Code No: NR220105 **NR** **Set No. 2**

**II B.Tech II Semester Examinations,December 2010**
**PROBABILITY AND STATISTICS**
**Common to CE, CHEM, IT, MEP, 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) A manufacturer of electronic equipment subjects samples of two competing brands of transistors to an accelerated performance test. If 45 of 180 transistors of the first kind and 34 of 120 transistors of the second kind fail the test, what can he conclude at the level of significance $\alpha = 0.05$ about the difference between the corresponding sample proportions?

   (b) On the basis of their total scores, 200 cadidates of a civil service examination are divided into two groups, the upper 30 % and the remaining 70 %. Consider the first question of the examination. Among the first group, 40 had the correct answer, whereas among the second group, 80 had the correct answer. On the basis of these results, can one conclude that the first question is no good at discriminating ability of the type being examined here? [8+8]

2. Determine the equation of the regression plane connecting $x_1$, $x_2$ and y. Estimate y at $x_1 = 1.8$, $x_2$ 112. [16]

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Diffusion time (hours) $x_1$ | 1.5 | 2.5 | 0.5 | 1.2 | 2.6 | 0.3 | 2.4 | 2.0 | 0.7 | 1.6 |
| Sheet resistance ohms-cm $x_2$ | 66 | 87 | 69 | 141 | 93 | 105 | 111 | 78 | 66 | 123 |
| Current gain y | 5.3 | 7.8 | 7.4 | 9.8 | 10.8 | 9.1 | 8.1 | 7.2 | 6.5 | 12.6 |

3. (a) Find the mean and standard deviation of a normal distribution in which 7% of the items are under 35 and 89% are under 63.

   (b) The number of e-mails received by a computer is at the rate of two per 3 minutes. Determine the probability that five or more e-mails are received in duration of a 9 minutes. [8+8]

4. (a) Find the probability of drawing 4 white balls and 2 black balls without replacement from a bag containing 1 red , 4 black and 6 white balls.

   (b) A purse contains 2 silver and 4 copper coins and a second purse contains 4 silver and 4 copper coins. If a coin is selected at random from one of the two purses, what is the probability that it is a silver coin? [8+8]

5. (a) The average sale of a toilet soap in a particular locality in a particular shop with an average 320 and S.D 40. An attractive display of advertisement for the soap in local TV increased in 36 days the sale by 70 in that soap in a day. Can we say that the advertisement has helped very much?

(b) A company manufacturing electric bulbs claims that the average life of its bulbs is 1600 hours. The average life and standard deviation of a random sample of 100 such bulbs were 1570 hours and 120 hours respectively. Should we accept the claim of the company? [8+8]

6. (a) Fit an exponential curve y=ax$^b$ of the y= Ae$^{BX}$ for the following data

| x | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| y | 7 | 11 | 17 | 27 |

(b) Predict y at x= 3.75 by fitting a power curve to the given data. [16]

| x | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| y | 2.98 | 4.26 | 5.21 | 6.10 | 6.80 | 7.50 |

7. (a) Define discrete probability distribution and cumulative distribution. Show that variance of $x = E(x^2) - \mu^2$ where $\mu$ is the arithmetic mean.

(b) Let X be a discrete random variable which denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the discrete probability distribution, expectation, variance of X. [8+8]

8. (a) A random sample of size 100 is taken from an infinite population having the mean $\mu = 76$ and the variance of $\sigma^2 = 256$. What is the probability that $\overline{X}$ will be between 75 and 78?

(b) If two independent random samples of size $n_1 = 9$ and $n_2$=16 are taken from a normal populations, what is the probability that the variance of the first sample will be at least four times as large as the varianace of the second sample? [8+8]

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Code No: NR220105 **NR** **Set No. 4**

**II B.Tech II Semester Examinations,December 2010**
**PROBABILITY AND STATISTICS**
**Common to CE, CHEM, IT, MEP, 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) Define discrete probability distribution and cumulative distribution. Show that variance of $x = E(x^2) - \mu^2$ where $\mu$ is the arithmetic mean.
   (b) Let X be a discrete random variable which denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the discrete probability distribution, expectation, variance of X. [8+8]

