.	Questions
58.	<p>Which of the following will be the maximum children of a B-tree of order n?</p> <p>(1) $n/2$ (2) $n + 1$ (3) n (4) $n - 1$</p>
59.	<p>Which of the following can replace the below query?</p> <p>SELECT name, course_id FROM instructor, teacher WHERE instructor_ID = teacher_ID;</p> <p>(1) select name, course_id from instructor natural join teacher; (2) select name, course_id from teacher, instructor where instructor_id = course_id; (3) select name, course_id from instructor (4) select course_id from instructor join teacher</p>
60.	<p>NATURAL JOIN can also be termed as</p> <p>(1) Combination of Union and Cartesian Product (2) Combination of Selection and Cartesian Product (3) Combination of Projection and Cartesian Product (4) Combination of Union and Projection</p>
61.	<p>Let $\langle M \rangle$ be the encoding of a Turing machine as a string over $\Sigma = \{0, 1\}$. Let $L = \{ \langle M \rangle \mid M \text{ is Turing machine that accepts a string of length } 2018 \}$.</p> <p>(1) decidable and recursively enumerable (2) decidable but not recursively enumerable (3) Un-decidable but recursively enumerable (4) Un-decidable and not recursively enumerable</p>

**SET-X
Code-C**

Question No.	Questions
62.	<p>The recurrence relation capturing the optimal execution time of the towers of Hanoi problem with n discs will be, which of the following :-</p> <p>(1) $T(n) = 2T(n-1) + 1$</p> <p>(2) $T(n) = 2T(n-2) + 2$</p> <p>(3) $T(n) = 2T(n-1) + n$</p> <p>(4) $T(n) = 2T(n/2) + 1$</p>
63.	<p>If L_1 and L_2 are regular languages, which among the following is an exception?</p> <p>(1) $L_1 - L_2$</p> <p>(2) $L_1 \cup L_2$</p> <p>(3) $L_1 \cap L_2$</p> <p>(4) All of the above</p>
64.	<p>Let $W(n)$ and $A(n)$ denote respectively, the worst case and average case running time of an algorithm executed on an input of size n. Which of the following is always true?</p> <p>(1) $A(n) = \Omega(W(n))$</p> <p>(2) $A(n) = O(W(n))$</p> <p>(3) $A(n) = o(W(n))$</p> <p>(4) $A(n) = \Theta(W(n))$</p>

**SET-X
Code-C**

Question No.	Questions
65.	<p>An array n numbers is given, where n is an even number. The maximum as well as the minimum of these n numbers needs to be determined. Which of the following is true about the number of comparisons needed?</p> <p>(1) At most $1.5n - 2$ comparisons are needed</p> <p>(2) At least $n \log_2 n$ comparisons are needed</p> <p>(3) At least $2n - c$ comparisons, for some constant, c are needed</p> <p>(4) None of the above</p>
66.	<p>Consider a hash table with 9 slots. The hash function is $h(k) = k \bmod 9$. The collisions are resolved by chaining. The following 9 keys are inserted in the order: 5, 28, 19, 15, 20, 33, 12, 17, 10. The maximum, minimum, and average chain lengths in the hash table, respectively, will be which of the following?</p> <p>(1) 3, 3 and 3</p> <p>(2) 3, 0 and 1</p> <p>(3) 0, 1 and 3</p> <p>(4) 3, 2 and 0</p>
67.	<p>The number of states in the minimal deterministic finite automaton corresponding to the regular expression $(0 + 1)^* (10)$ will be which of the following?</p> <p>(1) 2</p> <p>(2) 3</p> <p>(3) 4</p> <p>(4) 5</p>

Question No.	Questions
68.	<p>A canonical set of items is given below :- $S \rightarrow L > R$ $Q \rightarrow R$</p> <p>On input symbol $<$ the set has, which of the following?</p> <p>(1) a reduce-reduce conflict but not a shift-reduce conflict (2) neither a shift-reduce nor a reduce-reduce conflict (3) a shift-reduce conflict and a reduce-reduce conflict (4) a shift-reduce conflict but not a reduce-reduce conflict</p>
69.	<p>YACC builds up, which of the following?</p> <p>(1) LALR parsing table (2) SLR parsing table (3) Canonical LR parsing table (4) None of these</p>
70.	<p>For the expression grammar $E \rightarrow E * F \mid F + E \mid F$ $F \rightarrow F - I \mid I$</p> <p>Which of the following statement holds true?</p> <p>(1) Precedence of $-$ is higher $*$ (2) Precedence of $*$ is higher $+$ (3) $+$ and $-$ have same precedence (4) Precedence of $+$ is higher $*$</p>

Question No.	Questions
71.	<p>Consider a network with five nodes, N1 to N5, as shown below</p> <p>The network uses a Distance Vector Routing Protocol. Once, the Route have stabilized, the distance vectors at different nodes are as under :</p> <p>N1: (0, 1, 7, 8, 4) N2: (1, 0, 6, 7, 3) N3: (7, 6, 0, 2, 6) N4: (8, 7, 2, 0, 4) N5: (4, 3, 6, 4, 0)</p> <p>Each distance vector is the distance of best known path at that instance to nodes, N1 to N5, where the distance to itself is 0. Also, all links are symmetric and the cost is identical in both the directions. In each round, all nodes exchange their distance vectors with their respective neighbors. Then all nodes update the distance vectors. In between two rounds, any change in cost of a link will cause the two incident nodes to change only that entry in their distance vectors. The cost of link N2-N3 reduces to 2 (in both directions). After the next round updates. What will be the new distance vector at node, N3?</p> <p>(1) (6, 4, 1, 0, 2) (2) (3, 2, 0, 2, 5) (3) (7, 2, 0, 6, 3) (4) (3, 1, 6, 0, 2)</p>

