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Total No. of Questions : 09

B.Tech.(CE) (2012 to 2017) (Sem.–6)

NUMERICAL METHODS IN CIVIL ENGINEERING

Subject Code : BTCE-604

M.Code : 71085

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Q1. Answer the following :

a) Write a short note of Boundary Value problem.

b) Write normal equation for fitting second degree polynomial.

c) Write a short note on Bisection method.

d) Find a polynomial which takes values

x :	0	1	2	3	4
y :	1	2	1	1	10

e) Evaluate $\Delta^2 (ab^x)$, the interval of differencing being unity.

f) Find the Eigen values of the matrix

$$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$

g) Explain interpolation with example.

h) Give any two difference between Galerkin and collocation method.

i) Write the relation between Correlation and Regression coefficient.

j) What is the classification of the equation?

$$\frac{\partial^2 u}{\partial x^2} + 4\frac{\partial^2 u}{\partial x \partial y} + 4\frac{\partial^2 u}{\partial y^2} - \frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0$$

SECTION-B

2. Determine the largest Eigen values and Eigen vector of the matrix

$$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

3. A curve passes through the points (0, 18), (1, 10), (3, –18), (6, 90). Find the slope of the curve at x =2.

4. Apply Runge Kutta method to find an approximate root of y for x = 0.2 in steps of 0.1 of $\frac{dy}{dx} = x + y^2$ given y = 1 where x = 0.

5. Explain the New marks method for solving non linear problems.

6. Solve the equation $y'' = x + y$ boundary conditions $y(0) = y(1) = 0$

SECTION-C

7. Solve the system of equation using Gauss Jordan method

   $x + y + z = 9$

   $2x - 3y + 4z = 13$

   $3x + 4y + 5z = 40$

8. Solve the boundary value problem defined by $y'' - x = 0$ and $y(0) = 0$, $y(1) = \frac{-1}{2}$ by Galerkin's method.

9. Obtain the iterative formula for finding the $\sqrt{N}$ using Newton Raphson method and hence find the value of $\sqrt{5}$.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.