

Roll No.						Total No. of Pages : 0

Total No. of Questions: 09

B.Tech. (Electrical Engineering & Industrial Control) (2012 Onwards)
B.Tech.(Electrical & Electronics/Electronics & Electrical/EE) (2011 Onwards)
(Sem.-5)

NUMERICAL AND STATISTICAL METHODS

Subject Code: BTEE-505 Paper ID: [A2111]

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. a) Define absolute error and give bound on the absolute error of a floating point number in case of rounding and chopping.
 - b) Define Order of convergence and give order of convergence of Newton-Raphson method.
 - c) Obtain the approximate value of y(1.1) for the initial value problem $y' = -2xy^2$, y(1) = 1 with step size h = 0.1 by using Taylor series second order method.
 - d) Evaluate the following integral $\int_{0}^{3} \frac{1}{3x+4} dx$ using Simpson's $\frac{3}{8}$ th rule with three sub intervals.
 - e) Find the polynomial f(x) by using Lagrange's formula for the following data:

х	0	1	2	5
f(x)	2	3	12	47

f) A Random variable has the following probability distribution:

x	0	1	2	3	4	5	6	7
p(x)	0	K	2 <i>K</i>	2 <i>K</i>	3 <i>K</i>	K^2	$2K^2$	$7K^2+K$

Find *K*.

- g) If X is random variable then prove that $V(aX + b) = a^2V(X)$, where V(X) is variance of X.
- h) Under what conditions Poisson distribution is limiting case of Binomial distribution?

1 M-70558 (S2)-684



- i) Show that mean of Uniform distribution over interval (a, b) is $\frac{a+b}{2}$
- j) Give two properties of regression coefficients.

SECTION-B

- Q2. Use Newton's iterative formula; establish the iterative formula $x_{n+1} = x_n[2 Nx_n]$ to calculate the reciprocal of N. Hence find the value of $\frac{1}{37}$ upto four places of decimal.
- Q3. Determine the largest eigenvalue and the corresponding eigenvector of the matrix correct to three decimal places using the power method.

$$\begin{bmatrix} 4 & 1 & 0 \\ 1 & 20 & 1 \\ 0 & 1 & 4 \end{bmatrix}$$

Q4. Apply Gauss elimination method to solve the following system of equations

$$x + 4y - z = -5$$
; $x + y - 6z = -12$; $3x - y - z - 4$.

Q5. Using Newton's divided difference formula, find the missing value from the table

X	1	2	4	5	6
f(x)	14	15	5		9

Q6. The heights of 10 makes of given locality are 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 inches, It is reasonable to believe that the average height is > 64 inches? Test at 5% significance level assuming that for 9 degree of freedom P(t > 1.83) = 0.05.

SECTION-C

- Q7. Use Runge Kutta method of fourth order to approximate y(0.2) taking step size h = 0.1 for the initial value problem $\frac{dy}{dx} = \frac{y^2 x^2}{y^2 + x^2}$, y(0) = 1.
- Q8. A shipment of 20 similar computers to a retail outlet contains 3 that are defective. If a school makes a random purchase of 2 of these computers, find the probability distribution, mean and variance for the no. of defectives.
- Q9. By using the method of least squares, fit a curve of the form y = a + bx to the following data:

X	1	2	4	6
y	2	6	12	18

2 | M-70558 (S2)-684