Code No: RR220105 **RR** **Set No. 2**

II B.Tech II Semester Examinations,November 2010
PROBABILITY AND STATISTICS
Common to CE, ME, CHEM, IT, MECT, MEP, BT, AME, E.COMP.E, CSE, CSSE

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Two aero planes bomb a target in succession. The probability of each correctly scoring a hit is 0.3 and 0.2 respectively. The second will bomb only if the first misses the target. Find the probability that
   i. one target is hit
   ii. both fails to score hits
   (b) There are three boxes. Box I contains 10 light bulbs of which 4 are defective. Box II contains 6 light bulbs of which one is defective. Box III contains 8 light bulbs of which 3 are defective. A box is chosen and a bulb is drawn. Find the probability that the bulb is non defective. [8+8]

2. Given below is the number of male births in 1000 families having five children.

Male children	0	1	2	3	4	5
No of families	40	300	250	200	30	180

   Test whether the given data is consistent with the hypothesis that the chance of male birth is equal to the chance of female birth. [8+8]

3. Ten soldiers participated in a shooting competition in the first week. After intensive training they participated in the competition in the second week. Their scores before and after training given as follows.

Scores before	67	24	57	55	63	54	56	68	33	43
Scores after	70	38	58	58	56	67	68	75	42	38

   Do the data indicate that the soldiers have been benefited by the training. [16]

4. (a) Seeds are packed in packets of 20. It is known that 5% do not germinate. Determine the number of packets containing
   i. atleast 2
   ii. atmost 2 non germinating seeds in a consignment of 1000 packets.
   (b) When the mean of marks was 50% and standard deviation 5% then 60% of the students failed in mathematics examination. Determine the 'grace' marks to be awarded in order to show that 70% of the students passed, assuming that the marks are normally distributed. [8+8]

5. (a) The following are the measurements of the air velocity and evaporation coefficient of burning fuel droplets in air impulse engine

Air velocity x	20	60	100	140	180	220	260	300	340	380
Evaporation Coefficient y	.18	.37	.35	.78	.56	.75	1.18	1.36	1.17	1.65

(b) Fit a straight line to the above data. Fit a curve of the form y = a.$(b)^x$ by the method of least squares for the following data. [8+8]

x	0	1	2	3	4	5	6	7
y	10	21	35	59	92	200	400	610

6. 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.

No. of twists	(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

[16]

7. (a) If F(x) is the distribution function of X given by

$$F(x) = 0 \quad if \quad x \leq 1$$
$$= k(x-D)^4 \quad if \quad 1 < x \leq 3$$
$$= 1 \quad if \quad x > 3$$

determine

i. f(x)

ii. k

(b) Find the maximum n such that the probability of getting no head in tossing a coin n times is greater than .1 [8+8]

8. (a) A random sample of 6 steel beams has a mean compressive strength of 58,392 p.s.i. (pounds per square inch) with a standard deviation of 648 p.s.i. Use this information at the level of significance $\alpha = 0.025$ to test whether the true average compressive strength of steel from which this sample came is 58,000 p.s.i. Assume normality?

(b) Measuring specimens of nylon yarn taken from two machines, it was found that 8 specimans from 1^{st} machine had a mean denier of 9.67 with a standard deviation of 1.81 while 10 specimans from a 2^{nd} machine had a mean denier of 7.43 with a standard deviation 1.48. Assuming the population are normal test the hypothesis H_0 : μ_1 - $\mu_2 = 1.5$ against H_1 : μ_1 - $\mu_2 > 1.5$ at 0.05 level of significance? [8+8]

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Code No: RR220105 **RR** **Set No. 4**

II B.Tech II Semester Examinations,November 2010
PROBABILITY AND STATISTICS
Common to CE, ME, CHEM, IT, MECT, MEP, BT, AME, E.COMP.E, CSE, CSSE

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Two aero planes bomb a target in succession. The probability of each correctly scoring a hit is 0.3 and 0.2 respectively. The second will bomb only if the first misses the target. Find the probability that
   i. one target is hit
   ii. both fails to score hits
   (b) There are three boxes. Box I contains 10 light bulbs of which 4 are defective. Box II contains 6 light bulbs of which one is defective. Box III contains 8 light bulbs of which 3 are defective. A box is chosen and a bulb is drawn. Find the probability that the bulb is non defective. [8+8]

2. (a) If F(x) is the distribution function of X given by
$$F(x) = 0 \quad if \quad x \leq 1$$
$$= k(x-D)^4 \quad if \quad 1 < x \leq 3$$
$$= 1 \quad if \quad x > 3$$
   determine
   i. f(x)
   ii. k
   (b) Find the maximum n such that the probability of getting no head in tossing a coin n times is greater than .1 [8+8]

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.

