

- (b) If we could always choose the median as the splitter, then we could show a linear bound on the running time. Let c_n be the running time for `Select()`, not counting the time for the recursive call. Then, with medians as splitters, give an upper bound on the running time $T(n)$. 2
- (c) A universal family of hash functions is a set of hash functions H mapping a universe U to the set $\{0, 1, \dots, m-1\}$ such that: 2
- For any pair of elements $u \neq v$: $\Pr_{h \in H}[h(u)=h(v)] \leq 1/m$
 - Can select random h efficiently and can compute $h(u)$ efficiently.

Given $U = \{a, b, c, d, e, f\}$, $m = 2$, find whether $H=\{h_1, h_2\}$ is a universal family of hash functions or not in the following cases:

	a	b	c	d	e	f
$h_1(x)$	0	1	0	1	0	1
$h_2(x)$	0	0	0	1	1	1

10. Imagine you are a highly-in-demand actor, who has been presented with offers to star in n different movie projects under development. Each offer comes specified with the first and last day of filming. To take the job, you must commit to being available throughout this entire period. Thus you cannot simultaneously accept two jobs whose intervals overlap. For an artist such as yourself, the criteria for job acceptance is clear: you want to make as much money as possible. Because each of these films pays the same fee per film, this implies you seek the largest possible set of jobs (intervals) such that no two of them conflict with each other.

You (or your agent) must solve the following algorithmic scheduling problem:

Problem: Movie Scheduling Problem

Input: A set I of n intervals on the line.

Output: What is the largest subset of mutually non-overlapping intervals which can be selected from I ?

You are given the job of developing a scheduling algorithm for this task.

- (a) Present both optimization and decision problem formulation of the general movie scheduling problem. 2
- (b) Mention some potential heuristics to be followed for developing a scheduling algorithm for this task. 2
- (c) Prove that the general movie scheduling problem is NP-complete, with a reduction from independent set. 2

*** End of Questions ***

END SEMESTER EXAMINATION, JUNE-2023

ALGORITHM DESIGN-2 (CSE 4131)

Programme: B.Tech.(CSE/CSIT)

Semester: 4th

Time: 2 Hours

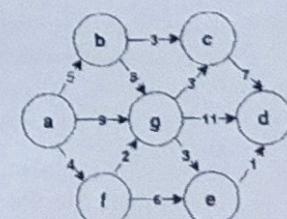
Full Marks: 30

Course Outcome	Taxonomy Level	Ques. Nos.	Marks
CO1: understand the network flow problem and apply it to real-world problems.	L3, L4, L5	2(a), 2(b), 2(c)	2+2+2
CO2: -distinguish between computationally tractable and intractable problems - define and relate class-P, class-NP and class NP-complete, PSPACE, PSPACE-complete. - given a problem in NP, define an appropriate certificate and the verification algorithm.	L3, L4, L5,	3(a), 3(b), 3(c), 4(a), 4(b), 4(c), 5(a), 5(b), 5(c)	2+2+2+2+2+2
CO3: understand approximation algorithms and apply this concept to solve problems	L3, L4, L5	6(a), 6(b), 6(c), 7(a), 7(b), 7(c),	2+2+2+2
CO4: understand local search techniques and apply this concept to solve problems	L3, L4, L5,	8(a), 8(b), 8(c),	2+2+2
CO5: understand randomization and apply this concept to solve problems	L3, L4, L5	9(a), 9(b), 9(c),	2+2+2
CO6: identify and apply an appropriate algorithmic approach to solve a problem and explain the challenges to solve it	L2,L3, L4,	1(a), 1(b), 1(c), 10(a), 10(b), 10(c),	2+2+2+2

*Bloom's taxonomy levels: Knowledge (L1), Comprehension (L2), Application (L3), Analysis (L4), Evaluation (L5), Creation (L6)

Answer all questions. Each question carries equal mark.

