Total No. of Questions : 6

Total No. of Printed Pages : 4

EH-197

B.E. V Semester (CGPA)
Civil Engineering Exam. 2014

NUMERICAL ANALYSIS

Paper : CE-501

Time Allowed : Three Hours

Maximum Marks : 60

Note : Attempt all questions. Each question carries equal marks.

Q.1 Short answer type questions:

a) Find the relative error of the number 8.6, if both of its digits are correct.

b) In solving simultaneous equations by gauss-elimination method, the co-efficients matrix is reduced to _____.

c) What is the disadvantage of Picard's method?

d) If dy/dx is a function of x alone the 4th order Runge-Kutta method reduced to $k_1 f(x_0)$

e) What is the Newton-Cote's general quadrature formula?

Q.2 a) Find the No. of terms of the exponential series such that their sum gives the value of e^x correct to five decimal places at $x = 1$.

b) If $f(x,y) = \frac{1}{2}\left(\frac{x^2}{y} + y\right)$, then find relative error in $f(x,y)$ when $x = 2, y = 3$ and errors in x and y are 0.01 and 0.03 respectively.

c) Draw the flow chart of Newton-Raphson method.

Q.3 a) Find the cube root of 31 by Regula-Falsi method.

b) Using Lin-Bairstow's method, obtain the quadratic factor of the following equation

$x^4 - 3x^3 + 20x^2 + 44x + 54 = 0$ starting with $(p - q) = (2, 2)$.

c) Use Newton-Raphson method to solve the equation $\cos x = xe^x$, correct to four decimal places.

Q.4. a) Use the stirling formula to find $f(1.22)$ given

x:	1.0	1.1	1.2	1.3
$f(x)$:	8.403	8.781	9.129	9.451

Contd.....

b) Find the no. of students from the following who scored marks not more than 45

Marks range :	30-40	40-50	50-60	60-70	70-80
No. of students :	35	48	70	40	22

c) Solve by Gaussian-three points formula $\int_s^{12} dx/x$.

Q.5. a) State and prove Newton's cotes formula.

b) Use the fourth order Runge-Kutta method to find $u(0.2)$ of the initial value problem $u' = -2tu^2, u(0) = 1$, using $h = 0.2$.

c) Solve by Euler's modified method the equations $dy/dx = \log_{10}(x+y)$.

$y(1) = 2$ at $x = 1.2$ and 1.4 with $h = 0.2$.

Q.6. a) Solve by Relaxation method

$x + 5y - 3z = 18,\ 9x - 2y + z = 50$ and

$-2x + 2y + 7z = 19$

b) Solve by Gauss-Seidel method $2x + 15y + 6z = 72$,

$-x + 6y + 27z = 85$ and $54x + y + z = 110$.

c) Solve by Triangularization method $2x+3y+z=9$, $x+2y+3z=6$ and $3x+y+2z=8$.

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