

Roll No.

S-8045

B. C. A. (Third Semester) Examination, 2017-18

Paper First

BCA - 701

[Computer Based Numerical and Statistical Techniques]

[Maximum Marks : 70]

Time : Three Hours]

Note : Attempt any five questions. All questions carry equal marks.

- Q1. (a) An approximate value of π is given by 3.1428571 and its true value is 3.1415926. Find absolute and relative errors. 7
- (b) Find a real root of $x^3 - x = 1$ between 1 and 2 by bisection method. Compute five iterations. 7
- Q2. (a) Solve $x^3 - 5x + 3 = 0$ by using Regula Falsi method. 7
- (b) Find a real root of the equation $x = e^{-x}$ using Newton-Raphson method? 7
- Q3. (a) Write forward difference table for : 7
- | | | | | |
|-------|-----|-----|-----|-----|
| $x :$ | 10 | 20 | 30 | 40 |
| $y :$ | 1.1 | 2.0 | 4.4 | 7.9 |
- (b) Apply Gauss's forward formula to find of μ_n , if $\mu_0 = 14, \mu_4 = 24, \mu_8 = 32, \mu_{12} = 35, \mu_{16} = 40$. 7
- Q4. (a) Use Stirling's formula to find y_{35} , given $y_{20} = 512, y_{30} = 439, y_{40} = 346$ and $y_{50} = 243$? 7
- (b) Given $y_{20} = 24, y_{24} = 32, y_{28} = 35$ and $y_{32} = 40$. Find y_{25} by Bessel's interpolation formula. 7
- Q5. (a) Using Everett's formula, evaluate $f(30)$ if 7
- | | |
|----------------|----------------|
| $f(20) = 2854$ | $f(28) = 3162$ |
| $f(36) = 7088$ | $f(44) = 7984$ |
- (b) Using Lagrange's interpolation formula, find $y_{(10)}$ from the following table :
- | | | | | |
|-------|----|----|----|----|
| $x :$ | 5 | 6 | 9 | 11 |
| $y :$ | 12 | 13 | 14 | 16 |

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Q6. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using:

(i) Simpson's $\frac{1}{3}$ rule taking $h = \frac{1}{4}$

(ii) Simpson's $\frac{3}{8}$ rule taking $h = \frac{1}{6}$

(iii) Weddle's rule taking $h = \frac{1}{6}$

Q7. (a) Given $\frac{dy}{dx} = \frac{y-x}{y+x}$ with $y=1$ for $x=0$. Find y approximately for $x=0.1$ by Euler's Method?

(b) Use Runge-Kutta method to approximate y when $x=0.1$ given that $x=0$ when $y=1$ and $\frac{dy}{dx} = x+y$.