PVP 14

Code: ME3T1, AE3T1

II B.Tech - I Semester–Regular/Supplementary Examinations – November 2017

NUMERICAL AND STATISTICAL METHODS

(Common for ME, AE)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1. a) Prove that (i) $\nabla = 1 - E^{-1}$ (ii) $\delta = E^{1/2} - E^{-1/2}$

   b) Write Newton's forward and backward Interpolation formulae.

   c) Given $\frac{dy}{dx} = x^2 - y, y(0) = 1,$ find correct to four decimal places the value of y(0.1) by Using Euler's method.

   d) Write Milne's predictor and corrector formula.

   e) Ten coins are thrown simultaneously, find the probability of getting at least seven Heads.

   f) State Baye's theorem.

   g) Average number of accidents on any day on a national highway is 1.6. Determine the Probability that the number of accidents are at least one.

   h) A sample of size 300 was taken from an infinite population whose standard deviation is 10. What is standard error of mean?

i) Find the value of the finite population correction factor for n = 10 and N = 1000

j) Explain one tailed and two tailed tests.

k) Write test static to test the difference between two means $\mu_1 = \mu_2$ when population standard deviations are known.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Find the interpolating polynomial f(x) from the data given below using Lagrange's interpolation. 8 M

X	0	1	4	5
y	4	3	24	39

b) Apply Regula- falsi method to find the root of $2x - \log_{10} x = 7$ 8 M

3. a) Given that $\frac{dy}{dx} = 1 + xy, y(0) = 1$ compute $y(0.1)$ and $y(0.2)$ using Picard's method. 8 M

b) Find $y(0.1)$ and $y(0.2)$ using Runge Kutta fourth order formula given that $\frac{dy}{dx} = x + x^2y$ and $y(0) = 1$. 8 M

4. a) A business man goes to hotels X, Y, Z, 20%, 50%, 30% of the times respectively . It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faulty plumbing. What is the probability that business man's room having faulty plumbing is assigned to hotel Z? 8 M

b) In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and Variance of the distribution. 8 M

5. a) Samples of size 2 are taken from the population 1, 2, 3, 4, 5, 6 with replacement. Find 8 M
   i) The mean of the population
   ii) Standard deviation of population
   iii) The mean of sampling distribution of means
   iv) The standard deviation of the sampling distribution of means.

b) In a study of automobile insurance a random sample of 80 body repair costs had a mean of Rs. 472.36 and the S.D. of Rs. 62.35. If $\bar{x}$ is used as a point estimate to the true average repair costs, with what confidence we can assert that the maximum error doesn't exceed Rs. 10. 8 M

6. a) In a sample of 600 students of a certain college 400 are found to use ball pens. In Another college from a sample of 900 students 450 were found to use ball pens. Test Whether 2 colleges are significantly different with respect to the habit of using ball pens. 8 M

b) The average breaking strength of the steel rods is specified to be 18.5 thousand pounds. To test this sample of 14 rods were tested. The mean and standard deviations obtained were 17.85 and 1.955 respectively. Is the result of experiment significant? 8 M