

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

WINTER - 2018

SUBJECT: COMPUTER ORIENTED NUMERICAL METHODS

Day: Friday
Date: 19/10/2018

Time: 11.00 AM TO 02.00 PM
Max. Marks: 60

W-2018-0915

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) Solve the equation $x^3 - 2x - 5 = 0$ by Regular-Falsi method to obtain a root lying in the interval (2, 3).
- b) Find the cube root of 10 by using Newton – Raphson method (Correct upto 4 decimal places).
- c) What do you mean by dummy activity? Why it is used in network?

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

- a) Establish the following identities:

i) $\mu = \frac{1}{2}(E^{1/2} + E^{-1/2})$.
ii) $\Delta = \nabla E = \delta E^{1/2}$.

- b) Using the following table find the $f(2.5)$.

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

- c) Find the value $f(8)$ by using Lagrange's interpolation formula given that;
 $f(6) = 1.556$, $f(7) = 1.690$, $f(9) = 1.908$, $f(12) = 2.158$.

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

- a) Use Simpson's (3/8)th rule to find

$$\int_0^6 \frac{4x}{(1+x)^2} dx, \quad h=1 .$$

- b) Using Runge – Kutta second order formula to find $y(0.2)$, given that

$$\frac{dy}{dx} = 1 + y^2, \quad y(0) = 0, \quad h = 0.2$$

- c) Obtain $y(x)$ by using Taylor's series method:

$$\frac{dy}{dx} = x - y^2, \quad y(0) = 1, \quad h = 0.1 \quad \text{Hence obtain } y(0.1).$$

(P.T.O.)

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

- a) Find the maximum and minimum values of the function tabulated below:

x	0	2	3	4
y	0	0	2	16

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

- c) Use the method of least squares to fit the straight line $y = a + bx$ to the data

x	0	1	2	3
y	2	5	8	11

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

- a) Construct forward difference table for following data:

x	0.20	0.22	0.24	0.26
f(x)	1.6596	1.6698	1.6804	1.6912

- b) 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

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

- d) Define Free float and Total float in CPM.

- e) Write down the formula for Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule.

- f) Describe the relation between shift operator E and forward difference operator Δ .

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