BACHELOR OF SCIENCE (COMPUTER SCIENCE) (CBCS - 2018 COURSE)
S.Y.B.Sc.(Computer Science) Sem-III : WINTER- 2022
SUBJECT : COMPUTER ORIENTED NUMERICAL METHODS

Day : Tuesday | Time : 10:00 AM-01:00 PM

Date : 13-12-2022 | **W-20094-2022** | Max. Marks : 60

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: **(12)**

a) Find the root of equation $x^5 + 5x + 1 = 0$ between $x = -1$ and $x = 0$ using bisection method.

b) Find $\sqrt[3]{18}$ by Newton-Raphson method. (Perform 4 iterations)

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

x	1	2	4	5	6	8	9
y	2	5	7	10	12	15	19

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

a) Find the number of students who obtained less than 45 marks, from the following data:

Marks	30-40	40-50	50-60	60-70	70-80
No. of Students	31	42	51	35	31

b) Using Lagrange's interpolation formula, find $y(10)$ from the following data:

y	5	6	9	11
Y	12	13	14	16

c) Solve $\frac{dy}{dx} - 1 = y^2$, given $y(0) = 0, h = 0.05$ using Euler's method and obtain $y(0.05)$, $y(0.1)$ and $y(0.15)$.

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

a) Calculate approximate value of $\int_1^3 \frac{1}{x} dx$ by using Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule with 4 strips and 8 strips.

b) Evaluate the integral $\int_0^{\pi/2} \sin x dx$ by using Trapezoidal rule. Take $h = \frac{\pi}{20}$.

c) Use the Runge-Kutta fourth order method to find the value of $y(1)$ given that $y(0) = 1$ and $\frac{dy}{dx} = \frac{y - x}{y + x}$.

P.T.O.

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

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

b) Show that $\nabla \equiv 1 - E^{-1}$.

c) Use least square method to fit a polynomial of first degree to the following data:

x	0	1	2	3
y	1	6	17	34

d) State and derive Simpson's $\left(\frac{3}{8}\right)^{th}$ rule.

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

a) 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

b) Briefly mention the advantages of PERT.

c) Construct a backward difference table from the values of x and y given below:

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

d) If $x_0 = 0.5$ and $x = 1$, then find next three approximations to root of the equation $xe^x - 2 = 0$ by false position method.

e) Locate the error in the following:
-1, 0, 7, 26, 65, 124, 215, 342, 511

f) Obtain Taylor series for $\frac{dy}{dx} = 1 + xy$ with $y(0) = 1$.

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