1. (a) Is there a subset of the numbers in $\{23, 59, 17, 47, 14, 40, 22, 8\}$ that sums to 100? What about 130? Show your work. 2
- (b) The following brief list of steps will provide you with "the Right Stuff" to be an algorithm designer.
 Step1: Do you really understand the problem?
 Step2: Can you find a simple algorithm or heuristic for my problem?
 Step3: Is your problem in the catalog of algorithmic problems covered in CSE3131 and CSE4131?
 Step4: Are there special cases of the problem that you know how to solve?
 Step5: Which of the standard algorithm design paradigms are most relevant to your problem?
 Are you still stumped? Then in which of the above step(s), you can apply some extra efforts in terms of some substeps?
 (c) Find the most suitable match between Gr-A (P, PSPACE, NPC, NPH) and Gr-B (Halting problem, MST, QSAT, TSP). 2
2. (a) Considering vertices a and d as source and sink vertices, find the maximum flow from a to d . 2



(b)	Find the minimum number of iterations to find the answer in Q2(a).	2		approximation algorithm do with this sequence of jobs? Show that the approximation ratio is close to a factor of 2 when m is large.
(c)	Show the minimum cut and the corresponding cut-edges.	2	7.	(a) Prove that: "For any vertex cover S , and any nonnegative and fair prices p_e , we have $\sum_{e \in S} p_e \leq w(S)$." (Fairness lemma)
5.	(a) Draw an example of a graph with 10 vertices and 15 edges that has a vertex cover of size 2.	2	(b)	Given an approximation algorithm for weighted-vertex-cover problem as below:
(b)	Reduce a 3-SAT formula to an independent set problem. (Explain with an example).	2		Vertex-Cover-Approx(G, w) { Set $p_e = 0$ for all $e \in E$ While (there is an edge $e = (i, j)$ such that neither i nor j is tight) { Select such an edge e Increase p_e without violating fairness } Let S be the set of all tight nodes Return S
(c)	What are the basic features of a computationally hard problem that can be sacrificed for dealing with intractable problems?	2		}
4.	(a) Given an instance of 8-puzzle game as follows.	2		Using the above algorithm based on pricing method, find the weighted-vertex-cover for the given graph with four vertices having vertex weights/costs 2, 2, 4 and 9.
		1 2 3 4 5 8 7 - 6		
	Map the problem into an instance of planning problem.	2		
(b)	Identify each operators and their corresponding prerequisite list, add list and delete list in the planning model designed in Q4(a).	2		
(c)	Given an instance of the QSAT problem as follows. $\phi(x_1, x_2, x_3) = (x_1 \vee x_2 \vee x_3) \wedge (x_1 \vee x_2 \vee x_3) \wedge (x_1 \vee x_2 \vee x_3) \wedge (x_1 \vee x_2 \vee x_3)$	2		
	Draw the recursion tree that leads to all possible truth assignments for the given QSAT. Check each assignment for the solution of ϕ .	2		
5.	(a) Consider a statement - "The intractability of Vertex Cover decision problem only sets in for real once k grows as a function of n ." (where n , the number of nodes in the graph, and k , the allowable size of a vertex cover.) Justify the statement with proper reasoning.	2		
(b)	Differentiate between tractable and intractable problem.	2		
(c)	Give a precise definition of a NP-Complete problem. How can we prove a given problem as a NP-Complete problem?	2		
6.	Greedy-Balance($n, m, t[1..n]$) { Start with no jobs assigned Set $T_i = 0$ and $A(i) = \emptyset$ for all machines M_i For $j = 1, \dots, n$ do { Let M_i be a machine that achieves the minimum $\min_k T_k$ Assign job j to machine M_i Set $A(i) \leftarrow A(i) \cup \{j\}$ Set $T_i = T_i + t_j$ } return $A[1], A[2], \dots, A[m]$	2		
(a)	Show that algorithm Greedy-Balance produces an assignment of jobs to machines with makespan $T \leq 2T^*$.	2		
(b)	What will be the resulting makespan of running this greedy algorithm on a sequence of six jobs with processing times 2, 3, 4, 6, 2, 2 for $m=3$ identical machines?	2		
(c)	In the load balancing problem, suppose we have m machines and $n = m(m-1) + 1$ jobs. The first $m(m-1) = n-1$ jobs each require time $t_i = 1$. The last job is much larger; it requires time $t_n = m$. What does our above greedy	2		
			8.	Given an undirected integer-weighted graph $G=(V_s, E_w)$ that represents a Hopfield Neural Network where set V_s represents the set of all vertices with their states as pair of (vertex,state) and E_w represents the set of all edges with their edge-weights as pair of (edge,edge-weight) which is as follows: $V_s = \{(v_1, -1), (v_2, +1), (v_3, +1), (v_4, +1), (v_5, -1)\}$ and $E_w = \{((v_1, v_2), -10), ((v_1, v_3), 8), ((v_2, v_3), -4), ((v_4, v_3), -1), ((v_5, v_3), -1)\}$
			(a)	For the above given configuration of the Hopfield neural network, find the sum of weights of all good edges.
			(b)	Using the State-flipping algorithm, show all the steps to find a stable configuration from the given configuration of the Hopfield neural network.
			(c)	Give a suitable bound for the number of iterations for the State-flipping algorithm to find a stable configuration.
			9.	Select(S, k) {choose a splitter $a_i \in S$, uniformly at random for each element a_j of S { if $a_j < a_i$ then put a_j in S^- if $a_j > a_i$ then put a_j in S^+ } if $ S^- = k - 1$ then return a_i // the splitter a_i was in fact the desired answer else if $ S^- \geq k$ then Select(S^-, k) // the k^{th} largest element lies in S^- else // suppose $ S^- = l < k - 1$ Select($S^+, k-l$) // the k^{th} largest element lies in S^+
			(a)	"Regardless of how the splitter is chosen, the algorithm Select(S, k) above returns the k^{th} largest element of S ." - TRUE/FALSE. Justify your answer.

