**MODEL QUESTION PAPER-2**

**Fourth Semester**

Common to all branches

**EN010401 Engineering Mathematics III**

**Time:** 3 hours **Maximum:** 100 marks

(Answer all questions)

**Part A**

1. Define R.M.S value.
2. State Fourier integral theorem.
3. Find partial differential equation of all spheres of radius 3 units having their centre in the *xy*-plane.
4. Write three properties of normal distribution.
5. Explain the terms (i) Critical region (ii) region of acceptance (iii) level of significance.

(5 x 3 = 15 marks)

**Part B**

1. Obtain sine series for in the interval *.*
2. Find Fourier Transform of

and deduce .

1. Solve .
2. Find mean and variance of exponential distribution.
3. Write down the general procedure of testing a hypothesis.

(5 x 5 = 25 marks)

**Part C**

1. Expand *x*sin*x* as a Fourier series in 0< *x* < 2π and hence deduce that

**OR**

1. Obtain a half range cosine series to represent in (0,1) and deduce the value of
2. a) Find **F**{}, a > 0 and deduce that
   * 2. **F**{}=

b) Find F.C.T of

**OR**

1. a) Find F.T of and use it to evaluate

(b) Find F.S.T of and hence find F.S.T of

1. (a) Solve

(b) Solve

**OR**

1. (a) Solve

(b)Solve

1. (a) The Probability that a patient recovers from a disease is 0.4. If 18 persons have such a disease, determine the probability that
   * 1. Exactly 6 survive
     2. At least 10 survive
     3. From 3 to 9 survive

(b) In a normal distribution 9% of the items are under 30 and 85% are under 65. Find the mean and variance of the distribution.

**OR**

1. (a) Fit a Poisson Distribution to the following data

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x : | 0 | 1 | 2 | 3 | 4 |
| f : | 319 | 252 | 124 | 46 | 13 |

(b) The mean and standard deviation of marks obtained by 1000 students in an examination are respectively 34.4 and 16.5. Assuming the normality of the distribution, find the approximate number of students expected to obtain marks between 30 and 60.

1. (a) The specification for a certain kind of ribbon call for a mean breaking strength of 150 pounds. If five pieces of randomly chosen ribbon have a mean breaking strength of 139.5 pounds with a standard deviation of 5.7 pounds, test the null hypothesis μ = 150 against the alternative hypothesis μ < 150 at the 0.01 level of significance.

(b) A random sample of size 18 is taken from a normal population with mean 28 and variance 49. Find the probability that the sample variance will be less than the population variance.

**OR**

1. (a) In a large city A, 20 % of a random sample of 900 school boys had a slight physical defect. In another city B 18.5 % of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant?

(b) A die was thrown 1200 times and the number ‘5’ was obtained 225 times. Can the die be considered fair at 0.01 level of significance.

(12 x 5 = 60 marks)