Hall Ticket Number:

April, 2017	**Common for CSE & IT**
Third Semester	**Discrete Mathematical Structures**
Time: Three Hours	**Maximum :** 60 Marks

Answer Question No.1 compulsorily. (1X12 = 12 Marks)

Answer ONE question from each unit. (4X12=48 Marks)

1. Answer all questions (1X12=12 Marks)

    a) (Pv~P) is a tautology or contradiction**?**
    b) Give the generating function A(X) for the sequence $a_n= (n+1)$?
    c) In how many ways can 10 people arrange themselves in a ring?
    d) Give the principle of Mathematical Induction?
    e) State the Euler's theorem?
    f) Give the chromatic number for Cycle if the length is even**?**
    g) What is meant by Bi – partite graph?
    h) What is the difference between tree and graph?
    i) What is meant by POSET?
    j) Show that 3 and 24 integers are congruent modulo 7?
    k) What is an Equivalence Relation?
    l) State the law of hypothetical syllogism?

UNIT I

1. Show that the following are equivalent formulas:
    a) [P v (P^Q)$\leftrightarrow$P]   (Using truth table) **[6 M]**
    b) [P v (~P^Q)$\leftrightarrow$P vQ] (Using rules of propositions) **[6 M]**

(OR)

2. **a)** Use Principle of Mathematical Induction to Prove that : $3n^5 + 5 n^3 + 7$ where n is
    divisible by 15 for each +ve integer. **[6 M]**
    b) Prove (or) Disprove the validity of the following argument (Using Rules of Inference) **[6 M]**
    Every living thing is a Plant or animal.
    David's dog is alive and it is not a plant.
    All animals have hearts.
    Hence, David's dog has a heart.

UNIT II

3. **a)** Find the coefficient of X^{12} in **[6 M]**
$$\frac{1-X^4-X^7+X^{11}}{(1-X)^5}$$
    b) Find the coefficient of X^{25} in $(X^2+X^3+X^4+X^5+X^6)^7$ **[6 M]**

(OR)

5. **a)** In How many ways can the committee of 5 teachers and 4 students be chosen from 9 teachers and 15
    students if teacher A refuses to serve if student B is on the committee? **[6 M]**
    b) In how many ways can 10 people arrange themselves **i)** In a row of 10 chairs? **ii)** In a row of 7
    chairs?   **iii)** In a circle of 10 chairs? **[6 M]**

UNIT III

6. Solve the following recurrence relations:
    a) $a_n=a_{n-1}+n$ where $a_0=2$. (using substitution method) **[6 M]**
    b) $a_n-6a_{n-1}=0$ where $a_0=1$.(Using Generating Functions Method) **[6 M]**

(OR)

7. **a)** Define the terms: **i)** lattice?   **ii)** Join – semi lattice **[4 M]**
                iii) Meet – semi lattice   **iv)** TOSET
    b) Draw the Hasse – diagram for the poset [D12;/]. Where '/' is the divisibility relation.
    Determine this POSET is lattice or not **[8 M]**

UNIT IV

8. **a)** Find the Chromatic – Number for the "Wheel" graph?   **[6 M]**
    b) State and explain Euler's Formula for planar graph?   **[6 M]**

(OR)

9. **a)** What is meant by Adjacency – Matrix? Give the adjacency   matrix $K_{3,3}$.   **[6 M]**
    b) What is meant by Isomorphism? Discuss with suitable examples.   **[6 M]**