- (b) Determine area of the triangle whose vertices are (2,2), (5,2), (3,4). 2
- (c) Calculate the eigenvalues and eigenvectors of AA^T and A^TA where $A = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$. 2
9. (a) Calculate the lengths and inner product of $x = \begin{bmatrix} 1 \\ i \end{bmatrix}$ and $y = \begin{bmatrix} 2+i \\ 2-4i \end{bmatrix}$. 2
- (b) Prove that eigenvalues of a Hermitian matrix are real. 2
- (c) Decide for or against the positive definiteness of the following matrix. 2
- $$A = \begin{bmatrix} 2 & -1 & -1 \\ -1 & 2 & -1 \\ -1 & -1 & 2 \end{bmatrix}$$
10. (a) Determine the Singular Value Decomposition and Pseudo-inverse of the matrix given in Q.8(c). 2
- (b) Calculate the norm and condition number of the matrix $A = \begin{bmatrix} 1 & 0 \\ 2 & 2 \end{bmatrix}$. 2
- (c) Compute the Jacobi matrix of the matrix $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$. 2

End of Questions

**END SEM. EXAMINATION, JULY-2023
APPLIED LINEAR ALGEBRA (MTH - 3003)**

Programme:B.Tech

Semester 4th

Full Marks: 60

Time: 3 Hours

Subject/Course Learning Outcome	*Taxonomy Level	Ques. Nos.	Marks
Apply Gauss elimination principle to solve system of linear equations and elementary matrices to get LU & LDU factorization of a matrix.	L3 L3L3L3L3L3	1 a,b,c 2 a,b,c	6+6
Explain vector space, subspace, null space and column space, linear independence, rank of a matrix	L4 L4 L3	3 a,b,c	6
Explain basis and dimension of vector space and four fundamental subspaces, linear transformations and their applications	L4 L3 L3 L4,L3	4 a,b,c 5 a,b	6+4
Explain orthogonality and its applications to find best fit solutions by least squares. Apply properties of determinants to solve the system of equations	L3 L3,L3,L3 L3,L3,L3 L3	5c, 6a,b,c 7a,b,c 8b	2+6+6 +2
Explain eigenvalues and eigenvectors and their application to solve system of differential equations.	L3 L3L3L3	8a,c,9a,b	4+4
Diagonalizations and complex matrices Hermitian, skew Hermitian, Unitary matrices	L3 L3L3	9c 10 a,b,c	2+6

Bloom's taxonomy levels: Remembering (L1), Understanding (L2), Applying (L3), Analyzing (L4), Evaluating (L5), Creating (L6)

Answer all questions. Each question carries equal mark.

