

**S.Y. B. SC. (COMPUTER SCIENCE) SEM -III (CBCS - 2016  
COURSE) : WINTER - 2017**

**SUBJECT : COMPUTER ORIENTED NUMERICAL METHODS**

Day **Thursday**  
Date **02/11/2017**

**W-2017-0722**

Time : **11:00AM TO 2:00PM**  
Max. Marks : **60**

**N. B.:**

- 1) All questions are COMPULSORY.
- 2) Figures to the right indicate FULL marks.
- 3) Use of logarithmic table and non-programmable scientific calculator is ALLOWED.

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

- a) Find the root of equation  $x^4 + x^2 - 80 = 0$  between  $x = 2.8$  and  $x = 3$  using bisection method.
- b) Find the real root of the equation  $x^2 - 2x - 1 = 0$  lies between 1 and 3 by Regula-Falsi method.(perform 4 iterations)
- c) In developing a decoration system at printing industry 13 activities were involved. Their interdependence is given below:

N is the first activity which is succeeded by A, C and B which are concurrent activities. A controls D and L; but L is also controlled by B and C. On B depends commencement of activities J, F and H. J controls K. F controls G and activity E cannot commence unless activities K, G and H are completed. Ground is set for commencement of activity P only when D, L and E are completed. P is the last activity. Draw neat network and number the events.

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

- a) The population of town in census is given below. Estimate the population for year 1955.

Year	1921	1931	1941	1951	1961
Population (in thousand)	46	66	81	93	101

- b) Use Newton-Raphson method to find the value of i)  $\sqrt{18}$   
ii)  $\sqrt[4]{74}$
- c) Apply Lagrange's formula to find the percentage of criminals under 35 years of the age from the following data:

Age less than	25	30	40	50
Percentage of criminals	52	67	84	94

**P.T.O.**

**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) Evaluate  $\int_0^6 y dx$  by Simpson's (3/8)<sup>th</sup> rule from the data given below:

x	0	1	2	3	4	5	6
y	1	0.5	0.2	0.1	0.0588	0.0385	0.027

c) Fit a polynomial of first degree to the following data:

x	0	1	2	3
y	1	6	17	34

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

a) What do you mean by dummy activity? Why it is used in network?

b) Prove that  $\delta^2 \equiv \Delta - \nabla$ .

c) Solve  $\frac{dy}{dx} = -2y$ ;  $y(0) = 1$  using Euler's method. Find  $y(0.1)$ ?

d) Generate  $y(0.2)$  using 4<sup>th</sup> order Runge-kutta formula for  $\frac{dy}{dx} = 1 + y^2$ ,  $y(0) = 0$

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

a) Locate the interval to find the root of  $x^3 - x - 1 = 0$

b) Briefly mention the advantages of PERT.

c) Construct a 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

d) Define:  $\Delta$ ,  $\nabla$  and  $\delta$ .

e) 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  $P(1.5)$ .

f) Write down formula for Trapezoidal rule.

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