Hall Ticket No | | | | | | | | | | | Question Paper Code: ACSB04

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Four Year B.Tech III Semester End Examinations(Regular) - November, 2019

Regulation: IARE – R18

DISCRETE MATHEMATICAL STRUCTURES

Time: 3 Hours **(Common to CSE |IT)** **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Define statement, atomic statement and Tautology with examples. **[7M]**

   (b) Write the negations of the following statements, i) Jan will take a job in industry or go to graduate school ii) James will bicycle or run tomorrow iii) If the processor is fast then the printer is slow **[7M]**

2. (a) State the definition for contradiction and provide a proof by contradiction of the following statement:
   For every integer 'n', if n^2 is odd then 'n' is odd. **[7M]**

   (b) Show that the following premises are inconsistent P+Q, Q+S and R+S **[7M]**

UNIT – II

3. (a) Explain about equivalence relation and partial order relation with an example for each. **[7M]**

   (b) Draw the Hasse diagram representing the positive divisors of 36. **[7M]**

4. (a) Define
   i) Sub lattice
   ii) Lattice homomorphism
   iii) Complete lattice
   iv) Distributive lattice
   [7M]

   (b) If $f(x) = x + 1$, $g(x) = 2x^2 + 3$ for real number , find $(i)\, f \circ g$ $(ii)\, g \circ f$ $(iii)\, f \circ f$ $(iv)\, g \circ g$ **[7M]**

UNIT – III

5. (a) Write short notes on Ring. Explain commutative ring and ring with unity. **[7M]**

   (b) A certain question paper contains three parts A,B, C with 4 questions in part A, 5 questions in part B and 6 questions in part C. It is required to answer 7 questions selecting at least two questions from each part. In how many different ways can a student select his7 questions for answering? **[7M]**

6. (a) Define sum rule and product rule. Explain homomorphism and isomorphism in detail. **[7M]**

(b) Find the term x^{12} containing in the expansion of $\left(x^2 - \frac{2}{x^2}\right)^8$ **[7M]**

UNIT – IV

7. (a) Identify the co-efficient of x^{15} of $x^3(1+x)^4$ / (1-x) . **[7M]**

(b) Solve the recurrence relation a_n=$7a_{n-1}$−$10a_{n-2}$ with a_0=2 and a_1=3 for n≥ 2. **[7M]**

8. (a) Determine the generating function for the following sequence
i)1,1,0,1,1,1....
ii)1,1,1..... **[7M]**

(b) Find the generating function for the below sequences:
i)1^2, 2^2, 3^2....
ii) 0,1,2,3,4 ..... **[7M]**

UNIT – V

9. (a) State the definition of order and size of a graph? Discuss Breadth first search algorithm with an example. **[7M]**

(b) Let a graph G is a 4-regular connected planar graph having 16 edges. Find the number of regions of G. **[7M]**

10. (a) Define graph? explain
i) matrix representation ii) incidence matrix
iii) Linked list representation of graph **[7M]**

(b) Construct the minimal cost spanning tree for the above graph shown in Figure 1 using Prim's algorithm? **[7M]**

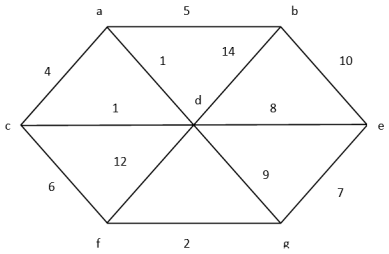

Figure 1