S.Y.B.SC. (Computer Science) SEM –III (2014 COURSE) : WINTER - 2018

SUBJECT: COMPUTATIONAL ORIENTED NUMERICAL METHODS

Day : Tuesday
Date : 16/10/2018

W-2018-0956

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) Use of non programmable **CALCULATOR** is allowed.

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

a) 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

b) Find $f(2.5)$ from the following data:

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

c) *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 points.

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

a) Given the value of x and y, find $\int_0^6 y\ dx$ using Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule.

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

b) Given that $\frac{dy}{dx} = \frac{y - x}{y + x}$ with the initial condition y(0) = 1 .
Find $y(0.1)$ using Euler's method.

c) Using Taylor's series, find $y(0.1), y(0.2)$ and $y(0.3)$ given that $\frac{dy}{dx} = xy + y^2,\ y(0) = 1.$

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

a) Find the cubic polynomial which takes the following values by using Newton's forward different formula.

x	0	1	2	3
y	1	2	1	10

b) Find the real root of the equation $x^2 - 2x - 1 = 0$ lies between 1 and 3 by Regula-Falsi method (perform 4 integration).

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c) Use Runge-Kutta second order formula to approximate y when $x = 0.1$ and $x = 0.2$. Given that $y(0) = 1$ when and $\frac{dy}{dx} = x + y$.

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

a) Write any two advantages of Newton Raphson method.

b) Write the conditions for location of root in bisection method.

c) Prove that: $\delta = E^{1/2} - E^{-1/2}$

d) Explain critical path.

e) Find the interval to locate the root of $x^3 - x - 1 = 0$.

f) Draw a network diagram for the following activities:

Activity	A	B	C	D	E	F	G	H	I	J	k
Predecessor	-	A	A	A	B	C	C	C,D	E,F	G,H	I,J

g) Construct a forward difference table for the following data:

x	10	20	30
$f(x)$	2.714	2.478	2.012

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