PVP 14

Code: ME3T1, AE3T1

II B.Tech - I Semester – Regular/Supplementary Examinations
November 2019

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 Bisection Method.

b) Prove that $\Delta \log f(x) = \log\left(1 + \frac{\Delta f(x)}{f(x)}\right)$

c) Write R-K method of fourth order.

d) Using Euler's method, find y(0.25),given that $\frac{dy}{dx} = 2xy$, y(0)=1.

e) Give formula to solve differential Equation in Taylor's series method.

f) State Baye's theorem.

g) If the probability of a defective bolt is 0.2, find i)mean ii) standard deviation for the distribution of bolts in a total of 400.

h) A population consists of five numbers 2,3,6,8 and 11. Consider all samples of size two which can be drawn with replacement from this population. Find the mean of the population.

i) A sample size 400 is taken from a population whose S.D is 16. Find the standard error.

j) Explain one tailed test.

k) Define the level of significance in testing of hypothesis.

PART – B

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

2. a) Using Newton-Raphson method , find a real root of the equation $x^3-x-1=0$. Correct to 3 decimal places. 8 M

b) Using Lagrange's Interpolation formula, find f(2) such that f (0)=1 , f (1)=3 and f (3)=55. 8 M

3. a) Given that $\frac{dy}{dx} = y^2+x$, y(0) =1.Compute y(0.1) and y(0.2) using Taylor's Series method. 8 M

b) Find y(0.1) and y(0.2) using fourth order R-K method, given that $\frac{dy}{dx} = x+x^2y$ and y(0)=1. 8 M

4. a) The probability that the life of a bulb is 100 days is 0.05. Find the probability that of 6 bulbs. i) At least one ii) greater than 4 and iii) none, were defective. 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 distribution. 8 M

5. a) A population consists of six numbers 4,8,12,16,20 and 24. Consider all samples of size two which can be drawn without replacement from this population. Find: 8 M

i) The population mean

ii) The population standard deviation

iii) The mean of sampling distribution of means

iv) The standard deviation of the sampling distribution of means.

b) A random sample of size 81 is taken from a population having standard deviation 5.1. Given that the sample mean is 216. Construct 98% confidence interval for the true mean. 8 M

6. a) It is claimed that a random sample of 49 tyres has a mean life of 15200 km. This sample was drawn from a population whose mean is 15150 km and a standard deviation of 1200 km. Test the significance at 0.05 level. 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