SET-X
Code-C

Question No.	Questions
72.	Host A sends a UDP datagram containing 8880 bytes of user data to host B over an Ethernet LAN. Ethernet frames may carry data up to 1500 bytes (i.e. MTU = 1500 bytes). Size of UDP header is 8 bytes and size of IP header is 20 bytes. There is no option field in IP header. How many total number of IP fragments will be transmitted and what will be the contents of offset field in the last fragment? (1) 7 and 8880 (2) 7 and 1110 (3) 5 and 6400 (4) 8 and 6625
73.	Consider a source computer (S) transmitting a file of size 10^6 bits to a destination computer (D) over a network of two routers (R_1 and R_2) and three links (L_1 , L_2 , and L_3). L_1 connects S to R_1 ; L_2 connects R_1 to R_2 ; and L_3 connects R_2 to D. Let each link be of length 100 km. Assume signals travel over each link at a speed of 10^8 meters per second. Assume that the link bandwidth on each link is 1Mbps. Let the file be broken down into 1000 packets each of size 1000 bits. Find the total sum of transmission and propagation delays in transmitting the file from S to D? (1) 1000 ms (2) 1005 ms (3) 1010 ms (4) 1015 ms
74.	Which of these are the features present in IPv4 but not in IPv6? (1) Options (2) Fragmentation (3) Header checksum (4) All of the above
75.	Which of the following is used in wireless LAN? (1) time division multiplexing (2) space division multiplexing (3) orthogonal frequency division multiplexing (4) none of the mentioned

PHD/URS-EE-DEC-2022 (Computer Science) Code-C (22)

SET-X
Code-C





Question No.	Questions
76.	Which of the following is/are example(s) of state-full application layer protocols? (i) HTTP (ii) FTP (iii) TCP (iv) POP3 (1) (i) and (ii) only (2) (ii) and (iv) only (3) (ii) and (iii) only (4) (iv) only
77.	A serial transmission T1 uses 8 information bits, 2 start bits, 1 stop bit and 1 parity bit for each character. A synchronous transmission T2 uses 3 eight bit sync characters followed by 30 eight bit information characters. If the bit rate is 1200 bits/second in both cases, what are the transfer rates of T1 and T2? (1) 60 characters/sec, 146 characters/sec (2) 80 characters/sec, 233 characters/sec (3) 100 characters/sec, 136 characters/sec (4) 100 characters/sec, 153 characters/sec
78.	Which of the following is required by Cloud Computing? (1) That the identity be authenticated (2) That the authentication be portable (3) That you establish an identity (4) All of the above

PHD/URS-EE-DEC-2022 (Computer Science) Code-C (23)

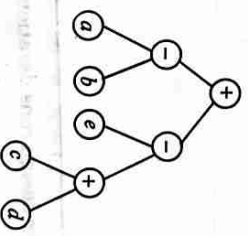
Question No.	Questions
79.	Which of the following is the Virtual machine conversion cloud? (1) Amazon Cloud Watch (2) AbiCloud (3) BMC Cloud Computing Initiative (4) None of the above
80.	Which of the following language preferred for IoT analytics? (1) Python (2) DHTML (3) PHP (4) Java Script
81.	Convert the following SOP expression to an equivalent POS expression :- $ABC + A\bar{B}\bar{C} + A\bar{B}C + AB\bar{C} + \bar{A}\bar{B}C$ (1) $(A + B + C)(A + \bar{B} + C)(A + \bar{B} + \bar{C})$ (2) $(\bar{A} + \bar{B} + \bar{C})(A + \bar{B} + C)(A + \bar{B} + C)$ (3) $(\bar{A} + \bar{B} + \bar{C})(A + B + \bar{C})(\bar{A} + B + C)$ (4) $(A + B + C)(\bar{A} + B + \bar{C})(A + \bar{B} + C)$
82.	'Aging registers' are :- (1) Registers which keep track of when the program was last accessed (2) Counters to keep track of last accessed instruction (3) Counters to keep track of the latest data structures referred (4) Counters which indicate how long ago their associated pages have been referenced


Question No.	Questions
83.	Which circuit is generated from D-Flip flop due to addition of an inverter by causing reduction in the number of inputs? (1) Gated JK - latch (2) Gated D - latch (3) Gated SR- latch (4) Gated T- latch
84.	The most efficient method followed by computers to multiply two unsigned numbers is :- (1) Booth algorithm (2) Restoring algorithm (3) Bit pair recording of multipliers (4) Non restoring algorithm
85.	In signed-magnitude binary division, if the dividend is $(11100)_2$ and divisor is $(10011)_2$, then the result is :- (1) $(01101)_2$ (2) $(10100)_2$ (3) $(11001)_2$ (4) $(01100)_2$
86.	Consider an instruction pipeline with five stages without any branch prediction : Fetch Instruction (FI) Decode Instruction (DI), Fetch Operand (FO), Execute Instruction (EI) and Write Operand (WO). The stage delays for FI, DI, FO, EI and WO are 5 ns, 7ns, 10 ns, 8 ns and 6 ns, respectively. There are intermediate storage buffers after each stage and the delay of each buffer is 1 ns. A program consisting of 12 instructions $I_1, I_2, I_3, \dots, I_{12}$ is executed in this pipelined processor. Instruction I_4 is the only branch instruction and its branch target is I_9 . If the branch is taken during the execution of this program, then the time (in ns) needed to complete the program will be : (1) 256 (2) 128 (3) 265 (4) 165

SET-X
Code-C

Question No.	Questions
87.	<p>How many 3-to-8 line decoders, with an enable input, are needed to construct at 6-to-64 line decoder, without using any other logic gates?</p> <p>(1) 32 (2) 16 (3) 8 (4) 4</p>
88.	<p>Which one of the following circuits is not equivalent to a 2-input XNOR (exclusive NOR) gate?</p> <p>(1) </p> <p>(2) </p> <p>(3) </p> <p>(4) </p>
89.	<p>Which memory is difficult to interface with processor?</p> <p>(1) Static memory (2) ROM (3) Dynamic Memory (4) None of these</p>

SET-X
Code-C

Question No.	Questions
90.	<p>Consider evaluating the following expression tree on a machine with load-store architecture, in which memory can be accessed only through load and store instructions. The variables a, b, c, d and e initially stored in memory. The binary operators used in this expression tree can be evaluated by the machine, only when the operands are in registers. The instructions produce result only in a register. If no intermediate results can be stored in memory, what will be the minimum number of registers needed to evaluate this expression?</p> <p>(1) 2 (2) 3 (3) 5 (4) 7</p> <p></p>

Question No.	Questions
91.	<p>Which of the following is the System Development?</p> <p>(1) It is development of SRS of a system.</p> <p>(2) Process of successive changes of system from new and changed requirement</p> <p>(3) Both (1) and (2)</p> <p>(4) None of the above</p>
92.	<p>Which method recommends that very frequent system builds should be carried out with automated testing to discover software problems?</p> <p>(1) Agile method</p> <p>(2) Large systems method</p> <p>(3) Parallel compilation method</p> <p>(4) All of the above</p> 
93.	<p>Which of the following is not a major design consideration of the system?</p> <p>(1) Data integrity constant</p> <p>(2) Availability of technically qualified personal to carry out design and development</p> <p>(3) Frequency of record updates</p> <p>(4) Response time required</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-C
(28)