2. Determine the equation of the regression plane connecting $x_1$, $x_2$ and y. Estimate y at $x_1 = 1.8$, $x_2$ 112. [16]

| Diffusion time (hours) $x_1$ | 1.5 | 2.5 | 0.5 | 1.2 | 2.6 | 0.3 | 2.4 | 2.0 | 0.7 | 1.6 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sheet resistance ohms-cm $x_2$ | 66 | 87 | 69 | 141 | 93 | 105 | 111 | 78 | 66 | 123 |
| Current gain y | 5.3 | 7.8 | 7.4 | 9.8 | 10.8 | 9.1 | 8.1 | 7.2 | 6.5 | 12.6 |

3. (a) Find the probability of drawing 4 white balls and 2 black balls without replacement from a bag containing 1 red , 4 black and 6 white balls.
   (b) A purse contains 2 silver and 4 copper coins and a second purse contains 4 silver and 4 copper coins. If a coin is selected at random from one of the two purses, what is the probability that it is a silver coin? [8+8]

4. (a) A manufacturer of electronic equipment subjects samples of two competing brands of transistors to an accelerated performance test. If 45 of 180 transistors of the first kind and 34 of 120 transistors of the second kind fail the test, what can he conclude at the level of significance $\alpha = 0.05$ about the difference between the corresponding sample proportions?
   (b) On the basis of their total scores, 200 cadidates of a civil service examination are divided into two groups, the upper 30 % and the remaining 70 %. Consider the first question of the examination. Among the first group, 40 had the correct answer, whereas among the second group, 80 had the correct answer. On the basis of these results, can one conclude that the first question is no good at discriminating ability of the type being examined here? [8+8]

5. (a) Find the mean and standard deviation of a normal distribution in which 7% of the items are under 35 and 89% are under 63.
   (b) The number of e-mails received by a computer is at the rate of two per 3 minutes. Determine the probability that five or more e-mails are received in duration of a 9 minutes. [8+8]

6. (a) Fit an exponential curve y=ax$^b$ of the y= Ae$^{BX}$ for the following data

| x | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| y | 7 | 11 | 17 | 27 |

(b) Predict y at x= 3.75 by fitting a power curve to the given data. [16]

| x | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| y | 2.98 | 4.26 | 5.21 | 6.10 | 6.80 | 7.50 |

7. (a) A random sample of size 100 is taken from an infinite population having the mean $\mu = 76$ and the variance of $\sigma^2 = 256$. What is the probability that $\overline{X}$ will be between 75 and 78?

(b) If two independent random samples of size $n_1 = 9$ and $n_2$=16 are taken from a normal populations, what is the probability that the variance of the first sample will be at least four times as large as the varianace of the second sample? [8+8]

8. (a) The average sale of a toilet soap in a particular locality in a particular shop with an average 320 and S.D 40. An attractive display of advertisement for the soap in local TV increased in 36 days the sale by 70 in that soap in a day. Can we say that the advertisement has helped very much?

(b) A company manufacturing electric bulbs claims that the average life of its bulbs is 1600 hours. The average life and standard deviation of a random sample of 100 such bulbs were 1570 hours and 120 hours respectively. Should we accept the claim of the company? [8+8]

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Code No: NR220105 **NR** **Set No. 1**

**II B.Tech II Semester Examinations,December 2010**
**PROBABILITY AND STATISTICS**
**Common to CE, CHEM, IT, MEP, E.COMP.E, CSE, CSSE**
**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) A random sample of size 100 is taken from an infinite population having the mean $\mu = 76$ and the variance of $\sigma^2 = 256$. What is the probability that $\overline{X}$ will be between 75 and 78?
   (b) If two independent random samples of size $n_1 = 9$ and $n_2$=16 are taken from a normal populations, what is the probability that the variance of the first sample will be at least four times as large as the varianace of the second sample? [8+8]

2. (a) Fit an exponential curve y=ax$^b$ of the y= Ae$^{BX}$ for the following data

| x | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| y | 7 | 11 | 17 | 27 |

   (b) Predict y at x= 3.75 by fitting a power curve to the given data. [16]

| x | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| y | 2.98 | 4.26 | 5.21 | 6.10 | 6.80 | 7.50 |