1. (a) Determine the values of b that lead to missing pivot in the following system.

$$x + by = 0, \quad x - 2y - z = 0, \quad y + z = 0$$
 2
- (b) Solve by sketching the row picture for the equations

$$x + y = 2, \quad 2x - 2y = 4.$$
 2

- (c) Apply Gaussian elimination to solve the system $2x+3y=0, 4x+5y+z=3, 2x-y-3z=5$. 2
2. (a) Find the LDU factorization of the following matrix, where L is lower triangular matrix, D is diagonal matrix and U is upper triangular matrix. 2
- $$A = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 2 & 1 \\ 0 & 1 & 2 \end{bmatrix}.$$
- (b) Evaluate the value(s) of d for which the system of equations has a unique solutions. $x+y+2z=1, x+2y+3z=2, x+4y+2dz=1$ 2
- (c) Use the Gauss-Jordan method to find inverse of the matrix 2
- $$A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}.$$
3. (a) Examine whether the following subset of R^3 is a subspace or not. $V = \{T\text{he plane of vectors } (b_1, b_2, b_3) \text{ with } b_1 = 0\}$. 2
- (b) Describe the column space and null space of the matrix 2
- $$A = \begin{bmatrix} 0 & 2 \\ 5 & 0 \end{bmatrix}.$$
- (c) Let $P = \begin{bmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{bmatrix}$ and $Q = \begin{bmatrix} -1 & -2 & -1 \\ 6 & 12 & 6 \\ 5 & 10 & 5 \end{bmatrix}$ be two matrices. 2
Then the rank of $P + Q$ is _____.
4. (a) Examine whether the following set a basis of R^3 or not. 2
 $\{(1, 2, 2), (-1, 2, 1), (0, 8, 6)\}$
- (b) Find a basis for the plane $x+y+z=0$ in R^3 . Then find a basis for the intersection of that plane with yz -plane. 2
- (c) Write the dimension of the four fundamental subspaces of the matrix 2
- $$A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 3 \\ 3 & 6 & 4 \end{bmatrix}.$$
5. (a) Let $c_1, c_2 \dots, c_n$ be scalars not all zero and $a_i \in R^n$ be column vectors of a matrix A such that $\sum_{i=1}^n c_i a_i = 0$ & $b = \sum_{i=1}^n a_i$. Then $Ax = b$ has how many solutions? Justify your answer. 2
- (b) Calculate the left inverse (if exists) for the matrix $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \\ 0 & 1 \end{bmatrix}$. 2
- (c) Determine the relation between determinant of A and determinant of B. Where $A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 4 & 1 & 2 & 3 \\ 3 & 4 & 1 & 2 \\ 2 & 3 & 4 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 & 1 & 2 \\ 4 & 1 & 2 & 3 \\ 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{bmatrix}$ 2
6. (a) Determine a vector x orthogonal to the row space of A and a vector y orthogonal to the column space of A , where $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 3 \\ 3 & 6 & 4 \end{bmatrix}$ 2
- (b) Determine the projection matrix that projects any vector onto the line passing through the vector perpendicular to $a = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$. 2
- (c) Compute the projection of $b = (1, 1)$ on to the line passing through $a = (1, -1)$. 2
7. (a) Determine the projection of b onto the column space of A , where $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \end{bmatrix}$, $b = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$ 2
- (b) Determine the largest eigenvalue of A $A = uv^T$ where $u = \begin{pmatrix} 1 \\ 2 \end{pmatrix}, v = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$ 2
- (c) If A is a 4 by 4 matrix with $\det. A = \frac{1}{3}$, then calculate $\det. (3A)$ and $\det. (A^{-1})$. 2
8. (a) Solve the following system using Cramer's rule. $2x+5y=1, x+4y=2$ 2