Question No.	Questions
94.	<p>What is the main difference between program testing and system testing?</p> <p>(1) System testing is tough and program testing is easy</p> <p>(2) Program testing is more comprehensive than system testing</p> <p>(3) System testing focuses on testing the interfaces between programs, program testing focuses on individual programs.</p> <p>(4) None of the above</p>
95.	<p>Which of the following is the major drawback of RAD model :-</p> <p>(1) It requires highly skilled developers/designers</p> <p>(2) It increases the component reusability</p> <p>(3) It necessitates customers feedbacks</p> <p>(4) Both (a) and (b)</p>
96.	<p>Which of the following models doesn't necessitate defining requirements at the earliest in the lifecycle?</p> <p>(1) Spiral and Prototyping</p> <p>(2) RAD and Waterfall</p> <p>(3) Prototyping and Waterfall</p> <p>(4) Spiral and RAD</p>
97.	<p>Which of the following is the main intent of project metrics?</p> <p>(1) To minimize the development schedule</p> <p>(2) To evaluate the ongoing project's quality on a daily basis</p> <p>(3) Both (1) and (2)</p> <p>(4) None of the above</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-C
(29)

**SET-X
Code-C**

Question No.	Questions
98.	<p>Which of the following does not complement the decomposition techniques but offers a potential estimation approach for their impersonal growth?</p> <p>(1) Empirical estimation models (2) Decomposition techniques (3) Automated estimation tools (4) Both empirical estimation models and automated estimation tools</p>
99.	<p>In CMM, the life-cycle activities of requirements analysis, design, code, and test are described in which of the following?</p> <p>(1) Software subcontract Management (2) Software Quality Assurance (3) Software Quality Management (4) Software Product Engineering</p>
100.	<p>Which of the following is an incorrect activity for the configuration management of a software system?</p> <p>(1) Change management (2) System management (3) Internship management (4) Version management</p>

57

SET-“X”

(Total No. of printed pages : 31)

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

(PHD/URS-EE-DECEMBER-2022)

Code

D

COMPUTER SCIENCE

Sr. No. 10052

Time : 1¼ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (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.





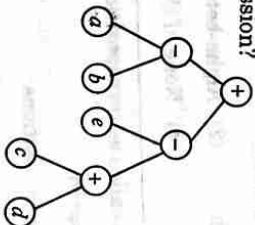
1. All questions are compulsory.
2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of 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 and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will 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 book-let itself. Answers MUST NOT be ticked in the Question book-let.
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 BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.



Question No.	Questions
1.	<p>Convert the following SOP expression to an equivalent POS expression :- $ABC + A\bar{B}\bar{C} + A\bar{B}C + AB\bar{C} + \bar{A}\bar{B}C$</p> <p>(1) $(A+B+C)(A+\bar{B}+C)(A+\bar{B}+\bar{C})$ (2) $(\bar{A}+\bar{B}+\bar{C})(A+\bar{B}+C)(A+\bar{B}+C)$ (3) $(\bar{A}+\bar{B}+\bar{C})(A+B+C)(\bar{A}+B+C)$ (4) $(A+B+C)(\bar{A}+B+\bar{C})(A+\bar{B}+C)$</p>
2.	<p>'Aging registers' are :-</p> <p>(1) Registers which keep track of when the program was last accessed (2) Counters to keep track of last accessed instruction (3) Counters to keep track of the latest data structures referred (4) Counters which indicate how long ago their associated pages have been referenced</p>
3.	<p>Which circuit is generated from D-Flip Flop due to addition of an inverter by causing reduction in the number of inputs?</p> <p>(1) Gated JK-latch (2) Gated D-latch (3) Gated SR-latch (4) Gated T-latch</p>
4.	<p>The most efficient method followed by computers to multiply two unsigned numbers is :-</p> <p>(1) Booth algorithm (2) Restoring algorithm (3) Bit pair recording of multipliers (4) Non restoring algorithm</p>

Question No.	Questions
5.	<p>In signed-magnitude binary division, if the dividend is $(110011)_2$ and divisor is $(10011)_2$, then the result is : -</p> <p>(1) $(01101)_2$ (2) $(10100)_2$ (3) $(11001)_2$ (4) $(01100)_2$</p>
6.	<p>Consider an instruction pipeline with five stages without any branch prediction : Fetch Instruction (FI) Decode Instruction (DI). Fetch Operand (FO), Execute Instruction (EI) and Write Operand (WO). The stage delays for FI, DI, FO, EI and WO are 5 ns, 7ns, 10 ns, 8 ns and 6 ns, respectively. There are intermediate storage buffers after each stage and the delay of each buffer is 1 ns. A program consisting of 12 instructions $I_1, I_2, I_3, \dots, I_{12}$ is executed in this pipelined processor. Instruction I_1 is the only branch instruction and its branch target is I_9. If the branch is taken during the execution of this program, then the time (in ns) needed to complete the program will be :</p> <p>(1) 256 (2) 198 (3) 265 (4) 165</p>
7.	<p>How many 3-to-8 line decoders, with an enable input, are needed to construct at 6-to-64 line decoder, without using any other logic gates?</p> <p>(1) 32 (2) 16 (3) 8 (4) 4</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-D
(2)

Question No.	Questions
8.	<p>Which one of the following circuits is not equivalent to a 2-input XNOR (exclusive NOR) gate?</p> <p>(1) </p> <p>(2) </p> <p>(3) </p> <p>(4) </p>
9.	<p>Which memory is difficult to interface with processor?</p> <p>(1) Static memory (2) ROM (3) Dynamic Memory (4) None of these</p>
10.	<p>Consider evaluating the following expression tree on a machine with load-store architecture, in which memory can be accessed only through load and store instructions. The variables a, b, c, d and e initially stored in memory. The binary operators used in this expression tree can be evaluated by the machine, only when the operands are in registers. The instructions produce result only in a register. If no intermediate results can be stored in memory, what will be the minimum number of registers needed to evaluate this expression?</p> <p>(1) 2 (2) 3 (3) 5 (4) 7</p> <p></p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-D
(3)