No. of tuwists	(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

[16]

4. (a) Seeds are packed in packets of 20. It is known that 5% do not germinate. Determine the number of packets containing
   i. atleast 2
   ii. atmost 2 non germinating seeds in a consignment of 1000 packets.
   (b) When the mean of marks was 50% and standard deviation 5% then 60% of the students failed in mathematics examination. Determine the 'grace' marks to be awarded in order to show that 70% of the students passed, assuming that the marks are normally distributed. [8+8]

5. Ten soldiers participated in a shooting competition in the first week. After intensive training they participated in the competition in the second week. Their scores before and after training given as follows.

Scores before	67	24	57	55	63	54	56	68	33	43
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Do the data indicate that the soldiers have been benefited by the training. [16]

6. Given below is the number of male births in 1000 families having five children.

Male children	0	1	2	3	4	5
No of families	40	300	250	200	30	180

Test whether the given data is consistent with the hypothesis that the chance of male birth is equal to the chance of female birth. [8+8]

7. (a) A random sample of 6 steel beams has a mean compressive strength of 58,392 p.s.i. (pounds per square inch) with a standard deviation of 648 p.s.i. Use this information at the level of significance $\alpha = 0.025$ to test whether the true average compressive strength of steel from which this sample came is 58,000 p.s.i. Assume normality?

(b) Measuring specimens of nylon yarn taken from two machines, it was found that 8 specimans from 1^{st} machine had a mean denier of 9.67 with a standard deviation of 1.81 while 10 specimans from a 2^{nd} machine had a mean denier of 7.43 with a standard deviation 1.48. Assuming the population are normal test the hypothesis $H_0 : \mu_1 - \mu_2 = 1.5$ against $H_1 : \mu_1 - \mu_2 > 1.5$ at 0.05 level of significance? [8+8]

8. (a) The following are the measurements of the air velocity and evaporation coefficient of burning fuel droplets in air impulse engine

Air velocity x	20	60	100	140	180	220	260	300	340	380
Evaporation Coefficient y	.18	.37	.35	.78	.56	.75	1.18	1.36	1.17	1.65

(b) Fit a straight line to the above data. Fit a curve of the form y = a.$(b)^x$ by the method of least squares for the following data. [8+8]

x	0	1	2	3	4	5	6	7
y	10	21	35	59	92	200	400	610

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Code No: RR220105 **RR** **Set No. 1**

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PROBABILITY AND STATISTICS
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Answer any FIVE Questions
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1. (a) If F(x) is the distribution function of X given by
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determine
   i. f(x)
   ii. k

   (b) Find the maximum n such that the probability of getting no head in tossing a coin n times is greater than .1 [8+8]

2. Ten soldiers participated in a shooting competition in the first week. After intensive training they participated in the competition in the second week. Their scores before and after training given as follows:

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Do the data indicate that the soldiers have been benefited by the training. [16]

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No. of twists	(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

[16]

5. (a) Two aero planes bomb a target in succession. The probability of each correctly scoring a hit is 0.3 and 0.2 respectively. The second will bomb only if the first misses the target. Find the probability that

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(b) There are three boxes. Box I contains 10 light bulbs of which 4 are defective. Box II contains 6 light bulbs of which one is defective. Box III contains 8 light bulbs of which 3 are defective. A box is chosen and a bulb is drawn. Find the probability that the bulb is non defective. [8+8]

6. (a) A random sample of 6 steel beams has a mean compressive strength of 58,392 p.s.i. (pounds per square inch) with a standard deviation of 648 p.s.i. Use this information at the level of significance $\alpha = 0.025$ to test whether the true average compressive strength of steel from which this sample came is 58,000 p.s.i. Assume normality?

(b) Measuring specimens of nylon yarn taken from two machines, it was found that 8 specimans from 1^{st} machine had a mean denier of 9.67 with a standard deviation of 1.81 while 10 specimans from a 2^{nd} machine had a mean denier of 7.43 with a standard deviation 1.48. Assuming the population are normal test the hypothesis H_0 : μ_1 - $\mu_2 = 1.5$ against H_1 : μ_1 - $\mu_2 > 1.5$ at 0.05 level of significance? [8+8]

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8. Given below is the number of male births in 1000 families having five children.

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Test whether the given data is consistent with the hypothesis that the chance of male birth is equal to the chance of female birth. [8+8]

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Code No: RR220105 **RR** **Set No. 3**

II B.Tech II Semester Examinations,November 2010
PROBABILITY AND STATISTICS
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⋆ ⋆ ⋆ ⋆ ⋆

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[16]

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