END SEMESTER EXAMINATION, JUNE-2023
Computer Organization and Architecture (EET 2211)

Programme: B.Tech
Full Marks: 60

Semester: 4th
Time: 3 Hours

Subject/Course Learning Outcome	*Taxonomy Level	Ques. Nos.	Marks
Able to explain the concepts that underline the modern Computers evolution, function, and organization.	L2	1,2,8	18
Able to identify the appropriate organization of a computer for achieving the best performance.	L3	3	6
Able to analyze and demonstrate the computer function and interconnection.	L2	4,7(c)	8
Able to understand and analyze the computer memory system.	L2	6,7(a), 7(b)	10
Able to understand and analyze computer arithmetic via digital logic.	L3	5	6
Able to interpret low level processor operations using a series of computer instructions.	L3	9,10	12

***Bloom's taxonomy levels: Remembering (L1), Understanding (L2), Applying (L3), Analysing (L4), Evaluating (L5), Creating (L6)**

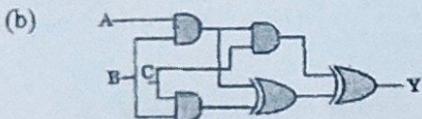
Answer all questions. Each question carries equal mark.

1. (a) Briefly define the main structural components of a computer. 2
 (b) What are the major structural components of the central processing unit (CPU)? 2
 (c) Describe the differences among the single-processor computer and multicore computer. 2
2. (a) Explain the concepts of Internet of Things (IoT). 2
 (b) What is the difference between microprocessor and microcontroller. 2
 (c) Explain the services provided by cloud service providers. 2
3. (a) Briefly describe some of the methods used to increase processor speed. 2
 (b) Briefly describe the Amdahl's law. 2
 (c) Two benchmark programs are executed on three computers with the following results: 2

	Computer A	Computer B	Computer C
Program 1	50	20	10
Program 2	100	200	40

The table shows the execution time in seconds, with 1,000,000 instructions executed in each of the two programs. Calculate the MIPS values for each computer for each program. Then calculate the arithmetic and harmonic means assuming equal weights for the two programs, and rank the computers based on arithmetic mean and harmonic mean.

4. (a) Explain the interconnection structure of I/O module. 2
 ↵ (b) Explain program timing diagram of long I/O wait with interrupts. 2
 ↵ (c) Explain the instruction cycle state diagram. 2
5. (a) Convert 45.25 decimal number into octal, hexadecimal and Binary. 2



Consider the circuit shown in the figure and find the expression of Y.



Consider the circuit shown in the figure and find the expression of F.

6. ↵ (a) What are the differences among direct mapping and associative mapping? 2
 ↵ (b) For a direct-mapped cache, a main memory address is viewed as consisting of three fields. List and define the three fields. 2
 ↵ (c) Explain semiconductor main memory organization. 2
7. (a) For the 8-bit word 00111001, the check bits stored with it would be 0111. Suppose when the word is read from memory, the check bits are calculated to be 1101. What is the data word that was read from memory? 2

- (b) Explain RAID2, RAID 4 and RAID6 levels. 2
- (c) Suppose that the 8255A is configured as follows: port A as output, port B as output, and all the bits of port C as input. Show the bits of the control register to define this configuration. 2
8. (a) List and briefly define the major types of OS. 2
 (b) Explain the memory layout for a resident monitor. 2
 (c) Explain the Interrupt driven I/O technique for input of a block of data with the help of flow diagram. 2
9. (a) Write assembly language program for addition of two 16 bit numbers using direct addressing mode. 2
 ↵ (b) Write a program for addition of two 32 bit numbers using load/store addressing mode of ARM processor. 2
 (c) Write a program to find the largest number in a given array of size N (8-bit numbers). 2
10. (a) Describe the pointer and index registers of 8086. 2
 ↵ (b) Describe the different registers present in ARM processor. 2
 (c) Describe with example any four logical instructions of 8086. 2