Question No.	Questions
11.	<p>The values of the set membership is represented by which of the following?</p> <p>(1) Discrete Set (2) Probabilities (3) Degree of truth (4) Both Degree of truth & Probabilities</p>
12.	<p>Which of the following search uses only the linear space for searching?</p> <p>(1) Best-first search (2) Depth-first search (3) Recursive best-first search (4) None of the mentioned</p>
13.	<p>What is the heuristic function of greedy best-first search?</p> <p>(1) $f(n) = h(n)$ (2) $f(n) = h(n)$ (3) $f(n) < h(n)$ (4) $f(n) > h(n)$</p>
14.	<p>Which search is equal to MiniMax search but eliminates the branches that can't influence the final decision?</p> <p>(1) Breadth-first search (2) Alpha-beta pruning (3) Depth-first-search (4) None of the above</p>
15.	<p>Which of the following is called as transposition table?</p> <p>(1) Next value in the search (2) Hash table of next seen positions (3) Hash table of previously seen positions (4) None of the above</p>

Question No.	Questions
16.	<p>Which of the following search is complete and optimal when $h(n)$ is consistent?</p> <p>(1) A* search (2) Best-first search (3) Depth-first search (4) Both Best-first & Depth-first search</p>
17.	<p>If A and B are two fuzzy sets with the following membership functions :- $\mu_A(x) = \{0.2, 0.5, 0.6, 0.1, 0.9\}$ $\mu_B(x) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$ then what will be the value of $\mu_{A \cap B}$?</p> <p>(1) $\{0.2, 0.5, 0.6, 0.7, 0.9\}$ (2) $\{0.2, 0.5, 0.2, 0.1, 0.8\}$ (3) $\{0.1, 0.5, 0.2, 0.1, 0.8\}$ (4) $\{0.1, 0.5, 0.6, 0.1, 0.8\}$</p>
18.	<p>How many types of polymerases are there in basic classification?</p> <p>(1) 1 (2) 2 (3) 3 (4) 5</p>
19.	<p>Why are researchers take more interest in linearly separable problems of neural network?</p> <p>(1) Because they are the only mathematical functions you can draw (2) Because they are the only class of problem that Perceptron can solve successfully (3) Because they are the only mathematical functions that are continue (4) Because they are the only class of problem that network can solve successfully</p>

SET-X
Code-D

Question No.	Questions
20.	<p>Having multiple perceptrons can actually solve the XOR problem satisfactorily - this is because of the fact that each perceptron can partition off a linear part of the space itself, and they can then combine their results. Which of the following is correct?</p> <p>(1) False – just having a single perceptron is enough (2) False – perceptrons are mathematically incapable of solving linearly inseparable functions, no matter what you do (3) True – perceptrons can do this but are unable to learn to do it – they have to be explicitly hand-coded. (4) True – this work always, and these multiple perceptrons learn to classify even complex problems.</p>
21.	<p>Let $\langle M \rangle$ be the encoding of a Turing machine as a string over $\Sigma = \{0, 1\}$. Let $L = \{ \langle M \rangle \mid M \text{ is Turing machine that accepts a string of length } 2018 \}$.</p> <p>(1) decidable and recursively enumerable (2) decidable but not recursively enumerable (3) Un-decidable but recursively enumerable (4) Un-decidable and not recursively enumerable</p>
22.	<p>The recurrence relation capturing the optimal execution time of the towers of Hanoi problem with n discs will be, which of the following :-</p> <p>(1) $T(n) = 2T(n-1) + 1$ (2) $T(n) = 2T(n-2) + 2$ (3) $T(n) = 2T(n-1) + n$ (4) $T(n) = 2T(n/2) + 1$</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-D
(6)

SET-X
Code-D

Question No.	Questions
23.	<p>If L_1 and L_2 are regular languages, which among the following is an exception?</p> <p>(1) $L_1 - L_2$ (2) $L_1 \cup L_2$ (3) $L_1 \cap L_2$ (4) All of the above</p>
24.	<p>Let $W(n)$ and $A(n)$ denote respectively, the worst case and average case running time of an algorithm executed on an input of size n. Which of the following is always true?</p> <p>(1) $A(n) = \Omega(W(n))$ (2) $A(n) = O(W(n))$ (3) $A(n) = o(W(n))$ (4) $A(n) = \Theta(W(n))$</p>
25.	<p>An array n numbers is given, where n is an even number. The maximum as well as the minimum of these n numbers needs to be determined. Which of the following is true about the number of comparisons needed?</p> <p>(1) At most $1.5n - 2$ comparisons are needed (2) At least $n \log_2 n$ comparisons are needed (3) At least $2n - c$ comparisons, for some constant, c are needed (4) None of the above</p>

PHD/URS-EE-DEC-2022 (Computer Science) Code-D
(7)

Question No.	Questions
26.	<p>Consider a hash table with 9 slots. The hash function is $h(k) = k \text{ mod } 9$. The collisions are resolved by chaining. The following 9 keys are inserted in the order: 5, 28, 19, 15, 20, 33, 12, 17, 10. The maximum, minimum, and average chain lengths in the hash table, respectively, will be which of the following?</p> <p>(1) 3, 3 and 3 (2) 3, 0 and 1 (3) 0, 1 and 3 (4) 3, 2 and 0</p>
27.	<p>The number of states in the minimal deterministic finite automaton corresponding to the regular expression $(0 + 1)^* (10)$ will be which of the following?</p> <p>(1) 2 (2) 3 (3) 4 (4) 5</p>
28.	<p>A canonical set of items is given below:- $S \rightarrow L > R$ $Q \rightarrow R$ On input symbol $<$ the set has, which of the following?</p> <p>(1) a reduce-reduce conflict but not a shift-reduce conflict (2) neither a shift-reduce nor a reduce-reduce conflict (3) a shift-reduce conflict and a reduce-reduce conflict (4) a shift-reduce conflict but not a reduce-reduce conflict</p>

Question No.	Questions
29.	<p>YACC builds up, which of the following?</p> <p>(1) LALR parsing table (2) SLR parsing table (3) Canonical LR parsing table (4) None of these</p>
30.	<p>For the expression grammar $E \rightarrow E * F \mid F + E \mid F$ $F \rightarrow F - I \mid id$ Which of the following statement holds true?</p> <p>(1) Precedence of $*$ is higher $*$ (2) Precedence of $*$ is higher $+$ (3) $+$ and $-$ have same precedence (4) Precedence of $+$ is higher $*$</p>
31.	<p>Which of the following is the System Development?</p> <p>(1) It is development of SRS of a system (2) Process of successive changes of system from new and changed requirement (3) Both (1) and (2) (4) None of the above</p>
32.	<p>Which method recommends that very frequent system builds should be carried out with automated testing to discover software problems?</p> <p>(1) Agile method (2) Large systems method (3) Parallel compilation method (4) All of the above</p>

