Swami Purnanand Degree College of Technical Education

External Examination Assignment 2021

BSc(IT)

Mathematical Foundation (BSIT-103)

Max. Marks : 70

SECTION-A

Note: Attempt any **Four questions** from Section A. Each question carry **7 marks**.

1. Explain Piano's axioms with suitable example.
2. Let A be the set{1,2,3}, define the following types of binary relation on A:
   i) A relation that is both symmetric and antisymmetric.
   ii) A relation that is neither symmetric nor antisymmetric.
3. Prove that the set $\{1,\omega, \omega^2\}$is a group under multiplication where ω is and the cube root of unity $\omega^3 =1$
4. By means of truth table, show that proposition $(p\vee q) \wedge\sim (p\vee q)$ is a contradiction.
5. Solve the recurrence relation :
   $4a_n - 20a_{n-1} + 17a_{n-2} - 4a_{n-3} = 0$
6. Write short notes on
   a) Predicates
   b) Quantifiers

SECTION-B

Note: Attempt any **3 questions** from Section B. Each question carry **14 marks**.

Let a and b be positive integers and suppose Q is defined recursively as follows :

1 a) $$Q(a,b) = \begin{cases} 0 & \text{if } a< b \\ Q(a-b, b) + 1 & \text{if } b<=a \end{cases}$$

i) Find Q(2,5)

ii) Find Q(12,5)

b) What is Hasse Diagram? Explain.

2. State and prove De-Morgan's laws and also shows that Distributive laws holds over three sets.

3. What do you mean by sampling? What are its types? Explain in detail.

4. State and proof Baye's Therom.

5. **a)** Prove that (I, +) is an abelian group. i.e. The set of all integers I form an abelian group with respect to binary operation '+'.

b) Show that the set of all integers ………..,-4,-3,-2,-1,0,1,2,3,4,………. is an infinite group with respect to the operation of addition of integers.