

Roll No.

97667

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

**MATHEMATICAL FOUNDATION OF COMPUTER
SCIENCE**

Paper : BCA-103

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
- (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

- (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 $\text{g.c.d.}(190, 34) = 190x + 34y$.
- (b) Solve the congruences: $342x = 5 \pmod{13}$