End of Questions

END SEMESTER EXAMINATION, JUNE-2023
Computer Science Workshop2 (CSE3141)

Programme: BTech(CSE/CSIT)
Full Marks: 60

Semester: 4th
Time: 2 Hours

Subject/Course Learning Outcome	*Taxonomy Level	Ques. Nos.	Marks
Analysis algorithm, using time and space complexity.	L3	Q1	5
Understanding and effectively use ADT, java collection, sorting and searching.	L3	Q2	5
Applying linked list, stack, queue on different problem solving.	L3	Q3, Q4	5+5
Applying priority queue, graph on problem solving.	L3	Q5, Q6	5+5+5 +5
Understanding algorithm design techniques.	L4	Q5	5+5
Applying design techniques on problem solving.	L4	Q6	5+5

*Bloom's taxonomy levels: Knowledge (L1), Comprehension (L2), Application (L3), Analysis (L4), Evaluation (L5), Creation (L6)

Answer all questions. Each question carries equal mark.

1. (a) Given an array of positive integers representing edges of triangle. Write a program to find the number of triangles that can be formed from these elements representing side of triangle. 5
 (b) Given an array of integer and a range. Write a program to partition array so that values smaller than range come to left, then values under the range followed with values greater than the range. 5

2.	(a) Write a program to create an Employee class having private member name, age, id, and required method and constructor. Create a Node class having member info reference to Employee object, and next and require constructor both default and parameterized. Create another class LinkedList has a member function to create a list and to display the list.	5	2D matrix. Add a DFS method to Graph class to traverse the vertices of the graph and a main method to invoke all the methods.
	(b) Add a method to LinkedList class to delete all the nodes whose id is same as the id of a given employee object. Add a method to LinkedList class to find Nth node from beginning. Create a class LinkedListApp has main function and call all the method created for execution.	5	(b) Write an algorithm to find the minimum spanning tree from a graph using prims algorithm.
3.	(a) Write a program to create a class Stack has member char array[], maxSize ,top and required constructor. Add method isEmpty to check stack is empty or not, push, pop, display method to Stack class.	5	
	(b) Create a class StackApp and add a method to the class which takes an infix equation and return true if the number of open parentheses is equal to close parenthesis otherwise false. Add a main method to check the balance parenthesizing of an infix equation.	5	
4.	(a) Write a program to solve josephus problem using queue. Note: Josephus' problem is, there are n people are seating in a round table. Kth people from start is going to be execute, The execution proceeds around the circle until only the last person remains. Find the position where you want to stand and gain your freedom.	5	
	(b) Create a static function which takes an integer array and make it as minimum heap. Create another static function which takes an array and check, is it minheap or not. Invoke both the function for execution.	5	
5.	(a) Create a class File having member fileld, size and required constructor and method. Create a class BNode has member info to store a File object, left to point to left child, right to refer to right child. Create the required constructor. Create another class BST having a member root, add required constructor, add a method to inset a node in binary search tree.	5	
	(b) Add method to BST to traverse a tree in in-order, find-max to find the node with maximum file size and find-min to find the node with minimum file size. Invoke The above methods for its execution.	5	
6.	(a) Create a class Graph and has member a 2D matrix, and N number of vertex. Add the required constructor to it. Add a method to the Graph class to read a graph and store it in the	5	

End of Questions

END SEMESTER EXAMINATION, JUNE - 2023
UNIVERSAL HUMAN VALUES (GEN 1972)

