

Code No: 07A4BS01

**R07****Set No. 2**

**II B.Tech II Semester Examinations, APRIL 2011**  
**PROBABILITY AND STATISTICS**  
**Common to CE, ME, CHEM, MECT, MEP, 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 196 is taken from an infinite population having the mean 30 and the standard deviation is 15. What is the probability that  $\bar{x}$  will be between 29 and 32.
- (b) A random sample of size 58 is taken from an infinite population with the standard deviation. Find
  - i. The standard error
  - ii. Probable error [8+8]
2. (a) What is the probability of getting two queens, if we draw two cards from a pack of 52 cards.
  - i. With replacement
  - ii. Without replacement
- (b) In a certain college 25% of the students failed in mathematics, 15% failed in chemistry. A student is selected at random.
  - i. If he failed in Mathematics, what is the probability that he failed in Chemistry
  - ii. If he failed in Chemistry, what is the probability that he failed in Mathematics. [8+8]
3. The following table gives the frequency of digits 0,1,2,3,4,5,6,7,8 and 9 in the last place in logarithm of numbers 10-99. Examine the equality of distribution of digits.
 

Digits	0	1	2	3	4	5	6	7	8	9
Frequency	6	16	15	10	12	12	3	2	9	5

[16]
4. (a) Probability density function of a random variable  $= \frac{1}{2} \sin x$  in  $0 \leq x \leq \pi$ ; =0 else where. Find
  - i. The mean
  - ii. Mode
  - iii. Median
  - iv.  $P(0 < x < \frac{\pi}{2})$ .
- (b) The probability that a man hitting a target is  $\frac{1}{3}$ . If he fires 6 times, find the probability that he fires
  - i. At the most 5 times
  - ii. Exactly once

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- iii. At least two times. [8+8]
5. (a) Average number of accidents on any day on a national highway is 3. Determine the probability that the number of accidents is
- At least two
  - At the most three
- (b) In a distribution exactly normal 10% of the items are under 40 and 80% are under 75. find the mean and the Standard deviation of mark [8+8]
6. (a) Construct 95% confidence interval for the mean of a normally distributed population from which the following sample was taken 15,17,10,18,16,9,7,11,13 and 14
- (b) A lady stenographer claims that she can take the dictation at the rate of 120 words per minute. Can we reject our claim on the basis of 100 trails in which she demonstrates a mean of 116 words with a S.D of 15 words. [8+8]
7. The Customer arrive at a fast food centre at an arrival of 11 minutes and they are served at the rate of 1 / 9 per minute. Find
- Average number of customers in the system.
  - Average number of customers in the queue.
  - The average waiting time of queue.
  - The probability that queue length is greater than or equal to five.
  - The probability that an arrival will have to wait for more than 10 minutes [16]
8. (a) In a certain factory there are two independent processes for manufacturing the same item. The average weight in a sample of 400 items produced from one process is found to be 150 gms with a standard deviation of 20 gms while the corresponding figures in a sample of 500 items from the other process are 190 and 24. Is there significant difference between the mean (test at 95% level).
- (b) Among 100 fish caught in a large take ,18 were inedible due to the pollution of the environment. With what confidence can we assert that the error of this estimate is at most .065? [8+8]

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**R07****Set No. 4**

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  - (a) Average number of customers in the system.
  - (b) Average number of customers in the queue.
  - (c) The average waiting time of queue.
  - (d) The probability that queue length is greater than or equal to five.
  - (e) The probability that an arrival will have to wait for more than 10 minutes [16]
2. (a) Probability density. function of a random variable  $= \frac{1}{2} \sin x$  in  $0 \leq x \leq \pi$ ;  $= 0$  else where. Find
  - i. The mean
  - ii. Mode
  - iii. Median
  - iv.  $P(0 < x < \frac{\pi}{2})$ .
 (b) The probability that a man hitting a target is  $1/3$ .  
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- (b) A random sample of size 58 is taken from an infinite population with the standard deviation 2 Find
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  - ii. Probable error [8+8]

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5. (a) What is the probability of getting two queens , if we draw two cards from a pack of 52 cards.
- With replacement
  - Without replacement
- (b) In a certain college 25% of the students failed in mathematics, 15% failed in chemistry. A student is selected at random.
- If he failed in Mathematics, what is the probability that he failed in Chemistry
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- (b) Among 100 fish caught in a large take ,18 were inedible due to the pollution of the environment. With what confidence can we assert that the error of this estimate is at most .065? [8+8]
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- |           |   |    |    |    |    |    |   |   |   |   |
|-----------|---|----|----|----|----|----|---|---|---|---|
| Digits    | 0 | 1  | 2  | 3  | 4  | 5  | 6 | 7 | 8 | 9 |
| Frequency | 6 | 16 | 15 | 10 | 12 | 12 | 3 | 2 | 9 | 5 |
- [16]
8. (a) Average number of accidents on any day on a national highway is 3. Determine the probability that the number of accidents is
- At least two
  - At the most three
- (b) In a distribution exactly normal 10% of the items are under 40 and 80% are under 75. find the mean and the Standard deviation of mark [8+8]

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Digits	0	1	2	3	4	5	6	7	8	9	
Frequency	6	16	15	10	12	12	3	2	9	5	[16]

2. (a) In a certain factory there are two independent processes for manufacturing the same item. The average weight in a sample of 400 items produced from one process is found to be 150 gms with a standard deviation of 20 gms while the corresponding figures in a sample of 500 items from the other process are 190 and 24. Is there significant difference between the mean (test at 95% level).
- (b) Among 100 fish caught in a large lake, 18 were inedible due to the pollution of the environment. With what confidence can we assert that the error of this estimate is at most .065? [8+8]
3. The Customer arrive at a fast food centre at an arrival of 11 minutes and they are served at the rate of  $1/9$  per minute. Find
- Average number of customers in the system.
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  - The probability that queue length is greater than or equal to five.
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5. (a) Probability density. function of a random variable  $= \frac{1}{2} \sin x$  in  $0 \leq x \leq \pi$ ;  $=0$  else where. Find
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- (b) The probability that a man hitting a target is  $1/3$ .  
If he fires 6 times, find the probability that he fires
- At the most 5 times
  - Exactly once
  - At least two times. [8+8]
6. (a) Average number of accidents on any day on a national highway is 3. Determine the probability that the number of accidents is
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- (b) In a certain college 25% of the students failed in mathematics, 15% failed in chemistry. A student is selected at random.
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  - (a) Average number of customers in the system.
  - (b) Average number of customers in the queue.
  - (c) The average waiting time of queue.

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- (d) The probability that queue length is greater than or equal to five.
- (e) The probability that an arrival will have to wait for more than 10 minutes [16]
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