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**MLR15**

Code No: A10006

**MLR INSTITUTE OF TECHNOLOGY**
(An Autonomous Institution)
B.Tech I Year II Sem Examinations- June-2016

**PROBABILITY THEORY AND MATHEMATICAL METHODS**
(Common to ECE & MECH)

Time: 3 hours Max.Marks :75

Note: 1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 25 marks. Answer all Questions in part A.
 3. Part B consists of 5 units. Answer any one full question from each unit. Each question carries 10
 Marks and may have a, b, c as sub questions.

 **PART-A (25 Marks)**

1. a) use Lagrange’s interpolation formula to find the value of , if the following values

 ofare given

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 5 | 6 | 9 | 11 |
|  | 12 | 13 | 14 | 16 |

 2M

 b) Evaluate using Simpson’s 1/3 rd rule  choose step length 0.25 2M

 c) Using Picard’s process of successive approximation, obtain a solution up to the third 2M

 approximation of the equation 

 d) Evaluate curl F at the point (1, 2, 3) given  2M

2.

 a)

 b) Derive the normal equations for fitting of a straight line. 3M

 c)  3M

 d)   3M

 e) A variate X has the probability distribution  3M

|  |  |  |  |
| --- | --- | --- | --- |
| x | -3 | 6 | 9 |
| P(X=x) | 1/6 | 1/2 | 1/3 |

 **PART-B (50 Marks)**

3. a) Use the method of false position, to find the fourth root of 32 correct to three decimal places.

 5M

 b) Find the Newton-Raphson method, the real root of the equation  5M

 **OR**

4. a) Find from the Gauss forward formula 5M

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 20 | 25 | 30 | 35 | 40 | 45 |
|  | 354 | 332 | 291 | 260 | 231 | 204 |

 b) Find the missing values in the following table 5M

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 45 | 50 | 55 | 60 | 65 |
|  | 3.0 | -- | 2.0 | -- | -2.4 |

5. a) Fit a second degree polynomial to the following data by the method of least squares 5M

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 |
|  | 1 | 1.8 | 1.3 | 2.5 | 6.3 |

 b) Obtain a relation of the form for the following data by the method of least squares. 5M

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 2 | 3 | 4 | 5 | 6 |
|  | 8.3 | 15.4 | 33.1 | 65.2 | 127.4 |

 **OR**

6. a) Given that

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 |
|  | 7.989 | 8.403 | 8.781 | 9.129 | 9.451 | 9.750 | 10.031 |

 Find  6M

 b) Compute the value of  using Simpson’s 3/8th rule (h=0.2) 4M

7. a) Employ Taylor’s method to obtain approximate value of for the differential 5M

Equation 

 b) Using Euler’s method, solve for  5M

 **OR**

8. a) Apply Runge-Kutta fourth order method, to find an approximate value of 5M

 

 b) Use Milne’s predictor –corrector method to obtain the solution of the equation 5M

 

9. a) Find the work done in moving a particle in the force field 

Along the straight line from (0, 0, 0) to (2, 1, 3) 5M

 b) Using Stoke’s theorem evaluate where C is the boundary

 of The triangle with vertices (2, 0, 0) , (0, 3, 0)and (0, 0, 6) 5M

 **OR**

10. a) Evaluate over the tetrahedron bounded by

  5M

 b) Evaluate by Green’s theorem where C is the triangle enclosed

 by the lines  5M

11. a) In a bolt factory machines A, B, C manufacture 20%, 30%, and 50% of the total of their

 Output and 6%, 3%, and 2% are defective. A bolt is drawn at random and found to be

 defective. Find the probabilities that it is manufactured from i) Machine A ii) machine B 6M

 b) The mean of binomial distribution is 3 and the variance is 9/4

 (i) Find the value of n

 (ii)  4M

  **OR**

 12. a) Fit a Poisson distribution to the following data

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 |
|  | 142 | 156 | 69 | 27 | 5 | 1 |

 5M

 b) Find the mean and standard deviation of a normal distribution in which 7% of items are

 under 35 and 89% are under 63 5M

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