**SET-X
Code-D**

Question No.	Questions
33.	<p>Which of the following is not a major design consideration of the system?</p> <ol style="list-style-type: none"> (1) Data integrity constant (2) Availability of technically qualified personal to carry out design and development (3) Frequency of record updates (4) Response time required
34.	<p>What is the main difference between program testing and system testing?</p> <ol style="list-style-type: none"> (1) System testing is tough and program testing is easy (2) Program testing is more comprehensive than system testing (3) System testing focuses on testing the interfaces between programs, program testing focuses on individual programs. (4) None of the above
35.	<p>Which of the following is the major drawback of RAD model :-</p> <ol style="list-style-type: none"> (1) It requires highly skilled developers/designers (2) It increases the component reusability (3) It necessitates customers feedbacks (4) Both (a) and (b)
36.	<p>Which of the following models doesn't necessitate defining requirements at the earliest in the lifecycle?</p> <ol style="list-style-type: none"> (1) Spiral and Prototyping (2) RAD and Waterfall (3) Prototyping and Waterfall (4) Spiral and RAD

**SET-X
Code-D**

Question No.	Questions
37.	<p>Which of the following is the main intent of project metrics?</p> <ol style="list-style-type: none"> (1) To minimize the development schedule (2) To evaluate the ongoing project's quality on a daily basis (3) Both (1) and (2) (4) None of the above
38.	<p>Which of the following does not complement the decomposition techniques but offers a potential estimation approach for their impersonal growth?</p> <ol style="list-style-type: none"> (1) Empirical estimation models (2) Decomposition techniques (3) Automated estimation tools (4) Both empirical estimation models and automated estimation tools
39.	<p>In CMM, the life-cycle activities of requirements analysis, design, code, and test are described in which of the following?</p> <ol style="list-style-type: none"> (1) Software subcontract Management (2) Software Quality Assurance (3) Software Quality Management (4) Software Product Engineering
40.	<p>Which of the following is an incorrect activity for the configuration management of a software system?</p> <ol style="list-style-type: none"> (1) Change management (2) System management (3) Internship management (4) Version management

Question No.	Questions
41.	<p>A file is organized so that the ordering of data records is the same, as or close to the ordering of data entries in some index. Which one of the following is that Index?</p> <p>(1) Dense (2) Clustered (3) Sparse (4) Unclustered</p>
42.	<p>Using Relational Algebra the query that finds customers, who have a balance of over 1000 is :-</p> <p>(1) Π Customer_name (σ balance > 1000 (Deposit)) (2) σ Customer_name (Π balance > 1000 (Deposit)) (3) Both of the above (4) None of the above</p>
43.	<p>Which of the following can be addressed by enforcing a referential integrity constraint?</p> <p>(1) All phone numbers must include the area code (2) Certain fields are required (such as the email address, or phone number) before the record is accepted (3) Information on the customer must be known before anything can be sold to that customer. (4) When entering an order quantity, the user must input a number and not some text (i.e., 12 rather than 'a dozen')</p>

Question No.	Questions
44.	<p>Consider the following transactions with data items P and Q initialized to zero :</p> <p>T1 : read (P) ; read (Q) ; if P = 0 then Q := Q + 1 ; write (Q) ;</p> <p>T2 : read (Q) ; read (P) ; if Q = 0 then P := P + 1 ; Write (P) ;</p> <p>Any non-serial interleaving of T1 and T2 for concurrent execution leads to:-</p> <p>(1) A serializable schedule (2) A conflict serializable schedule (3) A schedule for which a precedence graph cannot be drawn (4) A schedule that is not conflict serializable</p>
45.	<p>Which normalization form is based on the transitive dependency?</p> <p>(1) 1 NF (2) 2 NF (3) 3 NF (4) 4 NF</p>
46.	<p>Which normal form deals with multivalued dependency?</p> <p>(1) 1 NF (2) 2 NF (3) 3 NF (4) 4 NF</p>
47.	<p>Which of the following is known as minimal super key?</p> <p>(1) Primary Key (2) Candidate Key (3) Foreign Key (4) Unique Key</p>

**SET-X
Code-D**

Question No.	Questions
48.	<p>Which of the following will be the maximum children of a B-tree of order n?</p> <p>(1) $n/2$ (2) $n + 1$ (3) n (4) $n - 1$</p>
49.	<p>Which of the following can replace the below query?</p> <pre>SELECT name, course_id FROM instructor, teacher WHERE instructor_ID = teacher_ID;</pre> <p>(1) select name, course_id from instructor natural join teacher; (2) select name, course_id from teacher, instructor where instructor_id = course_id; (3) select name, course_id from instructor (4) select course_id from instructor join teacher</p>
50.	<p>NATURAL JOIN can also be termed as</p> <p>(1) Combination of Union and Cartesian Product (2) Combination of Selection and Cartesian Product (3) Combination of Projection and Cartesian Product (4) Combination of Union and Projection</p>
51.	<p>Which one of the following permutations can be obtained as the output using stack assuming that the input is the sequence 1, 2, 3, 4, 5 in that order :-</p> <p>(1) 3, 4, 5, 2, 1 (2) 3, 4, 5, 1, 2 (3) 5, 4, 3, 1, 2 (4) 1, 5, 2, 3, 4</p>

**SET-X
Code-D**

Question No.	Questions
52.	<p>Following is C like pseudo code of a function that takes a Queue Q as an argument, and uses a stack S to do processing.</p> <pre>void fun (Queue *Q) { stack S; // Creates an empty stack S // Run while Q is not empty while (!isEmpty(Q)) { // dequeue an item from Q and push the dequeued item to S push (&S, dequeue (Q)); } // Run while Stack S is not empty while (!isEmpty(&S)) { // Pop an item from S and enqueue the popped item to Q enqueue(Q, pop (&S)); } }</pre> <p>(1) Removes the last from Q (2) Keeps the Q same as it was before the call (3) Reverses the Q (4) Makes Q empty</p>

