Graphic Era

Mid Term (Odd) Semester Examination October 2024

Roll no. 2394081

Name of the Course and semester: B.Tech. Third semester
Name of the Paper: ***Discrete Structure and Combinatoric***
Paper Code: TMA-316
Time: 1.5 hour

Maximum Marks: 50

Note:

(i) Answer all the questions by choosing any one of the sub questions
(ii) Each question carries 10 marks.
(iii) Please specify COs against each question.

Q1. (10 Marks)

a. Give example of a relation on the set of positive integersS which is
(i) Symmetric and reflexive but not transitive
(ii) Reflexive and transitive but not symmetric
(iii) Symmetric, transitive but not reflexive
(iv) Reflexive but neither symmetric nor transitive
(v) Neither symmetric nor antisymmetric

CO1

OR

b. Prove the following
(i) $(A \cup B)' = A' \cap B'$
(ii) $(A \cap B)' = A' \cup B'$
(iii) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

CO1

Q2. (10 Marks)

a. let A = {1,2,3,6} where a is related to be by divisibility, meaning "a divides b." prove that the relation is a partial order, construct a Hasse diagram, and determine its maximal and minimal elements.

CO1

OR

b. Draw the Hasse diagram of the following sets under the partial order relation divides and indicate which are chains. A = {2,4,12,24} , B= {1,3,5,15,30}

CO1

Q3. (10 Marks)

a. A random variable X has the following probability function values

x	0	1	2	3	4	5	6	7
$P(x = X)$	0	b	$2b$	$2b$	$3b$	b^2	$2b^2$	$7b^2 + b$

(i) Find the value of b
(ii) Determine the distribution function of random variable X
(iii) Evaluate $P(X < 6), P(X \geq 6), P(0 < X < 5)$

CO2

OR

b. Experience shows that a box of 400 component of a company has 1% of defective items. Find the probability that such a box has CO2
(i) No defective items
(ii) One component is defective
(iii) At most 3 components are defective, given that $e^{-4} = 0.0183$

Q4. (10 Marks)

a. A bag I contains 4 white and 6 black balls while another Bag II contains 4 white and 3 black balls. One ball is drawn at random from one of the bags, and it is found to be black. Find the probability that it was drawn from Bag I. CO2

OR

b. There are four fused bulbs with a lot of 10 good bulbs. If three bulbs are drawn at random with replacement, find the probability of distribution of the number of fused bulbs drawn. CO2

Q5. (10 Marks)

a. If X is a Poisson variate such that P (x=2)=9P(x=4)+90P(x=6). Find λ (the mean for X). CO2

OR

b. Daily income of workers follows Normal distribution with mean Rs. 1000 and standard deviation Rs. 100. Find the probability of the income CO2
(i) Less than 1100 Rs.
(ii) More than 1100 Rs.
(iii) Less than 790 Rs.

Given that P(Z=1) = 0.3413, P (Z=2.1) = 0.4821

Note For the question paper setters:

- Question paper should cover all the COs of the course.