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Total No. of Pages : 02

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
M.Code : 70558

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) What is the difference between Rounding Error and Chopping?

b) Find order of Convergence of Bisection Method.

c) Define Pivoting and types of Pivoting.

d) Write Gauss-Legendre quadrature formula.

e) Write General Euler's formula. What is the disadvantage of this method?

f) Differentiate between interpolation and curve fitting.

g) Determine the step size that can be used in the tabulation of $f(x) = \sin x$ in the interval $\left[0, \frac{\pi}{4}\right]$ at equally spaced nodal point so that the truncation error of quadratic interpolation is less than 5×10^{-8}.

h) Is there any fallacy in the statement: The mean of binomial Distribution is 20 and its standard deviation is 7?

i) Define level of significance.

j) Define probability distribution.

SECTION-B

Q2. Compute root of equation $x^2 e^{\frac{-x}{2}} = 1$ in the interval [0, 2] using fixed point iteration Method. The root should be correct to three decimal places.

Q3. Solve the following system of equations using Gauss-Seidal iterative method.

$$27x + 6y - z = 85$$
$$x + y + 54z = 110$$
$$6x + 15y + 2z = 72$$

Q4. The velocity 'v' of a particle at distance 's' from a point on its linear path is given in the following table :

S (m) :	0	2.5	5	7.5	10	12.5	15	17.5	20
V(m/sec) :	16	19	21	22	20	17	13	11	9

Estimate the time taken by the particle to traverse the distance of 20 meters.

Q5. Derive relation between Divided Differences and Ordinary Differences.

Q6. Obtain a relation of the form $y = ab^x$ for the following data by the method of least squares:

X	2	3	4	5	6
Y	8.3	15.4	33.1	65.2	126.4

SECTION-C

Q7. Use the Runga-Kutta fourth order method to find the value of y when $x = 1$, given that $y = 1$ when $x = 0$ (taking $n = 2$) and $\frac{dy}{dx} = \frac{y - x}{y + x}$.

Q8. After correcting the proofs of the first 50 pages of a book, it is found that on an average there are 3 errors per 5 pages. Use Poisson distribution to estimate the number of pages with 0, 1, 2, 3 are more than 3 errors in the whole book of 1000 pages. (Given $e^{-6} = 0.5488$).

Q9. A sample of 200 persons with a particular disease was selected. Out of them 100 were given drug and others were not. The results were observed as follows :

	Drug	**No Drug**	**Total**
Cured	55	65	120
Not Cured	45	35	80
Total	100	100	200

Test whether the drug has been effective in curing the disease. (Given $\chi^2_{0.05} = 3.84$)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.