

**B.TECH SEM - III (2007 COURSE) (ELECTRICAL ENGG.) :**

**SUMMER - 2018**

**SUBJECT: NUMERICAL METHODS & COMPUTER PROGRAMMING**

Day : **Thursday**  
Date : **24/05/2018**

**S-2018-2574**

Time : **02.30 PM TO 05.30 PM**  
Max. Marks : 80

**N.B.**

- 1) Q.1 and Q.5 are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from each Section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Use of non-programmable calculator is allowed.
- 5) Assume suitable data if necessary.

**SECTION – I**

- Q.1** a) What is absolute and relative error? (05)  
The approximate value of  $1/3$  are given as 0.30, 0.33 and 0.34. Which of these three values is the best approximation?
- b) Explain multivariable Newton-Raphson technique. (05)
- c) Compare Bisection method and Secant method. (04)
- Q.2** a) If 1.414 is used as approximation to  $\sqrt{2}$ , find the absolute and relative errors. (05)
- b) The equation  $8x^3 - 12x^2 - 2x + 3 = 0$  has three real roots. Find the intervals each of unit length containing each one of these roots by using intermediate value theorem. (04)
- c) Explain basic principle of numerical methods and necessity for high speed computers calculations. (04)
- Q.3** a) Compare Newton's method with Regula-Falsi method. (06)
- b) Solve the equations: (07)  
 $10x_1 + x_2 + x_3 = 12$   
 $x_1 + 10x_2 - x_3 = 10$   
 $x_1 - 2x_2 + 10x_3 = 9$   
by Gauss-Jordan method.
- Q.4** a) Find the value of y at  $x = 0.17$  for the given values of x and y using central difference method. (07)

<b>x</b>	0	0.1	0.2	0.3
<b>y</b>	2	5	6	8

- b) Derive the Bessel's Interpolation formula. (06)

P.T.O.

**SECTION – II**

- Q.5** a) Derive Lagrange's Interpolation formula. (05)
- b) Discuss: (04)
- i) Function overloading
  - ii) Polymorphism
- c) Write a small C++ program explaining use of inline function. (05)
- Q.6** a) Derive expression for Trapezoidal rule and explain it graphically. (06)
- b) Given  $\frac{dy}{dx} = \frac{y-x}{y+x}$  with  $y=1$  for  $x=0$ . (07)
- Find  $y$  for  $x=0.1$  by Euler's method.
- Q.7** a) Discuss in detail: (05)
- i) Virtual functions in C++
  - ii) Constructors and destructors
- b) Discuss: (08)
- i) Class
  - ii) Object
  - iii) Functions
  - iv) Parameter passing in C++
- Q.8** a) Write a C++ program which accepts character data from input file and writes report in an output file. (08)
- b) What is stream in C++? Discuss various errors related to stream. (05)

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