Code No: 53014 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, February/March - 2016
PROBABILITY AND STATISTICS
(Common to ME, CSE, AME, MIE, MSNT)

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

Answer any five questions
All questions carry equal marks
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1.a) The Probabilities that students A,B,C and D solve a problem are $\frac{1}{3},\frac{2}{5},\frac{1}{5}$ *and* $\frac{1}{4}$ respectively. If all of them try to solve the problem, What is the probability that the problem is solved.

b) If $f(x)=Ke^{-|x|}$ is p. d.f in $-\infty \le x \le \infty$, find:
i) K ii) the mean iii) Variance. [8+7]

2.a) Suppose 300 misprints are distributed randomly throughout a book of 500 pages. find the probability that a given page contains:
i) Exactly 2 misprints
ii) 2 or more misprints.

b) The marks obtained by 1000 students are normally distributed with mean 78 % and Standard deviation 11%. Determine:
i) How many get more than 90%
ii) How many students get between 75% and 95%. [8+7]

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) A sample of 121 students is found to have a mean weight of 68 kgs. Can this be regarded as a sample from a population with mean weight 75 kgs. and standard deviation 31 kgs? [7+8]

4.a) In a random sample of 400 industrial accidents, it was found that 231 were due to unsafe working conditions Find:
i) The maximum error
ii) Construct 95% confidence interval for the proportion.

b) 400 articles from a factory are examined and 3% are found to be defective. 600 similar articles from a second factory are found to be 2% defective. Test the significance between the difference of two proportions at 5% level. [7+8]

5. A survey of 320 families with 5 children each revealed the following distribution. Is this, result with the hypothesis that male births are equally probable? [15]

No. of boys	0	1	2	3	4	5
No. of families	12	40	88	110	56	14

6.a) From the following data Calculate:
i) Coefficient of Correlation
ii) Standard deviation of y

$b_{xy} = \frac{9}{20}, b_{yx} = \frac{4}{5}, \sigma_x = 3$

b) Calculate the coefficient of rank correlation: [8+7]

x	68	64	75	50	64	80	75	40	55	64
y	62	58	68	45	81	60	68	48	50	70

7.a) Define the terms:
i) Expected queue length ii) Waiting time
iii) Busy period iv) Mean arrival rate.

b) Weavers in a textile mill arrive at a departmental store room to obtain spare parts needed for keeping the rooms running. The store is manned by one attendant. The average arrival rate of weavers is 10 per hour and the service rate is 12 per hour. Determine:
i) Average length of waiting line.
ii) Average time a machine spends in the system. [8+7]

8.a) Define:
i) essential state ii) Periodic state iii) ergodic state

b) A training process is considered as a two state marcov chain. If it rains considered as 0, if not 1. The transition probability matrix of the marcov chain is $P = \begin{bmatrix} 0.3 & 0.7 \\ 0.5 & 0.5 \end{bmatrix}$, Find the probability that it will rain after three days, given the initial probabilities as 0.2 and 0.8. [8+7]

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$2+52$