Programme: B.Tech
Full Marks: 60

Semester: 4th
Time: 3 Hours

Subject/Course Learning Outcome	*Taxonomy Level	Ques. Nos.	Marks
Able to understand the need, Basic Guidelines, Content and Process for Value Education.	L 1,2	1(a)2(a, c)3 a 4 b	10
Able to understand about harmony in the Human Being - Harmony in Myself.	L2,3	1(b,c)2b 3b,c 10 a,b	14
Able to understand Harmony in the Family and Society- Harmony in Human - Human Relationship.	L2,4	4 a,c 8 a,b,c 9 a,b	14
To understand the harmony in the Nature and Existence - Whole existence as Coexistence	L2,3	5 a,b,c 9c, 10c	10
To get a clear understanding about the Implications of the above Holistic Understanding of Harmony on Professional Ethics.	L5	6 a,b,c	6
Able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.	L2	7 a,b,c	6

***Bloom's taxonomy levels: Remembering (L1), Understanding (L2), Applying (L3), Analysing (L4), Evaluating (L5), Creating (L6)**

Answer all questions. Each question carries equal mark.

1.	(a)	If your friends are achieving their goals and are very happy, does that make you feel jealous or competitive with them, or are you chilled out and happy about their achievements? Explain the above statement (i) after undergoing this course and (ii) your response before attending this course.	2
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	(b) How do you understand that you are implementing UHV in your life? Give two instances.	2
	(a) How did you deal with peer pressure after undergoing this course, and how was it in school times? Do you see any changes in your perspective and behavior?	2
2.	(a) What are the basic human aspirations, and what are their requirements? Explain their correct priority. Support your answer with appropriate examples.	2
	(b) Is there any difference between prosperity and the accumulation of wealth? Explain your answer with a few examples based on your own experience.	2
	(a) Distinguish between animal consciousness and human consciousness. Also, describe the societal impact of living with human consciousness.	2
3.	(a) What is the meaning of the universal human order? What is its scope? How is the family order related to the universal human order?	2
	(b) Why are physical facilities required? What do you mean by the right utilization of the Body?	2
	(a) Examine whether health problems of recent times are more due to problems with the body or problems with the Self. Explain with examples.	2
4.	(a) "If I trust everyone, people would take undue advantage of me." Do you agree? Explain with two examples.	2
	(b) Share your understanding of natural acceptance with real-life examples. Does it change with time, place, and person?	2
	(c) Distinguish between reaction and response with the clarity of feeling of trust. Give one example of each for a particular case of relationship.	2
5.	(a) Distinguish between units and space? Answer briefly with examples.	2
	(b) Why is the human order, by and large, not mutually fulfilling for any of the four orders? Is your natural acceptance to be fulfilled for all four orders? What must a human being do to be mutually fulfilling for each of the four orders?	2
	(a) In nature, the first three orders already have definite conduct. Why do Human orders have to work for definite conduct?	2
6.	(a) Why is there a strong need to develop technologies with holistic objectives? Explain the answer with examples.	2

	(b) Differentiate between ethical and unethical professional practices with suitable examples.	2
	(c) How can someone achieve individual transformation and societal transformation to fulfill basic human aspirations?	2
7.	(a) Define renunciation and indulgence in human life. Illustrate them with suitable examples.	2
	(b) Draw a chart showing all the different categories of units of nature in space. Reason out why it is essential to study the space.	2
	(c) Distinguish between the needs of the Self and the needs of the Body. How is the response of the body definite?	2
8.	(a) Explain the feelings of care and guidance. Give two examples in each category.	2
	(b) What is justice? Is it a continuous or a temporary need? Explain the answer briefly.	2
	(c) Differentiate between reverence, respect, and glory. With appropriate examples, briefly explain the response.	2
9.	(a) Differentiate between respect and disrespect. Explain the answer briefly with examples.	2
	(b) Trust is the foundation value, and Love is complete; explain these feelings with reference to harmony in the family.	2
	(c) List the four orders in nature with examples of units in each order. What is the basis of this classification?	2
10.	(a) "I am the seer, doer, and enjoyer". The body is used as an instrument. Explain with an example of each.	2
	(b) If a person is making the same mistake repeatedly, even after drawing his attention to the mistake, can we say his intention is right? Explain the above statement with suitable examples.	2
	(c) Is Nature self-organized or is it chaos? Explain with a few examples.	2

End of Questions