

**B.TECH SEM - III (2007 COURSE) (ELECTRONICS) : SUMMER
- 2018**

SUBJECT: COMPUTATIONAL TECHNIQUES

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

S-2018-2578

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

N.B.:

- 1) Q.No.1 and 5 are **COMPULSORY**. Out remaining questions, attempt **ANY TWO** questions from each section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data, if necessary.
- 4) Draw neat diagrams **WHEREVER** necessary.
- 5) Use of non-programmable calculator is **ALLOWED**.

SECTION-I

- Q.1** a) What are the different types of errors in numerical computation? (05)
b) Prepare the table for Newton's divided difference interpolation method. (05)
c) Write an algorithm for Trapezoidal rule. (04)

- Q.2** a) Use Bisection method to determine the root of as $f(x) = e^{-x} - x = 0$ (07)
b) Write algorithm and flowchart for Secant method. (06)

- Q.3** a) Obtain the divided difference table for the following data points: (07)

x	2	4	9	10
y	4	56	711	980

- b) Show that n^{th} difference of polynomial of degree n is constant. (06)
- Q.4** a) Solve the following system of equation using triangularazation (LU decomposition) method. (07)
$$2x + 3y + z = 9$$
$$x + 2y + 3z = 6$$
$$3x + y + 2z = 8$$

- b) Solve the following equation using Gauss Seidel method. (06)
$$6x + 15y + 2z = 72$$
$$x + y + 54z = 110$$
$$27x + 6y - z = 85$$

SECTION-II

- Q.5** a) Write a program to create and display linked list in ascending order. (05)
b) Write algorithm for quick sort. (05)
c) Calculate y''' using Taylor series method (04)
 $x y = x - y$ Given $y(2) = 2$.

P.T.O.

- Q.6 a)** Using modified Euler's method solve the following differential equation **(07)**
$$\frac{dy}{dx} = 1 + xy$$

With $y=1$ when $x=0$. Find value of y at $x = 0.1$ and $x = 0.2$. Take step size of 0.1.
- b)** Solve the following equation by Runge kutta method at $x = 0.8$; $\frac{dy}{dx} = y - x$ **(06)**
Take $x_0 = 0$, $y(0) = 2$, $h = 0.2$
- Q.7 a)** Write an algorithm and Draw flow chart for insertion sort. **(07)**
- b)** Write a program for bubble sort using 'C'. **(06)**
- Q.8 a)** Write a program for handling stack using array. **(07)**
- b)** What is difference between queue and circular queue? **(06)**

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