



CORPORATE GROUP OF INSTITUTIONS
Dept. - Computer Science & Engineering

| Attendance (in %) | No. of Questions |
|--------------------------|---|
| 60-74 | 2 Questions from each unit of every subject |
| 50-59 | 3 Questions from each unit of every subject |
| 35-49 | 4 Questions from each unit of every subject |
| Below 35 | 5 Questions from each unit of every subject |

Assignment of Data Structures (SUB CODE- CS-305)

UNIT –I

- Q 1. What is the difference between signed integer and unsigned integer in terms of memory and range?
- Q 2. Write in detail about one dimensional and multidimensional arrays. Also write about how initial values can be specified for each type of array.
- Q 3. Explain Garbage collection in detail.
- Q 4. Explain tower of Hanoi problem with example.
- Q 5. Explain Sparse Matrix in detail.

UNIT –II

- Q 1. Define a data structure. What are the different types of data structures? Explain each of them with suitable example.
- Q 2. Define linked list. Explain various operations performed on linked lists with suitable algorithms.
- Q 3. Write a program to count the number of nodes in a linked
- Q 4. Write a program using pointers to implement a stack with all the operations. Declare a circular queue of integers such that F points to the front and R points to the rear. Write functions
 - a. To insert an element into queue
 - b. To delete an element from queue.
- Q 5. Consider the following arithmetic expression in postfix notation: $7\ 5\ 2\ +\ *\ 4\ 1\ 5\ -\ /\ -$
 - 1. Find the equivalent prefix form of the above .
 - 2. Obtain the computed value of the expression from its postfix notation

UNIT- III

- Q 1. Write an algorithm to count the number of leaf nodes in a binary tree. What is its computing time?
- Q 2. Explain a procedure for preorder traversal of a binary tree with an example in detail. Analyze the time complexity of your procedure.
- Q 3. Construct a binary tree for the following preorder and inorder traversals.
- a. Pre order : ABCDEFGHIJKLMNOPQ
 - b. In order : DECFBHGAKMLJIORNQP
- Q 4. Prove that a binary tree with n leaves contains $2n-1$ nodes.
- Q 5. Explain AVL tree with example.

UNIT- IV

- Q 1. Distinguish between linear and binary search methods.
- Q 2. Explain Quick sort with algorithm.
- Q 3. Derive the time complexity of merge sort.
- Q 4. compare quick sort and heap sort methods.
- Q 5. Explain quick sort method for the elements. 11,51,71,21,61,41,91,31

UNIT -V

- Q 1. List and explain about the basic operations on a graph.
- Q 2. What are the advantages of adjacency matrix representation of graphs.
- Q 3. Define spanning tree of an undirected graph.
- Q 4. Write a program for depth first search of a graph.
- Q 5. Explain graph traversal methods with examples.

_____END OF DSA ASSIGNMENT _____

Assignment of Discrete Structure (SUB CODE- CS-302)

UNIT -I

- Q 1. Define a set. What are the different types of sets? What are properties of sets?
- Q 2. Let R be a binary relation on the set of all positive integers such that: $R = \{(a, b) | a-b \text{ is an odd positive integer}\}$.
- Q 3. Let A, B, C be any three sets, then prove that:
- $$A \times (B \cap C) = (A \times B) \cap (A \times C)$$
- Q 4. A survey of 500 television watchers produced the following information: 285 watch football games, 195 watch hockey games, 115 watch basketball games, 45 watch football

and basketball games, 70 watch football and hockey games, 50 watch hockey and basketball games, 50 do not watch any of the three games:

- c. How many people in the survey watch all three games?
- d. How many people watch exactly one of the three games?

Q 5. What is the binary relation? What are the properties of binary relations?

UNIT -II

Q 1. Define the following:

- (1) Subgroup (2) Normal Subgroup (3) Field (4) Coset

Q 2. Show that set Q of all rational numbers other than 1, forms an infinite abelian group with the operation $*$ defined by the rule $a*b = a + b - ab$.

Q3. Let $(A, *)$ be a semigroup. Show that for $a, b, c \in A$ if $a*c = c*a$ and $b*c = c*b$, then $(a*b)*c = c*(a*b)$

Q 4. If H_1 and H_2 are normal subgroups of a group G , then prove that $H_1 \cap H_2$ is also a normal subgroup of G

Q 5. Define the field and prove that the set $F = \{0, 1, 2, 3, \dots, 6\}$ under addition and multiplication modulo 7 is a field.

UNIT- III

Q 1. Define following terms with examples:

- (a) Truth Table (b) Tautology (c) Contradiction
- (d) Logical Connectives

Q2. Find :

- 1. Conjunctive Normal Form of : $q \wedge (p \wedge \sim q) \vee (\sim p \wedge \sim q)$
- 2. Disjunctive Normal Form of: $(p \vee q \vee \sim q) \wedge (p \vee \sim p)$

Q3. Define normal forms in brief.

Q4. Explain Finite Automata with example

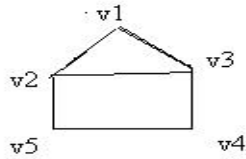
Q5. Differentiate DFA and NFA

UNIT- IV

Q 1. Define following terms with examples (Any three)?

- a. Directed Graph
- b. Adjacency Matrix
- c. Bipartite Graph
- d. Complete Graph

Q 2. Find the adjacency and incidence matrix of the following graph



Q 3. Prove that the number of vertices of odd degree in a graph is always even.

Q 4. Draw $K_{3,4}$ bipartite graph. Is this planar?

Q 5. Explain Eulerian graph with example.

UNIT -V

Q 1. Let $X = \{1, 3, 9, 27, 81, 243\}$. Draw the Hasse diagram of the poset $(X, /)$

Q 2. Define Lattice in detail.

Q 3. Explain distributive lattice and complemented lattice

Q 4. Explain multinomial Coefficient.

Q5. Explain recurrence relations with a suitable example

_____END OF DS ASSIGNMENT _____

Assignment of Digital Circuit and System

Unit -1

- (i) Subtract $(54013)_8 - (725360)_8$.
- (ii) Express -35 in 8 bit 2's complement.
- (iii) Add 36 and 39 in XS-3 form.
- (iv) Simplify following equation using k map.
 $Y = ab'cd' + a'b'd' + abc'd + ac'd' + a'bc'$
- (v) Reduce and implement in nor logic using k map.
 $F = \text{sigma } M(2,3,5,7,9,11,12,13,14,15)$.

Unit – 2

Draw the circuit diagram and write a truth table for following terms.

- (i) Half adder
- (ii) Full adder
- (iii) Half subtractor
- (iv) Full subtractor
- (v) Look ahead carry generator

Unit -3

Explain the following terms

- (i) Multiplexer
- (ii) Demultiplexer
- (iii) Encoder
- (iv) Counters both syn. And async.
- (v) Shift register

Unit-4 Explain following terms

- (i) Ram
- (ii) Pla
- (iii) Eeprom
- (iv) Magnetic tape.

Unit-5

Explain the following terms.

- (i) Rtl
- (ii) Ttl open collector
- (iii) Ttl totempole
- (iv) Weightcode d to a convertor
- (v) Any two types of a to d convertor