Hall Ticket Number :										

R-13

Code: 1G133

II B.Tech. I Semester Supplementary Examinations August 2021

Mathematical Foundations of Computer Science

(Common to CSE & IT)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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1. a) Write the following statements into symbolic form:
   i) Mark is poor but happy.
   ii) Mark is rich or unhappy.
   iii) Mark is neither rich nor happy.
   iv) Mark is poor or he is both rich and unhappy. 6M

   b) Define Tautology. Show that the following statement formula is a tautology by using truth table: **$(P \leftrightarrow Q) \leftrightarrow ((P \rightarrow Q) \wedge (Q \rightarrow P))$** 8M

2. a) Explain Rules of inference. 6M

   b) Determine whether the conclusion C flows logically from the premises H_1 and H_2 using truth table.
   i) $H_1 : P \rightarrow Q$ $H_2 : P$ C: Q
   ii) H_1: ~P H_2: $P \leftrightarrow Q$ C: $\sim(P \wedge Q)$ 8M

3. a) Define the following with example:
   i) Identity function
   ii) One to one function
   iii) Onto fuction
   iv) One to one correspondence. 8M

   b) Define equivalence relation. Let X={1,2,3,4,5,6,7} and R={**‹x,y›/** x-y is divisible by 3}. Show that R is an equivalence relation and draw the graph of R. 6M

4. a) Define group, monoids, semi groups and subgroups with examples. 8M

   b) Define homomorphism and explain homomorphism of semi groups. 6M

5. a) Define permutation. Consider the three letters a, b, c. How many arrangements of the letter a, b, c taken two at a time? 6M

   b) Explain the principal of inclusion-exclusion 8M

6. a) Define generating function. Find the generating function for the sequence 1,1,1,1…… 4M

   b) Find the sequences generated by the following functions
   i) $2x^2(1-x)^{-1}$
   ii) $2x^3 + 1 / (1-x)$ 10M

7. a) Define Minimal Spanning tree. Write Prim's algorithm to construct minimal spanning tree with example. 10M

   b) Define planar graph with example. 7M

8. a) Define the following terms with suitable examples
   i) Euler path
   ii) Euler circuit
   iii) Multi graph
   iv) Hamiltonian cycle 8M

   b) Write a short note on connected graphs with examples. 6M

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