Question No.	Questions
53.	<p>Consider the following function implemented in C :-</p> <pre>void goto (int x, int y) { int *ptr; x = 0; ptr = &x; *ptr = 1; printf ("%d, %d", x, y); }</pre> <p>The output of invoking goto (1, 1) will be which of the following :-</p> <p>(1) 0, 0 (2) 1, 0 (3) 0, 1 (4) 1, 1</p>
54.	<p>What will be the output when you compile and run the following C code?</p> <pre>#include<stdio.h> int main () { static char *s[] = {"black", "white", "pink", "violet"}; char ** ptr[] = {s+3, s+2, s+1, s}, ***p; p = ptr; ++p; printf("%s", **p+1); return 0; } </pre> <p>(1) ite (2) ack (3) ink (4) let</p>

Question No.	Questions
55.	<p>What will be the output of the program?</p> <pre>#include<stdio.h> int main () { int i = 4, j = 8; printf("%d, %d, %d\n", i j & i, i j & i, i ^ j); return 0; }</pre> <p>(1) 112, 1, 2 (2) 12, 12, 12 (3) 32, 1, 12 (4) -64, 1, 12</p>
56.	<p>If a node in a BST has two sub-tree, then its in-order predecessor has :-</p> <p>(1) no right child (2) no left child (3) two children (4) no child</p>
57.	<p>What will be the output of the following C program?</p> <pre>void count(int n) { static int d = 1; printf("%d", n); printf("%d", d); d++; if(n > 1) count(n-1); printf("%d", d); } void main() { count(3); }</pre> <p>(1) 3122213444 (2) 312111333 (3) 3121112 (4) 3122134</p>

SET-X
Code-D

Question No.	Questions
58.	In the array implementation of circular queue, which of the following operation takes linear time in the worst case? (1) To empty a queue (2) Deletion (3) Insertion (4) None
59.	Correct syntax to pass a Function Pointer as an argument (1) void pass(int (*fptr)(int, float, char)){ (2) void pass(*fptr)(int, float, char){} (3) void pass (int (*fptr)){ (4) void pass(*fptr){}
60.	Consider the following recursive C function that takes two arguments :- unsigned int join (unsigned int n, unsigned int r) { if (n > 0) return ((n%r) + join(n/r, r)); else return 0; } What is the return value of the function join when it is called as join (345, 10)? (1) 96 (2) 48 (3) 24 (4) 12
61.	A multithreaded program P executes with x number of threads and uses y number of locks for ensuring mutual exclusion while operating on shared memory locations. All locks in the program are non-re-entrant, i.e., if a thread holds a lock l, then it cannot re-acquire lock l without releasing it. If a thread is unable to acquire a lock, it blocks until the lock becomes available. The minimum value of x and the minimum value of y together for which execution of P can result in a deadlock are :- (1) x = 1, y = 2 (2) x = 1, y = 1 (3) x = 2, y = 1 (4) x = 2, y = 2

SET-X
Code-D

Question No.	Questions															
62.	An Operating System uses Shortest Remaining Time first (SRTF) process scheduling algorithm. Consider the arrival times and execution times for the following processes :- <table border="1"> <thead> <tr> <th>Process</th> <th>Execution Time</th> <th>Arrival Time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>20</td> <td>0</td> </tr> <tr> <td>P2</td> <td>25</td> <td>15</td> </tr> <tr> <td>P3</td> <td>10</td> <td>30</td> </tr> <tr> <td>P4</td> <td>15</td> <td>45</td> </tr> </tbody> </table> What is the total waiting time for process P2? (1) 55 (2) 40 (3) 15 (4) 05	Process	Execution Time	Arrival Time	P1	20	0	P2	25	15	P3	10	30	P4	15	45
Process	Execution Time	Arrival Time														
P1	20	0														
P2	25	15														
P3	10	30														
P4	15	45														
63.	Consider a main memory with five page frames and the following sequence of page references: 3, 8, 2, 3, 9, 1, 6, 3, 8, 9, 3, 6, 2, 1, 3. Which one of the following is true with respect to page replacement policies First In First Out (FIFO) and Least Recently Used (LRU)? (1) LRU incurs 2 more page faults than FIFO (2) Both incur the same number of page faults (3) FIFO incurs 1 more page faults than LRU (4) FIFO incurs 2 more page faults than LRU															
64.	Which of the following is shared by threads of a process? (1) neither global variables nor heap (2) heap but not global variables (3) both heap and global variables (4) global variables but not heap															

Question No.	Questions
65.	<p>Whenever a process need I/O to or from a disk, it issues :-</p> <p>(1) a system call to the operating system</p> <p>(2) a system call to the CPU</p> <p>(3) a system call to the kernel</p> <p>(4) a system call to the specific API</p>
66.	<p>A computer has twenty physical page frames which contain pages numbered 101 through 120. Now, a program accesses the pages numbered 1, 2, 100 in that order, and repeats the access sequence thrice. Which one of the following page replacement policies experiences the same number of page faults as the optimal page replacement policy for this program?</p> <p>(1) First-in-first-out</p> <p>(2) Most-recently-used</p> <p>(3) Last-in-first-out</p> <p>(4) Least-recently-used</p>
67.	<p>Thread pools help in :-</p> <p>(1) servicing multiple requests using one thread</p> <p>(2) servicing a single request using multiple threads from the pool</p> <p>(3) faster servicing of requests with an existing threads rather than waiting to create a new thread.</p> <p>(4) None of the above</p>

Question No.	Questions
68.	<p>Consider a swapping system in which memory consists of the following hole sizes in memory order:</p> <p>H0 H1 H2 H3 H4 H5 H6 H7</p> <p>10K 4 KB 20 KB 18 KB 7KB 9 KB 12 KB 15 KB</p> <p>and a successive segment request of 12 KB, 10 KB, 9 KB. Which of the following sentences is/are true?</p> <p>(1) First fit algorithm allocates H2, H0, H3 for the mentioned request</p> <p>(2) Best fit algorithm allocates H2, H0, H3 for the mentioned request</p> <p>(3) First fit algorithm allocates H2, H6, H7 for the mentioned request</p> <p>(4) Worst fit algorithm allocates H2, H3, H6 for the mentioned request</p>
69.	<p>What are the characteristics of Host based IDS?</p> <p>(1) Log are analyzed to detect tails of intrusion</p> <p>(2) The host operating system logs in the audit information</p> <p>(3) Logs includes logins, file opens, and program executions</p> <p>(4) All of the above</p>
70.	<p>What are the characteristics of stack based IDS?</p> <p>(1) It is programmed to interpret a certain series of packets</p> <p>(2) It models the normal usage of the network as a noise characterization</p> <p>(3) They are integrated closely with the TCP/IP stack watch packets</p> <p>(4) The host operating system logs in the audit information</p>

