Total No. of Questions : 4]

SEAT No. :

PC412

[Total No. of Pages : 2

[6359]-532

S.E. (AI & ML) (Insem)

DISCRETE MATHEMATICS

(2019 Pattern) (Semester - III) (218541)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Make suitable assumptions if necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Write the contrapositive, the converse, inverse of the following sentence. "If today is Easter, then tomorrow is Monday". **[3]**

b) Show that $1+4+7+.....+(3n-2)=\frac{n(3n-1)}{2}$ by Mathematical Induction. **[6]**

c) In a survey of 60 people, it was found that, **[6]**

25 read Business India
26 read India Today
26 read Times of India
11 read both Business India and India Today
9 read both Business India and Times of India
8 read both India Today and Times of India
8 read none of these

i) How many read all three?
ii) How many read exactly one?

OR

Q2) a) Show that (A – B) – C = A – (B U C) using Venn Diagram. **[3]**

b) Prove by truth table : **[6]**

i) $(p \wedge q) \wedge [\sim (p \vee q)]$

ii) $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$

c) Determine the validity of the argument. **[6]**

S_1 : If I like discreate mathematics then I will Study.
S_2 : Either I will study or I will fail.

S : If I fail then I do not like discreate mathematics

P.T.O.

Q3) a) Find the number of permutations that can be made out of the letters **[3]**

i) COMPUTER

ii) ASSASSINATION

b) Out of 5 males and 6 females, a committee of 5 is to be formed. Find the number of ways in which it can be formed so that among the person chosen in the committee there are, **[6]**

i) Exactly a male and 2 female

ii) At least 2 male and 1 female

c) A single card is drawn from an ordinary deck of 52 cards. Find the probability p that : **[6]**

i) The card is a face card

ii) The card is face card and heart

iii) The card is face card or heart

OR

Q4) a) In how many ways can 6 men and 5 women be seated in a line so that no two women sit together? **[3]**

b) In a group of 6 boys and 4 girls, four children are to be selected. In how many ways can they be selected such that at least one boy should be there. **[6]**

c) A bag contains 5 red, 4 white and 8 blue balls. 4 balls are drawn at random. What is the probability that there is at least one ball of each color? **[6]**