PVP 14

Code: ME3T1, AE3T1

II B.Tech - I Semester – Regular Examinations – December 2015

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) Explain the method of regula falsi

   b) Find $\Delta^2(ab^x)$.

   c) State Newton forward difference formula

   d) Using Picard's method of successive approximation obtain a solution up to 2nd approximation of the equation $\frac{dy}{dx} = x^2 + y$ and y(0)=1.

   e) Write the formula for RK method of 4th order.

   f) If X is a Poisson variate such that $P(X = 3) = \frac{1}{6}$ and $P(X = 2) = \frac{1}{3}$ find $P(X = 0)$

   g) X is normally distributed and the mean of X is 12 and S.D is 4. Find $P(X \geq 20)$.

   h) Samples of size 2 are taken from the population 10,16,22,28 without replacement. Find the mean of sampling distribution of means.

i) Find the sample size if the true proportion does not exceed 0.12 to estimate the true proportion of defective items with at least 95% confidence with error 0.04.

j) Explain one tailed test.

k) Write the critical region for testing one large sample mean hypothesis in two tailed test.

PART – B

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

2. a) Compute a real root of the equation $x^3 + x^2 - 1 = 0$ by iterative method. 8 M

b) Determine the polynomial such that

$f(0) = 1, f(1) = 3, f(3) = 55$

using Lagrange's interpolation formula. Hence find *f(2)*. 8 M

3. a) Solve $\frac{dy}{dx} = y + e^{2x}$, y(0) = 0 by Picard's method and find y(0.1) 8 M

b) Solve $\frac{dy}{dx} = x^2(1+y), y(1) = 1$ by Euler's method and find y(1.1). 8 M

4. a) State and prove multiplication theorem of probability. 8 M

b) A consulting firm rents cars from three agencies, 30% from agency D, 20% from agency E and 50% from agency F. If 10% of the cars from D, 15% of the cars from E, and 5% of the cars from F have bad tires. What is the probability that the firm will get a car with bad tires. 8 M

5. a) A random sample of size 64 is taken from a normal population with mean 51.4 and standard deviation 6.8. Find the probability that the mean of the sample will
i) exceed 52.9 ii) fall between 50.5 and 52.3 8 M

b) A random sample of size 81 is taken from a population having standard deviation 5.1. Given that the sample mean is 21.6. Construct 98% confidence interval for the true mean. 8 M

6. a) In a labor-management discussion it was brought up those workers at a certain large plant take on average 32.6 minutes to get to work. If a random sample of 60 workers took on the average 33.8 minutes with a standard deviation of 6.1 minutes, can we reject the null hypothesis $\mu = 32.6$ in a favour of the alternative hypothesis $\mu > 32.6$ at the 0.05 level of significance. 8 M

b) In a sample of 1000 people in a city 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat eaters are equally popular in this city at 1% level of significance. 8 M