Question No.	Questions
71.	A binary tree T has 20 leaves. What will be the number of nodes in T having two children? (1) 17 (2) 18 (3) 19 (4) 20
72.	Let $G = (V, E)$ be any connected undirected edge-weighted graph. The weight of the edges in E are positive and distinct. Consider the following statements :- (i) Minimum Spanning Tree of G is always unique (ii) Shortest path between any two vertices of G is always unique. Which of the above statements is necessarily true? (1) (i) only (2) (ii) only (3) Neither (i) nor (ii) (4) Both (i) and (ii)
73.	Let T be a binary search tree with 15 nodes. The minimum and maximum possible heights of T are: (Please note that the height of a tree with a single node is 0) (1) 5 and 14 respectively (2) 14 and 5 respectively (3) 3 and 14 respectively (4) 14 and 3 respectively
74.	If the address of $A[1][1]$ and $A[2][1]$ are 1000 and 1010 respectively and each element occupies 2 bytes then the array has been stored in which order? (1) column major (2) row major (3) matrix major (4) none of these

Question No.	Questions
75.	The number of distinct binary trees with 3 nodes, which when traversed in post order gives the sequence A, B, C is :- (1) 3 (2) 9 (3) 5 (4) 7
76.	The height of a tree is the length of the longest root-to-leaf path in it. The maximum and minimum number of nodes in a binary tree of height 5 are :- (1) 63 and 6 respectively (2) 64 and 5 respectively (3) 32 and 6 respectively (4) 31 and 5 respectively
77.	Consider a hash table of size seven, with starting index zero, and a hash function $(3x + 4) \bmod 7$. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that ' _ ' denotes an empty location in the table. (1) 8, _ , _ , _ , _ , _ , 10 (2) 1, 8, 10, _ , _ , _ , 3 (3) 1, _ , _ , _ , _ , _ , 3 (4) 1, 10, 8, _ , _ , _ , 3

Question No.	Questions
76.	<p>From a complete graph having n nodes and e edges, we can construct a spanning tree by removing maximum _____ edges :-</p> <p>(1) $n - e + 1$ (2) $e - n + 1$ (3) $n + e - 1$ (4) $e - n - 1$</p>
79.	<p>In the following DAG, find out the number of required stacks in order to represent it in a Graph Structured Stack :-</p> <p>(1) 1 (2) 2 (3) 3 (4) 4</p>
80.	<p>What will be the Time Complexity to check if an edge exists between two vertices?</p> <p>(1) $O(V^*V)$ (2) $O(V + E)$ (3) $O(1)$ (4) $O(E)$</p>

Question No.	Questions
81.	<p>Which of the following is equal to the logical expression. $(X \wedge Y) \rightarrow (Z \wedge X) \rightarrow (X \equiv 1)$?</p> <p>(1) Contradiction (2) Valid (3) First Order Logic (4) None of the above</p>
82.	<p>The minimum number of colors needed to color a graph having n (> 3) vertices and 2 edges is :-</p> <p>(1) 1 (2) 2 (3) 3 (4) 4</p>
83.	<p>A graph with n vertices will definitely have a parallel edge or self-loop, if the total number of edges are :-</p> <p>(1) Less than $(n-1)$ (2) Greater than $(n-1)/2$ (3) Greater than $(n-1)$ (4) Greater than $n(n-1)/2$</p>
84.	<p>A PERT network has 09 activities on its critical path. The standard deviation of each activity on the critical path is 03. The standard deviation of the critical path is :-</p> <p>(1) 03 (2) 09 (3) 27 (4) 81</p>

SET-X
Code-D

Question No.	Questions
85.	Two people : Amar and Akbar have picked 10 Mangoes, 15 Banana and 14 Apples. What is the number of ways they can divide the fruits between them : (1) 2640 (2) 2100 (3) 1638 (4) 1148
86.	A six sided unbiased dice with 04 Green faces and 04 Blue faces is rolled seven times. Which of the following combinations is the most likely outcome of the experiment? (1) 03 Green faces and 04 Blue faces (2) 04 Green faces and 03 Blue faces (3) 05 Green faces and 02 Blue faces (4) 05 Green faces and 01 Blue face
87.	A bag contains 2 Pens, 3 Pencils and 4 Sharpeners. Item are drawn from the bag at random, one at a time, without replacement. The probability of drawing 2 Pen first followed by 3 Pencils and subsequently the 4 Sharpeners is : (1) 3/560 (2) 2/315 (3) 1/1260 (4) 1/2443

SET-X
Code-D


Question No.	Questions
88.	In a graph, if $e = (u, v)$, then it means :- (1) u is adjacent to v but v is not adjacent to u (2) e begins at u and ends at v (3) u is predecessor and v is successor (4) both (2) and (3)
89.	An examination consists of two papers; X and Y. The probability of failing in X is 0.3 and that in Y is 0.2. Given that a student has failed in Y, the probability of failing in X is 0.6. The probability of a student failing in both the papers is :- (1) 0.06 (2) 0.50 (3) 0.12 (4) 0.18
90.	Honda Automobile contracted to buy shock absorbers from two suppliers X and Y. X supplies 60% and Y supplies 40% of the shock absorbers. All shock absorbers are subjected to a quality test. The ones that pass the quality test are considered reliable. Of X's shock absorbers, 96% are reliable. Of Y's shock absorbers, 72% are reliable. The probability that a randomly chosen shock absorber, which is found to be reliable, is made by Y is : (1) 0.720 (2) 0.667 (3) 0.384 (4) 0.288

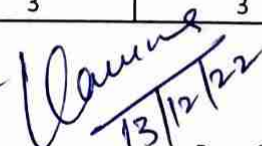
Question No.	Questions
91.	<p>Consider a network with five nodes, N1 to N5, as shown below</p> <pre> graph TD N1((N1)) --- 3 N2((N2)) N2 --- 6 N3((N3)) N2 --- 4 N5((N5)) N3 --- 2 N4((N4)) </pre> <p>The network uses a Distance Vector Routing Protocol. Once, the Route have stabilized, the distance vectors at different nodes are as under :</p> <p>N1: (0, 1, 7, 8, 4) N2: (1, 0, 6, 7, 3) N3: (7, 6, 0, 2, 6) N4: (8, 7, 2, 0, 4) N5: (4, 3, 6, 4, 0)</p> <p>Each distance vector is the distance of best known path at that instance to nodes, N1 to N5, where the distance to itself is 0. Also, all links are symmetric and the cost is identical in both the directions. In each round, all nodes exchange their distance vectors with their respective neighbours. Then all nodes update the distance vectors. In between two rounds, any change in cost of a link will cause the two incident nodes to change only that entry in their distance vectors. The cost of link N2-N3 reduces to 2 (in both directions). After the next round updates. What will be the new distance vector at node, N3?</p> <p>(1) (6, 4, 1, 0, 2) (2) (3, 2, 0, 2, 5) (3) (7, 2, 0, 6, 3) (4) (3, 1, 6, 0, 2)</p>

