Total No. of Questions : 5 Total No. of Printed Pages : 3

EKS-331

B.E. V Semester (CGPA) Civil Engg. Examination 2017

NUMERICAL ANALYSIS

Paper : CE-501

Time Allowed : Three Hours

Maximum Marks : 60

Note : i) Attempt any two parts of each question.

ii) All questions carry equal marks.

Q.1. a) Define Absolute errors, Relative errors and Percentage errors. Round off the numbers .865250 and 37.46235 to four significant figures and compute absolute error, relative error and percentage error.

b) If $u = \frac{4x^2y^3}{z^4}$ and errors in x, y, z be 0.001, compute the relative maximum error in u when $x = y = z = 1$.

c) Write an algorithm and draw the flow chart to find the solution of Differential Equation $\frac{dy}{dx} = f(x, y)$, $y(x_0) = y_0$ by modified Euler's method.

Q.2. a) Find a real root of the equation $3x + \sin x - e^x = 0$ by the method of false position correct to four decimal places.

b) Prove that Newton-Raphson's method is quadratic convergent.

c) Solve the equation $x^4 + 8x^3 + 39x^2 - 62x + 50 = 0$ by Bairstow's method staring with $p_0 = 0$ and $q_0 = 0$.

Q.3. a) Estimate the missing term from the following table :

x :	0	1	2	3	4
y :	1	3	9	-	81

Why $f(x)$ differ from 3^3?

b) Use Stirling's formula to find y_{35} given that

$y_{10} = 600$, $y_{20} = 512$, $y_{30} = 439$, $y_{40} = 346$, $y_{50} = 243$.

c) Find an approximate value of $\log_e 5$ by calculating to four decimal places, by Simpson's 1/3 rule, $\int_0^5 \frac{dx}{4x+5}$ dividing the range into 10 equal parts.

Q.4. a) Use Euler's modified method compute y at $x = .1$ in 2 steps given that $\frac{dy}{dx} = \frac{y-x}{y+x}$ with $y(0) = 1$.

b) Using the Runge-Kutta fourth order method, find the value of y, when $x = 0.1$ and 0.2, given the differential equation $\frac{dy}{dx} = x + y$ with $y(0) = 1$.

c) Given $\frac{dy}{dx} = x^2(1+y)$ and $y(1) = 1$, $y(1.1) = 1.233$, $y(1.2) = 1.548$, $y(1.3) = 1.979$. Evaluate $y(1.4)$ by Milne's predictor-corrector method.

Q.5. a) Solve by Partial pivoting, the equations :

$2x + 2y + z = 12,\ 3x + 2y + 2z = 8,\ 5x + 10y - 8z = 10$

b) Solve by Gauss Seidel method :

$20x + y - 2z = 17,\ 3x + 20y - z = -18,$

$2x - 3y + 20z = 25$

c) Solve the following system of equations by the method of triangularization :

$x + 2y + 3z = 14,\ 2x + 5y + 2z = 18,\ 3x + y + 5z = 20$.

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