

**S.Y. B. SC. (Computer Science) SEM –III (CBCS - 2016 COURSE) :**  
**SUMMER - 2019**

**SUBJECT: COMPUTER ORIENTED NUMERICAL METHODS**

Day: **Saturday**  
Date: **20/04/2019**

**S-2019-1091**

Time: **03.00 PM TO 06.00 PM**  
Max. Marks: **60**

**N.B:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) User of non programmable **CALCULATOR** is allowed.

**Q.1** Attempt any **TWO** of the following: **(12)**

- a) Find the real root of equation  $x^2 - 2x - 1 = 0$  lies between 1 and 3 by Regula-Falsi method. ( Perform 4 iterations).
- b) If  $y(-1) = -8$ ,  $y(0) = 3$ ,  $y(2) = 1$ ,  $y(3) = 12$ . Find Lagrange's interpolation polynomial that takes the same values as the function  $y$  at the given point.
- c) Fit a straight line by least square method of the form  $y = a + bx$  to the following data:

x	1	2	3	4	5	6
y	1200	900	600	200	110	50

**Q.2** Attempt any **TWO** of the following: **(12)**

- a) Calculate approximate value of  $\int_1^3 \frac{dx}{x}$  by using Simpson's  $\left(\frac{1}{3}\right)^{rd}$  rule with 4 strips.
- b) Find the real root of  $x^3 + x^2 + 3x + 4 = 0$  correct upto 4 decimal places by Newton's Raphson method.
- c) Use Taylor's series method to solve the initial value problem  $\frac{dy}{dx} = x^2 + y^2$  with  $y(0.25) = 1$ .

**Q.3** Attempt any **TWO** of the following: **(12)**

- a) Use Trapezoidal rule to evaluate  $\int_0^1 x^3 dx$  considering 5 subintervals.
- b) Fit a polynomial of first degree to the following data:

x	0	1	2	3
y	1	6	17	34

- c) Using Euler's method, solve  $\frac{dy}{dx} - 1 = y^2$  given that  $y(0) = 0$ . Take  $h = 0.05$  and obtain  $y(0.05)$ ,  $y(0.1)$  and  $y(0.15)$ .

**Q.4** Attempt any **THREE** of the following: **(12)**

- a) What do you mean by dummy activity? Why it is used in networking?
- b) Prove that  $\delta^2 \equiv \Delta - \nabla$ .

**P.T.O.**

- c) Find  $y(0.2)$  using fourth order Runge – Kutta formula  
for  $\frac{dy}{dx} = 1 + y^2, y(0) = 0$  .

- d) Find  $f(2.5)$  from the following data:

x	1	2	3	4
f(x)	2	9	28	65

**Q.5** Attempt any **FOUR** of the following: **(12)**

- a) Briefly mention the advantages of PERT.
- b) Using Lagrange's formula find a unique polynomial  $P(x)$  of degree 2 or less such that  $P(1) = 1$  ,  $P(3) = 27$  ,  $P(4) = 64$  and hence evaluate  $P(1.5)$  .
- c) Write down the formula for Trapezoidal rule.
- d) Construct backward difference table from the following values of x and y

x	10	20	30	40	50
y = f(x)	45	65	80	92	100

- e) Explain : i) Total float                      ii) Free float
- f) Write the interval in which root of  $x^3 - 4x - 9 = 0$  lies.

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