

Roll No. to be filled in your Answer Book

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BCA (Third Semester) EXAMINATION, 2015**COMPUTER BASED NUMERICAL TECHNIQUES**

Time: 3.00 Hrs]

[Max. Marks: 70

Q1 Attempt any TWO of the following: $7 \times 2 = 14$

- a) Solve $xe^x = \cos x$ in the interval $(0,1)$ using the method Regula-Falsi.
- b) Prove that Newton-Raphson method is quadratic convergent.
- c) Find a positive root of the equation by $x^3 - 2x - 1 = 0$ bisection method which lies between 1 and 2 correct to 2 places of decimal.

Q2 Attempt any TWO of the following: $7 \times 2 = 14$ Find the unique polynomial $P(x)$ of degree 2 such that:

$$P(1)=1, P(3)=27, P(4)=64.$$

Use Lagrange method of interpolation.

- b) Find the value of $e^{-1.7425}$ from the following table using Gauss' forward difference formula:

$x:$	1.72	1.73	1.74	1.75	1.76
$e^{-x}:$	0.17907	0.17728	0.17552	0.17377	0.17204

- c) Evaluate $\int_0^4 e^x dx$ by Simpson's rule, given that $e = 2.72, e^2 = 7.39, e^3 = 20.09, e^4 = 54.6$ and compare it with the actual value.

Q3 Attempt any TWO of the following: 7 x 2 = 14

- a) Apply Stirling's formula to find y_{28} , given:

$$y_{20} = 49225, y_{25} = 48316, y_{30} = 47236, y_{35} = 45926.$$

$$y_{40} = 44306$$

- b) Evaluate $\int_0^4 \frac{1}{1+x^e} dx$ using Boole's rule taking $h=1$ and $h=0.5$.
- c) Use iterative method to find the root of the equation $\sin x = 10(x-1)$ upto four significant figures.

Q4 Attempt any TWO of the following: 7 x 2 = 14

a) Use Picard's method to obtain y for $x = 0.1$. Given that :

$$\frac{dy}{dx} = 3x + y^2; y = 1 \text{ at } x = 0.$$

b) The area A of a circle of the diameter d is given for the following values: Calculate the area of a circle of diameter 105.

d :	80	85	90	95	100
A :	5026	5674	6362	7088	7854

c) By means of Newton's divided difference formula, find the values of $f(8)$ and $f(15)$ from the following table:

x:	4	5	7	10	11	13
f(x):	48	100	294	900	1210	2028

Q5. Attempt any TWO of the following: 7 x 2 = 14

a) Use Runge-Kutta Fourth Order formula to find $y(1.4)$ if

$$y(1)=2 \text{ and } \frac{dy}{dx} = xy. \text{ Take } h=0.2.$$

b) Define Error. If $\pi=22/7$ is approximated as 3.14, find the absolute error, relative error and percentage error.

- c) Compute root of the equation $x^2 e^{\frac{-x}{2}} = 1$ in the interval $[0.2]$ using secant method upto three decimal places.

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