

S.Y.B.SC. (COMPUTER SCIENCE) SEM –III (2014 COURSE) :

SUMMER - 2018

SUBJECT: COMPUTER ORIENTED NUMERICAL METHODS

Day: Thursday
Date: 19/04/2018

S-2018-0846

Time: 12.00 NOON TO 02.00 PM
Max. Marks: 40

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.

Q.1 Attempt **ANY TWO** of the following:- **(10)**

- a) Solve $x^4 - x - 9 = 0$ by Newton Raphson method. (perform 3 iterations)
- b) Solve by iteration method and apply Aitken's Δ^2 process to the function $e^{-x} = 10x$.
- c) Briefly mention the advantages of PERT.

Q.2 Attempt **ANY TWO** of the following:- **(10)**

- a) Prove the following identity

$$\mu_0 + \mu_1 + \mu_2 + \dots + \mu_n = {}^{n+1}C_1\mu_0 + {}^{n+1}C_2\Delta\mu_0 + {}^{n+1}C_3\Delta^2\mu_0 + \dots + \Delta^n\mu_0.$$
- b) Find y for x = 30 given that

x	21	25	29	33	37
y	18.4708	17.8144	17.1070	16.3432	15.5154

- c) Fit a Straight line to the following

X	0	1	2	3	4
y	1	1.8	3.3	4.5	6.3

Q.3 Attempt **ANY TWO** of the following:- **(10)**

- a) Find $\int_0^6 y dx$ using Trapezoidal rule for values of x & y are given in following table

X	0	1	2	3	4	5	6
y	0.146	0.161	0.176	0.190	0.204	0.217	0.230

- b) Use Runge-Kutta 4th order method to obtain y(0.1), where $\frac{dy}{dx} = y - x$, $y(0) = 2$, $h = 0.1$
- c) Use Euler's method to compute y(0.1) Given that $\frac{dy}{dx} = x^2 + y$, $y(0) = 1$, $h = 0.05$

Q.4 Attempt **ANY FIVE** of the following:- **(10)**

- a) Define critical path.
- b) Find the location of root if $f(x) = x^3 - 4x + 1$.
- c) Write down Newton Gregory formula for forward interpolation.
- d) Construct backward difference table for following data

X	10	20	30	40	50
y	2.714	2.473	2.012	1.735	1.491

- e) Write the formula for Trapezoidal rule.
- f) Write the general formula for second order Runge -Kutta method.
- g) State Lagrange's interpolation formula.