3. (a) Find the probability of drawing 4 white balls and 2 black balls without replacement from a bag containing 1 red , 4 black and 6 white balls.
   (b) A purse contains 2 silver and 4 copper coins and a second purse contains 4 silver and 4 copper coins. If a coin is selected at random from one of the two purses, what is the probability that it is a silver coin? [8+8]

4. (a) Find the mean and standard deviation of a normal distribution in which 7% of the items are under 35 and 89% are under 63.
   (b) The number of e-mails received by a computer is at the rate of two per 3 minutes. Determine the probability that five or more e-mails are received in duration of a 9 minutes. [8+8]

5. Determine the equation of the regression plane connecting $x_1$, $x_2$ and y. Estimate y at $x_1 = 1.8$, $x_2$ 112. [16]

| Diffusion time (hours) $x_1$ | 1.5 | 2.5 | 0.5 | 1.2 | 2.6 | 0.3 | 2.4 | 2.0 | 0.7 | 1.6 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sheet resistance ohms-cm $x_2$ | 66 | 87 | 69 | 141 | 93 | 105 | 111 | 78 | 66 | 123 |
| Current gain y | 5.3 | 7.8 | 7.4 | 9.8 | 10.8 | 9.1 | 8.1 | 7.2 | 6.5 | 12.6 |

6. (a) The average sale of a toilet soap in a particular locality in a particular shop with an average 320 and S.D 40. An attractive display of advertisement for

the soap in local TV increased in 36 days the sale by 70 in that soap in a day. Can we say that the advertisement has helped very much?

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8. (a) A manufacturer of electronic equipment subjects samples of two competing brands of transistors to an accelerated performance test. If 45 of 180 transistors of the first kind and 34 of 120 transistors of the second kind fail the test, what can he conclude at the level of significance $\alpha = 0.05$ about the difference between the corresponding sample proportions?

(b) On the basis of their total scores, 200 cadidates of a civil service examination are divided into two groups, the upper 30 % and the remaining 70 %. Consider the first question of the examination. Among the first group, 40 had the correct answer, whereas among the second group, 80 had the correct answer. On the basis of these results, can one conclude that the first question is no good at discriminating ability of the type being examined here? [8+8]

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Code No: NR220105 **NR** **Set No. 3**

**II B.Tech II Semester Examinations,December 2010**
**PROBABILITY AND STATISTICS**
**Common to CE, CHEM, IT, MEP, E.COMP.E, CSE, CSSE**
**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Define discrete probability distribution and cumulative distribution. Show that variance of $x = E(x^2) - \mu^2$ where $\mu$ is the arithmetic mean.
   (b) Let X be a discrete random variable which denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the discrete probability distribution, expectation, variance of X. [8+8]

2. (a) Fit an exponential curve y=ax$^b$ of the y= Ae$^{BX}$ for the following data

| x | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| y | 7 | 11 | 17 | 27 |

   (b) Predict y at x= 3.75 by fitting a power curve to the given data. [16]

| x | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| y | 2.98 | 4.26 | 5.21 | 6.10 | 6.80 | 7.50 |

3. (a) The average sale of a toilet soap in a particular locality in a particular shop with an average 320 and S.D 40. An attractive display of advertisement for the soap in local TV increased in 36 days the sale by 70 in that soap in a day. Can we say that the advertisement has helped very much?
   (b) A company manufacturing electric bulbs claims that the average life of its bulbs is 1600 hours. The average life and standard deviation of a random sample of 100 such bulbs were 1570 hours and 120 hours respectively. Should we accept the claim of the company? [8+8]

4. (a) Find the probability of drawing 4 white balls and 2 black balls without replacement from a bag containing 1 red , 4 black and 6 white balls.
   (b) A purse contains 2 silver and 4 copper coins and a second purse contains 4 silver and 4 copper coins. If a coin is selected at random from one of the two purses, what is the probability that it is a silver coin? [8+8]

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| Diffusion time (hours) $x_1$ | 1.5 | 2.5 | 0.5 | 1.2 | 2.6 | 0.3 | 2.4 | 2.0 | 0.7 | 1.6 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sheet resistance ohms-cm $x_2$ | 66 | 87 | 69 | 141 | 93 | 105 | 111 | 78 | 66 | 123 |
| Current gain y | 5.3 | 7.8 | 7.4 | 9.8 | 10.8 | 9.1 | 8.1 | 7.2 | 6.5 | 12.6 |

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