BACHELOR OF SCIENCE (COMPUTER SCIENCE) (CBCS - 2018 COURSE)
S.Y.B.Sc.(Computer Science) Sem-III : WINTER :- 2021
SUBJECT: COMPUTER ORIENTED NUMERICAL METHODS

Day : Tuesday
Date 25-01-2022 **W-20094-2021**
Time : 10:00 AM-01:00 PM
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** allowed.

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

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

b) Use Newton-Raphson method to find the values of:
i) $\sqrt{10}$ **ii)** $\sqrt[3]{13}$.

c) Fit a second degree polynomial to the following data:

x	-2	-1	0	1	2
y	-1.2	-1.5	-1.3	1.9	7.1

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

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

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

b) Find the value of f(5) using Lagrange's interpolation formula, given that:

x	1	3	4	8	10
y = f (x)	8	15	19	32	40

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

P.T.O.

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

a) Evaluate $\int_0^1 \frac{1}{1+x}dx$ with $h=\frac{1}{6}$ by using Simpson's $\left(\frac{3}{8}\right)^{th}$ rule. Compare the result with actual value.

b) Find an approximation to $\int_0^4 \sqrt{x}\,dx$ by Trapezoidal rule from the following data:

x	0	1	2	3	4
f(x)	0	1	1.41	1.73	2

c) Find the value of $y(0.1)$ and $y(0.2)$ by using Runge-Kutta second order method, given that $y(0)=1$ and $\frac{dy}{dx}=x+y$.

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

a) Explain:
i) Total float in CPM **ii)** Free float in CPM

b) Construct a backward difference table from the values of x and y given in the following table and find the value of $\nabla^3 40$, $\nabla^2 30$, $\nabla^4 50$.

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

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) State and derive Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule.

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

a) Show that: $\nabla \equiv 1-E^{-1}$ or $E \equiv (1-\nabla)^{-1}$.

b) Draw a network diagram for the following activities:

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

c) Distinguish between CPM and PERT.

d) Obtain $y(0.05)$ using Euler's method, given $\frac{dy}{dx}-1=y^2$ and $y(0)=0$.
Take $h=0.05$.

e) Define: **i)** Forward difference
ii) Averaging operator (μ)

f) Write the interval in which root of $x^3-4x-9=0$ lies.

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