

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 $1 + 4 + 7 + \dots + (3n - 2) = \frac{n(3n - 1)}{2}$ 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 $(A - B) - C = A - (B \cup C)$ 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 discrete mathematics then I will Study.
 S_2 : Either I will study or I will fail.

S : If I fail then I do not like discrete 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]

