Roll No. .....

97667

B.C.A. 2nd Semester Examination – May, 2019

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 : Question No. **1** is ***compulsory***. Attempt ***four*** questions by selecting ***one*** question from each Unit. All questions carry equal marks.

1. (a) Find the median of the following series :

25 , 20 , 23 , 32 , 40 , 27 , 30, 25 , 20 , 10, 55, 41

(b) What do you mean by correlation ?

(c) Explain the properties of algorithm.

(d) What is directed graph ?

(f) What do you mean by software documentation ? Explain. 2

(g) What is software evolution ? Explain. 2

(h) What do you mean by validation and verification ? 2

UNIT – I

2. (a) What is Software Engineering ? What are the essential characteristics and challenges of software engineering ? Explain. 8

(b) What do you understand by project scheduling ? Also enumerate the activities involved in project scheduling. 8

3. (a) What do you understand by Software Process Models ? Compare waterfall model and spiral model of Software Development. 8

(b) Explain elaborately the various strategies and steps involved in risk management. 8

UNIT – II

4. (a) What is Software Requirements Engineering ? Discuss the various requirements engineering processes in detail. 8

(b) What are software metrics ? Discuss the effect of software metrics on software productivity. 8

5. (a) What is Software requirements ? Discuss different types of requirements in detail. 8

(b) What do you mean by Software Project Estimation models ? Explain COCOMO model in detail. 8

UNIT – III

6. (a) What is software design Process ? State its relevance and also discuss the importance of software design Process in software engineering. 8

(b) What is Software Reliability ? How does it contribute to software quality ? Explain. 8

7. (a) What is software testing ? How is testing important in software life cycle ? Discuss the objectives of software testing. 8

(b) What is computer aided software engineering (CASE) ? What are various types of CASE tools ? Explain. 8

UNIT – IV

8. (a) What is Software Maintenance ? What is the importance of Software Maintenance ? What are various type of software maintenance ? Diseuss in detail. 8

(b) What is Software Reuse ? Illustrate the reasons for software reuse. Also discuss the benefits of Software Reuse. 8

7. (a) (i) Convert the decimal number $(413.75)_{10}$ into binary number.

(ii) Convert the binary number $(1001.1101)_2$ into decimal number.

(b) Explain merge sort and sort these elements by using merge sort 14, 72, 20, 9, 16, 27, 19 in increasing order.

UNIT – IV

8. (a) Solve the recurrence relation subject to given initial conditions :

$a_n = 5a_{n-1} - 6a_{n-2}, n > 2, a_1 = 1.5, a_2 = 3$

(b) Using principle of mathematical induction, prove that :

$1 + 3 + 3^2 + 3^3 + \ldots\ldots\ldots + 3^{n-1} = (3^n - 1)/2$

9. (a) Find the g.c.d. of 190 and 34. Also find x and y, if g.c.d. (190, 34) = $190x + 34y$.

(b) Solve the congruences : $342x = 5 \pmod{13}$