7. Explain bubble sort technique with algorithm-Use bubble sort algorithm to sort the following list of numbers :

70, 30, 40, 10, 80, 20, 60, 50.

UNIT – IV

8. (a) Solve the recurrence relations subject to givca initial conditions :

$a_n = 5a_{n-1} - 6a_{n-2}$, for $n \geq 2$ with $a_0 = 7, a_1 = 15$

(b) Using Principle of mathematical induction, prove that for all n ∈ N, $9^n - 8^n - 1$ is divisible by 8.

9. (a) Find the g.c.d of 595 and 252 and express it in the form 252m + 595m.

(b) Decrypt the message "YZW WKH ERPE" which is encrypt by the formula p + 3 (mod26).

Roll No. .....

97667

BCA 2nd Semester Examination – April, 2018

MATHEMATICAL FOUNDATION 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 ***five*** questions in all. Question No. **1** is ***compulsory*** and attempt ***four*** more questions by selecting ***one*** question from each Unit. All questions carry equal marks.

1. (a) If the mean of 7, 9,11, x and 15 is 12, find the value of x.

(b) Find the standard deviation of : 11, 14, 15, 17, 18.

(c) Define Big-O notation.

(d) Define binary search algorithm.

(e) Convert the binary number 1101 into decimal number.

(f) Define complete binary tree with the help of example.

(g) Find the first four terms of a sequence from ihe recursive formula $a_n = 3a_{n-1}, n \geq 1$, with the initial condition. $a_0 = 2$

(h) Define LHRRWCC.

UNIT – I

2. (a) Find the missing frequencies in the following frequency distribution table, it being given that the mean of this distribution is 50 :

Class in Interval	0-20	20-40	40-60	60-80	80-100	Total
Frequency	17	?	32	?	19	120

(b) Find the median of the following frequency distribution :

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	15	17	19	27	19	12

3. (a) Find the line of regression of y on x for the following data :

x	10	9	8	7	6	4	3
y	8	12	7	10	8	9	6

(b) Calculate Karl Pearson's Coefficient of Correlation for the following data :

x	1	2	3	4	5	6	7	8	9
y	7	6	8	10	9	11	12	14	13

UNIT – II

4. (a) What do you mean by complexity of an algorithm ? Explain the concept of best case and worst case time complexity.

(b) (i) Write the algorithm to find the roots of a quadratic equation.

(ii) Write an algorithm to find whether given number is Prime or not.

5. (a) Prove that the degree of any vertex in a simple graph of 'n' vertices cannot exceed n – 1.

(b) Explain isomorphic and homeomorphic graphs with the help of examples.

UNIT – III

6. (a) What is minimum spanning tree. Explain Kruskal's algorithm for minimum spanning tree with the help of example.

(b) Convert the following decimal numbers into binary numbers :

(i) 123.123

(ii) 74.125