

June 2012

Bachelor of Computer Application (BCA) Examination
VI Semester

Computer Oriented Numerical Methods

Time : 3 Hours]

[Max. Marks : 50

Note : Solve any two parts from each question. All questions carry equal marks

1. (a) Find cube root of 12 upto four places of decimal by Newton-Raphson method.
- (b) Find real root of equation $x \log_{10} x = 1.2$ by False Position method.
- (c) Write an algorithm for bisection method.
2. (a) Solve the following system of equations by Gauss-Jordan's method :
- $$\begin{aligned} x + 2y + z &= 8 \\ 2x + 3y + 4z &= 20 \\ 4x + 3y + 2z &= 16 \end{aligned}$$
- (b) What is Pivoting? Explain with suitable example.
- (c) Write an algorithm for Pivotal condensation.
3. (a) What do you mean by forward, backward and divided difference operator? Prove that :
- (i) $E\nabla = \nabla E$ (ii) $(1 + \Delta)(1 - \Delta) = 1$.
- (b) Using Newton's forward interpolation formula find the value of $f(1.6)$ if :
- | | | | | | | |
|---|---|----|----|----|----|----|
| x | : | 1 | 5 | 7 | 9 | 12 |
| y | : | 10 | 15 | 12 | 15 | 21 |
- (c) Describe various curve fitting methods.
4. (a) What is general quadrature formula ? Derive it, then derive Trapezoidal Rule.
- (b) Evaluate $\int_0^4 e^x dx$ by Simpson's 1/3rd rule. Given that:
- $$e^1 = 2.72, e^2 = 7.39, e^3 = 20.09, e^4 = 54.60.$$
- (c) Describe Simpson's 3/8 Rule for integration.

5. (a) Using Runge-Kutta fourth order, solve for $y(0.1)$, $y(0.2)$ and $y(0.3)$ given that $y' = xy + y^2$, $y(0) = 1$.
- (b) Use Picard's method to approximate y when $x = 0.2$ given that $y = 1$ when $x = 0$, $\frac{dy}{dx} = x - y$.
- (c) Find the solution to $\frac{dy}{dx} = y^2 - t^2$, $y(1) = 0$ at $t = 2$ by the modified Euler method using step size = 0.1.

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