Roll No. ....

24041

B. Tech 3rd Semester (CS & IT)
Examination – December, 2017

DISCRETE STRUCTURE

Paper : CSE-203-F

Time : Three Hours]   [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (i) What is Power Set ?
   (ii) What is Multiset ?
   (iii) What are different properties of monoid ?
   (iv) What is spanning tree ?
   (v) Explain Hamilton Circuit.
   (vi) Explain Multi graph.
   (vii) What is Lagrange's Theorem ?
   (viii) What is Homomorphism ?

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SECTION – A

2. (a) Explain the various operations on multiset with example.

   (b) On the set of integers Z, the relation aℝb iff a-b is multiple of 5, is equivalence relation. Find the equivalence classes.

3. (a) Let R={(1,1),(1,2),(2,2),(2,3),(2,1),(3,1),(3,2)}. What is the symmetric closure of R?

   (b) Prove that for any three sets A, B, and C

   $$A \times (B \cap C) = (A \times B) \cap (A \times C)$$

SECTION – B

4. (a) How many people among 100 are born in the same month ?

   (b) Which term is 1/128 of the sequence 4, 2, 1, ...

5. (a) The product of three consecutive terms of a G.P. is 216 and the sum of their products in pairs is 156. Find the terms.

   (b) Solve the following recurrence relation

   $$a_n = 6 a_{n-1} - 9 a_{n-2}, a_0 = 1, a_1 = 6$$

SECTION – C

6. Define monoid, semigroup, group and ring with example.

7. Explain the concept of homomorphism, Isomorphism and automorphism in detail.

SECTION – D

8. Explain the following :

   (a) Points and Bridges
   (b) Multigraph
   (c) Planer graph and graph coloring

9. What do you mean by spanning tree ? Explain the various algorithms for finding the spanning tree.

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