

Total No. of Questions : 4]

SEAT No. :

P-5401

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[6186]-527

**S.E. (Information Technology) (Insem.)**  
**DISCRETE MATHEMATICS**  
**(2019 Pattern) (Semester - III) (214441)**

*Time : 1 Hour]*

*[Max. Marks : 30*

*Instructions to the candidates:*

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*

**Q1) a)** How many integers from 1 to 1000 are multiples of 6 or 7? **[5]**

b) Prove that :  $p \vee (q \wedge r) \Leftrightarrow (p \vee q) \wedge (p \vee r)$  **[5]**

c) Given : **[5]**

$s(x)$  : x is student

$c(x)$  : x is clever

Translate the following sentences using quantifiers

- i) There is a student.
- ii) Some students are clever
- iii) All students are clever
- iv) Some students are not clever.
- v) Not a single student is clever.

OR

**Q2) a)** Define POWER SET. Write POWER SET of following sets **[5]**

i)  $A = \{a, b, c, d\}$

ii)  $B = \{(a, b), c, d\}$

b) Prove using mathematical induction “ $3^n - 1$  is multiple of 2” **[5]**

c) Prove Associative law for Union using Venn Diagram. **[5]**

$$A \cup (B \cup C) = (A \cup B) \cup C$$

**P.T.O.**

**Q3) a)** Two unbiased dice are thrown. Find the probability of events A and B. [5]

A : score is a multiple of 3

B : score is the number less than 5

b) How many bit strings of length 7 either start with 1 bit or end with 2 bits 00? [5]

c) In how many ways can a photographer at a wedding arrange 6 people in a row from a group of 10 people, where the bride and groom are among these 10 people. if [5]

i) the bride must be in the picture?

ii) both the bride and the groom must be in the picture?

OR

**Q4) a)** Given that you draw a black card, what's the probability that it's a four? [5]

b) A box contains 5 black, 6 white and 4 green balls. Two balls are drawn at random. Find the probability that [5]

i) Both are green.

ii) One is black and the other is green.

c) A palindrome is a string whose reversal is identical to the original string. How many bit strings of length n are palindromes? [5]

□□□