Roll No. .....

Bachelor of Computer Application/ Bachelor of Science in Computer Science

Second Semester Examination-2015

BCA-05/B.SC.(CS)-03

Discrete Mathematics

Time : 3 Hours **Maximum Marks :** 60

Note : This paper is of sixty (60) marks divided into three (03) sections A, B, and C. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section - A

(Long Answer Type Questions)

Note : Section 'A' contains four (04) long-answer-type questions of fifteen (15) marks each. Learners are required to answer any two (02) questions only. (2×15=30)

1. Prove that A X (B U C) = (A X B) U (A X C).
2. If f : A--> B and g: B --> C be one to one onto function, then prove that (gof) is also one to one onto.
3. Prove by induction that the sum of the cubes of 3 consecutive integers is divisible by 9.
4. Define Ring. Show that: a (b - c) = ab - ac is a ring R.

Section - B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short-answer-type questions of five (05) marks each. Learners are required to answer any four (04) questions only. (4×5=20)

1. Define a commutative ring with unity.
2. Negate the following statements :
   - All Students live in hostel.
   - Some boys can run faster than girls.
3. State and prove pigeonhole principle.
4. Prove that the statement (p -> q) <--> (~q -> ~p) is a tautology.
5. Suppose that two distinguishable dice are rolled. In how many ways we get the sum of 6 or 8.
6. State and prove DeMorgan's Law.
7. Prove that the complement of the union of two sets is the intersection of their complements.
8. Define Group. Explain the difference between Finite and Infinite Group.

Section - C

(Objective Type Questions)

Note : Section 'C' contains ten (10) objective-type questions of one (01) mark each. All the questions of this section are compulsory. (10×1=10)

1. If every element of a group G is its own inverse, then G is

   a) finite b) infinite

   c) cyclic d) abelian

2. A one to one function is also known as

   a) injective function b) surjective function

   c) bijective function d) none of these

3. The number of substrings of all lengths that can be formed from a character string of length n

   a) n b) n2

   c) n(n-1)/2 d) n(n+1)/2

4. Let S={ 1,2,3 ,4}.A relation R defined on set s as, R={(1,2),(4,3),(2,2),(2,1),(3,1)} is

   a) transitive b) symmetric

   c) anti-symmetric d) none of these

5. Which of the following is a subgroup G=(0,1,2,3,4,5) under addition module 6

   a) {0,3} b) {0,4}

   c) {0,l} d) {0,2}

6. If D_{30}= {1,2,3,6,10,15,30} determine least upper bound of 10 and 15

   a) 1 b) 2

   c) 6 d) 30

7. There are three identical red balls and two identical blue balls in a bag.Three balls are drawn.The number of different color combinations is

   a) 20 b) 35

   c) 40 d) 30

8. A vertex of degree one is called as

a) rendent b) isolated vertex

c) null vertex d) coloured vertex

9. An act in a connected graph which includes every vertex of the graph is known as

a) euler b) universaI

c) Hamilton d) cheque

10. In any undirected graph, the sum of degree of all the vertices

(a) must be even

(b) is twice the number of edges

(c) must be odd

(d) both (a) and (b)