Question No.	Questions
92.	<p>Host A sends a UDP datagram containing 8880 bytes of user data to host B over an Ethernet LAN. Ethernet frames may carry data up to 1500 bytes (i.e. MTU = 1500 bytes). Size of UDP header is 8 bytes and size of IP header is 20 bytes. There is no option field in IP header. How many total number of IP fragments will be transmitted and what will be the contents of offset field in the last fragment?</p> <p>(1) 7 and 8880 (2) 7 and 1110 (3) 5 and 6400 (4) 8 and 6625</p>
93.	<p>Consider a source computer (S) transmitting a file of size 10^6 bits to a destination computer (D) over a network of two routers (R_1 and R_2) and three links (L_1, L_2, and L_3). L_1 connects S to R_1; L_2 connects R_1 to R_2; and L_3 connects R_2 to D. Let each link be of length 100 km. Assume signals travel over each link at a speed of 10^8 meters per second. Assume that the link bandwidth on each link is 1Mbps. Let the file be broken down into 1000 packets each of size 1000 bits. Find the total sum of transmission and propagation delays in transmitting the file from S to D?</p> <p>(1) 1000 ms (2) 1005 ms (3) 1010 ms (4) 1015 ms</p>
94.	<p>Which of these are the features present in IPv4 but not in IPv6?</p> <p>(1) Options (2) Fragmentation (3) Header checksum (4) All of the above</p>
95.	<p>Which of the following is used in wireless LAN?</p> <p>(1) time division multiplexing (2) space division multiplexing (3) orthogonal frequency division multiplexing (4) none of the mentioned</p>
96.	<p>Which of the following is/are example(s) of state-full application layer protocols?</p> <p>(i) HTTP (ii) FTP (iii) TCP (iv) POP3 (1) (i) and (ii) only (2) (ii) and (iv) only (3) (ii) and (iii) only (4) (iv) only</p>

Question No.	Questions
97.	<p>A serial transmission T1 uses 8 information bits, 2 start bits, 1 stop bit and 1 parity bit for each character. A synchronous transmission T2 uses 3 eight bit sync characters followed by 30 eight bit information characters. If the bit rate is 1200 bits/second in both cases. what are the transfer rates of T1 and T2?</p> <p>(1) 60 characters/sec, 146 characters/sec (2) 80 characters/sec, 233 characters/sec (3) 100 characters/sec, 136 characters/sec (4) 100 characters/sec, 153 characters/sec</p>
98.	<p>Which of the following is required by Cloud Computing?</p> <p>(1) That the identity be authenticated (2) That the authentication be portable (3) That you establish an identity (4) All of the above</p>
99.	<p>Which of the following is the Virtual machine conversion cloud?</p> <p>(1) Amazon Cloud Watch (2) AbiCloud (3) BMC Cloud Computing Initiative (4) None of the above</p>
100.	<p>Which of the following language preferred for IoT analytics?</p> <p>(1) Python (2) DHTML (3) PHP (4) Java Script</p>

ANSWER KEYS OF COMPUTER SCIENCE FOR SESSION 2022-23				
Q. NO.	A	B	C	D
1	4	3	2	1
2	2	1	3	4
3	3	4	2	2
4	2	2	3	3
5	1	4	1	2
6	3	2	2	4
7	3	2	3	3
8	4	2	1	1
9	3	1	4	3
10	3	1	3	2
11	1	3	1	3
12	4	1	3	3
13	2	2	1	2
14	3	3	3	2
15	2	4	2	3
16	4	1	1	1
17	3	3	1	3
18	1	1	4	4
19	3	4	1	2
20	2	3	4	3
21	1	2	4	3
22	3	1	2	1
23	1	3	3	4
24	3	4	2	2
25	2	3	1	4
26	1	4	3	2
27	1	2	3	2
28	4	3	4	2
29	1	1	3	1
30	4	3	3	1
31	2	1	3	3
32	1	4	3	1
33	3	2	2	2
34	4	3	2	3
35	3	2	3	4
36	4	4	1	1
37	2	3	3	3
38	3	1	4	1
39	1	3	2	4
40	3	2	3	3
41	2	3	3	2
42	3	3	1	1
43	2	2	3	3
44	3	2	2	4
45	1	3	3	3
46	2	1	1	4
47	3	3	2	2
48	1	4	2	3
49	4	2	3	1
50	3	3	4	3


 13/12/22


 13/12/22

ANSWER KEYS OF COMPUTER SCIENCE FOR SESSION 2022-23				
Q. NO.	A	B	C	D
51	3	3	2	1
52	1	1	1	3
53	2	3	3	1
54	3	2	4	3
55	4	3	3	2
56	1	1	4	1
57	3	2	2	1
58	1	2	3	4
59	4	3	1	1
60	3	4	3	4
61	3	2	3	2
62	1	2	1	3
63	3	2	4	2
64	2	4	2	3
65	3	3	4	1
66	1	2	2	2
67	2	3	2	3
68	2	4	2	1
69	3	3	1	4
70	4	1	1	3
71	3	2	2	3
72	1	3	2	1
73	4	2	2	3
74	2	3	4	2
75	4	1	3	3
76	2	2	2	1
77	2	3	3	2
78	2	1	4	2
79	1	4	3	3
80	1	3	1	4
81	2	1	1	4
82	2	3	4	2
83	2	1	2	3
84	4	3	3	2
85	3	2	2	1
86	2	1	4	3
87	3	1	3	3
88	4	4	1	4
89	3	1	3	3
90	1	4	2	3
91	3	4	3	2
92	3	2	1	2
93	2	3	2	2
94	2	2	3	4
95	3	1	4	3
96	1	3	1	2
97	3	3	3	3
98	4	4	1	4
99	2	3	4	3
100	3	3	3	1

Q4
13/12/22

Wanna
13/12/22