Code No: R05220101 **R05** **Set No. 2**

II B.Tech II Semester Examinations,April/May 2012
PROBABILITY AND STATISTICS
Common to CE, ME, CHEM, MECT, MEP, BT, AME

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) A random sample of size 100 is taken from an infinite population having the mean μ=76 and the variance $\sigma^2 = 256$. Find the probability that $\overline{x}$ will be between 75 and 78. ($\overline{x}$ is sample mean)
   (b) Write about
      i. Null hypothesis
      ii. Alternate Hypothesis [8+8]

2. Fit a parabola of the form y = a + bx + cx^2 for the following data by the method of least squares [16]

x	20	40	60	80	100	120
y	5.5	9.1	14.9	22.8	33.3	46

3. A pair of dice are thrown 360 times and the frequency of each sum is indicated below:

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	8	24	35	37	44	65	51	42	26	14	14

   Would you say that the dice are fair on the basis of the chi-square test at .05 level of significance. [16]

4. (a) What is the maximum error can one expect to make with probability 0.90 when using the mean of a random sample of size n = 64 to estimate the mean of a population with $\sigma^2 = 2.56$
   (b) A sample of 10 cam shafts intended for use in gasoline engines has an average eccentricity of 1.02 and a standard deviation of 0.044 inch. Assuming the data may be treated a random sample from a normal population, determine a 95% confidence interval for the actual mean eccentricity of the cam shaft?
   (c) It is claimed that a random sample of 100 tyres with a mean life of 15,269 km is drawn from population of tyres which has a mean life of 15,200 km and a standard deviation of 1248. Test the validity of the claim at 95% level. [5+5+6]

5. The following are the data on the number of twists required to break a certain kind of forged alloy bar and the percentage of two alloying elements present in the metal. Fit at least sequence regression line on x_1 and x_2. [16]

No. of tuirists	(y)	41	49	69	65	40	50	58	57	31	36	44	57	19	31	33	43
% of elements of A	(x_1)	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
% of elements of B	(x_2)	5	5	5	5	10	10	10	10	15	15	15	15	20	20	20	20

6. (a) Find the probability that at most 5 defective components will be found in a lot of 200 past experience shows that 2% of such components are defective. Also find the probability of more than five defective components.
   (b) Write the importance of normal distribution.
   (c) If the mean and S.D of normal distribution are 70 and 16, find p(38< x < 46) [5+5+6]

7. (a) For the continuous probability function $f(x) = kx^2\ e^{-x}$ when $x \geq 0$ find
      i. k
      ii. mean
      iii. variance
   (b) 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random.
      i. none is defective
      ii. one is defective
      iii. $p(1 < x < 4)$ [8+8]

8. (a) State and prove Baye's theorem
   (b) In a certain college 25% of boys and 10% of girls are studying mathematics. The girls constitute 60% of the students. If a student is selected at random and is found to be studying mathematics, find the probability that the student is a
      i. girl
      ii. boy [8+8]

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Code No: R05220101 **R05** **Set No. 4**

II B.Tech II Semester Examinations,April/May 2012
PROBABILITY AND STATISTICS
Common to CE, ME, CHEM, MECT, MEP, BT, AME

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) A random sample of size 100 is taken from an infinite population having the mean μ=76 and the variance $\sigma^2 = 256$. Find the probability that $\overline{x}$ will be between 75 and 78. ($\overline{x}$ is sample mean)
   (b) Write about
      i. Null hypothesis
      ii. Alternate Hypothesis [8+8]

2. (a) Find the probability that at most 5 defective components will be found in a lot of 200 past experience shows that 2% of such components are defective. Also find the probability of more than five defective components.
   (b) Write the importance of normal distribution.
   (c) If the mean and S.D of normal distribution are 70 and 16, find p(38< x < 46) [5+5+6]

3. The following are the data on the number of twists required to break a certain kind of forged alloy bar and the percentage of two alloying elements present in the metal. Fit at least sequence regression line on x_1 and x_2. [16]

No. of tuirists	(y)	41	49	69	65	40	50	58	57	31	36	44	57	19	31	33	43
% of elements of A	(x_1)	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
% of elements of B	(x_2)	5	5	5	5	10	10	10	10	15	15	15	15	20	20	20	20

4. A pair of dice are thrown 360 times and the frequency of each sum is indicated below:

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	8	24	35	37	44	65	51	42	26	14	14

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   (b) In a certain college 25% of boys and 10% of girls are studying mathematics. The girls constitute 60% of the students. If a student is selected at random and is found to be studying mathematics, find the probability that the student is a
      i. girl
      ii. boy [8+8]

6. Fit a parabola of the form y = a + bx + cx^2 for the following data by the method of least squares [16]

x	20	40	60	80	100	120
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7. (a) For the continuous probability function $f(x) = kx^2\ e^{-x}$ when $x \geq 0$ find
   i. k
   ii. mean
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   (b) 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random.
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   ii. one is defective
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8. (a) What is the maximum error can one expect to make with probability 0.90 when using the mean of a random sample of size n = 64 to estimate the mean of a population with $\sigma^2 = 2.56$
   (b) A sample of 10 cam shafts intended for use in gasoline engines has an average eccentricity of 1.02 and a standard deviation of 0.044 inch. Assuming the data may be treated a random sample from a normal population, determine a 95% confidence interval for the actual mean eccentricity of the cam shaft?
   (c) It is claimed that a random sample of 100 tyres with a mean life of 15,269 km is drawn from population of tyres which has a mean life of 15,200 km and a standard deviation of 1248. Test the validity of the claim at 95% level. [5+5+6]

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Code No: R05220101 **R05** **Set No. 1**

II B.Tech II Semester Examinations,April/May 2012
PROBABILITY AND STATISTICS
Common to CE, ME, CHEM, MECT, MEP, BT, AME

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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% of elements of B	(x_2)	5	5	5	5	10	10	10	10	15	15	15	15	20	20	20	20

2. Fit a parabola of the form y = a + bx + cx^2 for the following data by the method of least squares [16]

x	20	40	60	80	100	120
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3. (a) Find the probability that at most 5 defective components will be found in a lot of 200 past experience shows that 2% of such components are defective. Also find the probability of more than five defective components.
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   (c) If the mean and S.D of normal distribution are 70 and 16, find p($38 < x < 46$) [5+5+6]

4. A pair of dice are thrown 360 times and the frequency of each sum is indicated below:

Sum	2	3	4	5	6	7	8	9	10	11	12
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6. (a) What is the maximum error can one expect to make with probability 0.90 when using the mean of a random sample of size n = 64 to estimate the mean of a population with $\sigma^2 = 2.56$

(b) A sample of 10 cam shafts intended for use in gasoline engines has an average eccentricity of 1.02 and a standard deviation of 0.044 inch. Assuming the data may be treated a random sample from a normal population, determine a 95% confidence interval for the actual mean eccentricity of the cam shaft?

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(b) 20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random.

i. none is defective

ii. one is defective

iii. $p(1 < x < 4)$ [8+8]

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Code No: R05220101 **R05** **Set No. 3**

II B.Tech II Semester Examinations,April/May 2012
PROBABILITY AND STATISTICS
Common to CE, ME, CHEM, MECT, MEP, BT, AME

Time: 3 hours **Max Marks: 80**

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% of elements of B	(x_2)	5	5	5	5	10	10	10	10	15	15	15	15	20	20	20	20

2. (a) Find the probability that at most 5 defective components will be found in a lot of 200 past experience shows that 2% of such components are defective. Also find the probability of more than five defective components.
   (b) Write the importance of normal distribution.
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