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**R09**

Code No: 09A30302

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD**  
**B.Tech II Year I Semester Examinations, May/June-2013**

**Probability and Statistics**  
**(Common to ME, CSE, MCT, AME, MIE)**

**Time: 3 hours**

**Max. Marks: 75**

**Answer any five questions**  
**All questions carry equal marks**

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- 1.a) There are ten chips numbered 1 to 10. Two chip are drawn. Find the probability that the sum is greater than 4.  
i) When the selection is with replacement  
ii) When the selection is without replacement.
- b) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective find the expected number of defective items. [15]
- 2.a) The probability that a man hits a target is  $\frac{1}{2}$ . He fires 6 times. Find the probability that he hits the target (i) Exactly 2 times (ii) More than 4 times (iii) At least once.
- b) In a test on electrical bulbs, it was found that the life of a particular make was normally distributed with an average life of 2040 hours and S.D of 40 hrs. Estimate the number of bulbs likely to burn for more than 2140. [15]
- 3.a) The dean of college wants to use the mean of a random sample to estimate the average amount of time students take to get from one class to the next and she wants to be able to assert with 99% confidence that the error is at most 0.25 minute. If it can be presumed from experience that  $\sigma = 1.40$  minutes. How large a sample will she have to take?
- b) It is claimed that a random sample of 100 tyres with a mean life of 15269 is drawn uom a population of tyres which has a mean life of 15200 km and a standard deviation of 1248 km. Test the validity of this claim. [15]
- 4.a) A manufacturer claimed that at least 95% of the equipment which he supplied to a factory conformed to specifications. An examination of a sample of 200 pieces of equipments revealed that 180 were faulty. Test his claim at a significant level of 0.05
- b) A study shows that 16 of 200 Tractors produced on one assembly line required extensive adjustments before they could be shipped, while the same was true for 14 of 400 tractors produced on another assembly line. At the 0.01 level of significance, does this support the claim that the second production line does superior work. [15]
5. Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results.

Horse A	28	30	32	33	35	29	34
Horse B	29	30	30	24	27	29	37

Test whether the two horses have the same running capacity.

[15]

- 6.a) A sample of 12 fathers and their elder sons gave the following data about their heights in inches. Calculate the coefficient of rank correlation.

Fathers	65	63	67	64	68	62	70	66	68	67	69	71
Sons	68	66	68	65	69	66	68	65	71	67	68	70

- b) The equations of two Regression lines are  $7x-16y+9=0$ ,  $5y-4x-3=0$ , find the Coefficient of Correlation and the means of  $x$  and  $y$ . [15]
7. A fast food restaurant has one drive window. Cars arrive according to a poisson process. Cars arrive at the rate of 2 per 5 minutes. The service time per customer is 1.5 minutes. Determine
- The Expected number of customers waiting to be served.
  - The probability that the waiting line exceeds 10
  - Average waiting time until a customer reaches the window to place an order.
  - The probability that the facility is idle. [15]
- 8.a) Define Marcov Chain and give one example.
- b) The school of international studies for population found out by its survey that the mobility of the population of a state to village, town and city is in the following percentage.

		To		
		Village	Town	City
From	Village	30%	20%	50%
	Town	30%	50%	20%
	City	10%	40%	50%

What will be the proportion of population in village, town and city after two years? Present population has proportion of 0.4, 0.3 and 0.3 village, town and city respectively. Find the proportions in the long run. [15]

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