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Code No: 09A40101 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech II Year II Semester Examinations, June-2014
PROBABILITY AND STATISTICS
(Common to CE, CHEM, IT, PTE, CEE)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

1.a) Three machines I, II and III produce 40%, 30% and 30% of the total number of items of a factory. The percentages of defective items of these machines are 4%, 2% and 3%. An item is selected at random and found to be defective. Find the probability that it is from
i) Machine- I
ii) Machine-II
iii) Machine-III.

b) A continuous Random variable has the p.d.f

$$f(x)=\begin{cases} Kxe^{-\lambda x}, & \text{If } x \geq 0, \lambda \geq 0 \\ 0, & \text{elsewhere} \end{cases}$$

Determine
i) K
ii) The mean
iii) Variance.

2.a) If the variance of a Poisson variate is 3. Find the probability that
i) P(x=0)
ii) $P(1 \leq x < 4)$
iii) $P(x > 2)$.

b) If the weights of 300 students are normally distributed with mean 68 kgs and standard deviation 3kgs. How many students have weight?
i) Greater than 72 kgs ii) Between 65 and 71 kgs.

3.a) A sample of size 64 and mean 60 was taken from a population whose standard deviation is10. Construct 95% confidence interval for the mean.

b) The average income of 100 people of a city is Rs.210 with a standard deviation of Rs.10. For another sample of 150 persons the average income was Rs.220 with a standard deviation of Rs.12 Test the significance between the difference of two means at 5% level.

4.a) A coin is tossed 960 times. Head turned up 184 times. Find whether the coin is unbiased.

b) Random samples of 600 men and 900 women in a locality were asked whether they would like to have a bus stop near their residence. 350 men and 475 women were in favour of the proposal. Test the significance between the difference of two proportions at 5% level.

5. A story writer is bringing out a new story book. He wants to determine whether the story will appeal to a particular age group or to all age groups. He takes a random sample of 200 and got their opinion as follows. Use χ^2 test to test whether opinion of the story age group.

Age group opinion.	Below 20	20-39	40-59	60 and above
Liked the story	35	30	15	20
Dislike the story	15	20	5	20
Indifferent	10	5	10	15

6. The marks obtained by 10 students in Mathematics and Statistics are given below. Find the Coefficient of Correlation between the two subjects and the two lines of Regression.

Marks in Maths	25	28	30	32	35	36	38	39	42	45
Marks in Statistics	20	26	29	30	25	18	26	35	35	46

7.a) Derive the formula to find the variance of queue length.

b) In a colour T.V manufacturing plant, a loading unit takes exactly 10 minutes to load 2 T.V sets into a wagon and again comes back to the position to load another set of T.V If the arrival rate is 2 T.V sets per 20 minutes. Calculate the average time of T.V sets in a stationary state.

8. A professor has three pet questions, one of which occurs on every test he gives. He never uses the same question twice in successive examinations. If he used the question no1, he tosses a coin and uses the question no 2 if head appears. If he uses the question no 2, he tosses two coins and use the question no 3, if both are heads. If he uses the question no 3, he tosses three coins and use the question no 1, if all are heads. In long run which question does he use most often and with how much frequency is it used.

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