Total No. of Questions—8] [Total No. of Printed Pages—4

Seat No.	

[5668]-201

S.E. (Information Technology) (Third Semester) EXAMINATION, 2019

DISCRETE STRUCTURES

(2015 PATTERN)

Time : Two Hours Maximum Marks : 50

N.B. :— (i) Solve Q. Nos. 1 or 2, 3 or 4, 5 or 6, 7 or 8.
(ii) Neat diagrams must be drawn wherever necessary.
(iii) Figures to the right indicate full marks.
(iv) Assume suitable data, if necessary.

1. (a) A bag contains 3 red, 6 white and 7 blue balls. What is the probability that two balls drawn are white and blue ? [6]

(b) Three cards are drawn from a well-shuffled pack of 52 cards. Find the probability that they are a king, a queen and a jack.[6]

Or

2. (a) How many 3-digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9, which are divisible by 5 and none of the digits is repeated ? [6]

(b) What is Multiset ? Let A and B be the multisets {a, a, b, b, c, f} and {a, a, b, b, b, d, d}, respectively. [6]

Find :

(a) A B

(b) A B

(c) A – B

(d) B – A.

3. (a) Prove by Mathematical Induction that for n > = 1 : [6]

1.1!+2.2!+3.3!+.....+n.n!=(n+1)!1.

P.T.O.

(b) Define with example : [6]

(i) Equivalence relation

(ii) POSET

(iii) Lattice.

Or

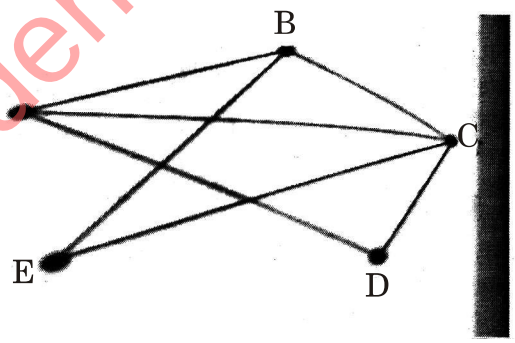
4. (a) Solve the following recurrence relation : [6]

$x(n) - 6x(n-1) + 9x(n-2) = 0$

$x(0) = 0$

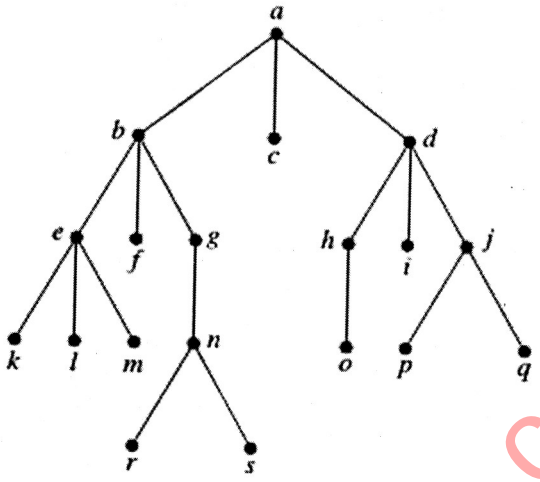
$x(1) = 3.$

(b) Consider the graph given in the figure, find the set V(G) of the vertices's present in G and that set E(G) of edges of G also find the degree of each vertex and show that sum of the degree of the vertices's is twice the number of edges in graph G. [6]



5. (a) Build a binary search tree for the words banana, peach, apple, pear, coconut, mango, and papaya using alphabetical order. Write sequence of visiting words in preorder and post-order traversal. [7]

(b) Determine the order in which a preorder, postorder and inorder traversal visits the vertices of the given ordered rooted tree. [6]



Or

6. (a) What is expression tree ?

Represent the expressions

(i) (x + xy) + (x/y)

(ii) x + ((xy + x)/y) [7]

using binary trees. Write each of these expressions in :

(a) prefix notation.

(b) postfix notation.

(b) For the following set of characters, construct Huffman code.

Find average bit length of the code : [6]

Character	A	B	C	D	E
Frequency	0.1	0.15	0.25	0.2	0.3

7. (a) Let G = {even, odd} and binary operation $\oplus$ be define as : [7]

$\oplus$	even	odd
even	even	odd
odd	odd	even

Show that (G, $\oplus$) is a group.

(b) Define the following : [6]

(a) Group

(b) Monoid

(c) Abelian group.

Or

8. (a) Show that $(G, +_8)$ is an abelian group where G = {0, 1, 2, 3, 4, 5, 6, 7}. [7]

(b) Prove that G = {0, 1, 2, 3, 4, 5} = Z_6 is an abelian group of order 6 with respect to addition modulo 6. [6]