

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 ?

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- (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

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- (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 ? Discuss 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 :

$$1 + 3 + 3^2 + 3^3 + \dots + 3^{n-1} = (3^n - 1) / 2$$
- 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 : $342x = 5 \pmod{13}$