

R09
Code: 9ABS304

B.Tech II Year II Semester (R09) Supplementary Examinations December/January 2015/2016

PROBABILITY & STATISTICS

(Common to CE, ME, CSS & IT)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) A fair coin is tossed 5 times. What is the probability of having at least one head?
(b) In a team of communication engineers, 80% know probability theory, 75% know information theory and 70% know both probability theory and information theory. Calculate the percentage of engineers who know neither probability theory nor information theory.

- 2 The cumulative distribution function for a continuous random variable x

$$F(x) = \begin{cases} 1 - e^{-2x} & x \geq 0 \\ 0 & x < 0 \end{cases}$$

 Find the density function $f(x)$.

- 3 Five dice were thrown together 96 times. The number of times 4, 5, 6 was actually thrown is given below. Calculate the expected frequencies.

No. of dice	0	1	2	3	4	5
Frequencies	1	10	24	35	18	8

- 4 A random sample of size 25 from a normal population has the mean $\bar{x} = 47.5$ and the standard deviation $s = 8.4$. Does this information tend to support or refuse the claim that mean of the population is $\mu = 42.1$?
- 5 (a) Define unbiased estimator. What is the more efficient unbiased estimator? Explain briefly.
(b) Show that $\bar{x}$ is an unbiased estimator of the population mean μ .
- 6 (a) In a city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers?
(b) A sample of 400 items is taken from a population whose S.D. is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38? Also calculate 95% confidence interval for the population.

- 7 Scores obtained in a shooting competition by 10 soldiers before and after intensive training are given below:

Before	67	24	57	55	63	54	56	68	33	43
After	70	38	58	58	56	67	68	75	42	38

Test whether the intensive training is useful at 0.05 level of significance.

- 8 (a) What is the probability distribution of time spent in the $(M/M/1) : (\infty/\text{FIFO})$ queuing system
(b) What is the probability distribution density function of the waiting time distribution for $(M/M/1) : (\infty/\text{FIFO})$ queuing system?
