

Register Number :

Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2008

(COMPUTER SCIENCE AND ENGINEERING)

(THIRD SEMESTER)

**COEC - 302. NUMERICAL AND
STATISTICAL METHODS**

May]

[Time : 3 Hours

Maximum : 60 Marks

Answer any ONE full question from each Unit.

Use of Statistical Table is Permitted.

All questions carry equal marks.

UNIT - I

1. (a) Evaluate :

$$\int_0^2 \frac{dx}{x^2 + x + 1}$$

using Simpson's rule, choosing 11 ordinates.

Turn over

(b) Construct the polynomial for the data :

x:	4	6	8	10
y:	1	3	8	16

hence, find $f(5)$.

2. (a) Give the data :

x:	2	5	8	14
y:	94.8	87.9	81.3	68.7

find y at $x = 5.4$.

(b) Given the data :

x:	0.4	0.5	0.6	0.7	0.8
y:	1.5836	1.7974	2.0442	2.3275	2.6511

find the first and second derivative at $x = 0.6$.

UNIT - II

3. (a) Using Regula - Falsi method, find a positive root of $x - \cos x = 0$.

(b) Using Crout's method, solve :

$$x + y + 2z = 7,$$

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

$$4x + 3y + 2z = 8.$$

4. (a) Using Gauss - Seidel method, solve :

$$4x + 2y + z = 14,$$

$$x + 5y - z = 10,$$

$$x + y + 8z = 20.$$

(b) Using Newton - Raphson method, find a positive root of $x \tan x = 1.28$.

UNIT - III

5. (a) Given

$$y = 1 + y^2, \quad y(0) = 1,$$

find

$$y(0.2), \quad y(0.4)$$

using modified Euler's method.

Turn over

(b) Given

$y'' = x^2 - xy, y(0) = 1, y'(0) = 0,$
find $y(0.2)$ by Taylor series method.

6. (a) Given

$y' = 2e^x - y, y(0) = 2, y(0.1) = 2.010$
 $y(0.2) = 2.040, y(0.3) = 2.090,$ find $y(0.4)$
by Milne's method.

(b) Give

$$y' = y - x, y(0) = 2,$$

find $y(0.2)$ by Runge - Kutta method of fourth order.

UNIT - IV

7. (a) An electrical firm manufacturing light bulbs that have a length of life which normally distributed with mean = 800 hrs and S.D = 40 hrs. Find the probability that a bulb burns between 778 and 834 hours.

(b) Find the M.G.F. of the r.v. X having p.d.f.

$$f(x) = \begin{cases} x & : 0 \leq x < 1 \\ 2 - x & : 1 \leq x < 2 \\ 0 & : \text{otherwise.} \end{cases}$$

8. (a) The time (in hours) required to repair in machine is exponentially distributed with parameter

$$\lambda = \frac{1}{2}.$$

What is the probability that the repair time exceeds 2 hours? What is the conditional probability that the repair time taken at least 10 hours, given that its duration exceeds 9 hours?

(b) A continuous r.v. X follows the probability law

$$f(x) = Ax^2, 0 \leq x \leq 1,$$

find A and find the probability that X lies between 0.2 and 0.5.

UNIT - V

9. (a) Two independent random samples of 8 individuals provide the following data. Estimate the variance ratio and test the significance:

- 63 64 65 65 66 66 67 68
- 69 66 67 67 66 68 69 69

(b) A sample of 100 items is drawn from a population with mean is 162 and S.D. 4.16. The mean of the sample is 162.63. Does this sample mean represent a significant divergence from the population mean?

10. (a) A sample of heights of 6,400 soldiers has a mean of 67.85 inches and a S.D. of 2.56 inches while another sample of heights of 1,600 sailors has a mean of 68.55 inches with a S.D. of 2.52 inches. Do the data indicate that the sailors are on the average taller than soldiers.

(b) The following table gives the number of aircraft accidents that occurred during the various days of the week. Find whether the accidents are uniformly distributed over the week.

Day	No. of accidents
Sunday	14
Monday	16
Tuesday	8
Wednesday	12
Thursday	11
Friday	9
Saturday	14