

Roll No.

97667

**B.C.A. 2nd Semester (New)
Examination – May, 2013**

**MATHEMATICAL FOUNDATIONS OF COMPUTER
SCIENCE**

Paper : BCA-108

Time : Three hours] [Maximum Marks : 80

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 any five questions including Q. No. 1 which is compulsory. Select one question from each Unit.

1. (i) What is Correlation ?
- (ii) Define linear search.
- (iii) Define various types of graphs.
- (iv) What is minimum weight spanning tree ?

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(v) What is the complexity of bubble sort ?

(vi) Define recursive procedure.

(vii) Define congruence.

(viii) Explain the concept of standard deviation

UNIT - I

2. (a) Find the mean and median for the following data :

Class interval	200-240	240-280	280-320	320-360	360-400	400-440	440-480
Frequency	50	60	70	80	90	100	110

(b) Two psychologists ranked nine candidates in the selection test as under :

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	13	13	14	16	15

Determine the two regression co-efficient and calculate the correlation co-efficient.

3. (a) Find the standard deviation of the following data :

Marks	15	20	25	30	35	40	45	50
No. of students	3	4	5	3	3	2	3	2

(b) Find the mean for the following data :

Class Interval	10-19	20-29	30-39	40-49	50-59	60-69
No. of students	5	12	17	20	18	8

UNIT – II

4. Explain Big-Oh notation with the help of example.
5. Give an example of a graph with ten edges that have a bridge as well as an Euler path.

UNIT – III

6. Explain minimal spanning tree with an example.
7. Define merge sort and insertion sort with example.

UNIT – IV

8. Let $X = \{1, 2, 3, 4, 5, 6, 7\}$ and $R = \{(x, y) : x - y \text{ is divisible by } 3\}$ in X . Show that R is an equivalence relation.

9. Prove the following identities for Fibonacci numbers :

(i) $u_1 + u_3 + u_5 + \dots + u_{2n-1} = u_{2n}$

(ii) $u_2 + u_4 + u_6 + \dots + u_{2n} = u_{2n+1} - 1$