

Code: 9ABS304

R09

B.Tech II Year I Semester (R09) Supplementary Examinations June 2016

PROBABILITY & STATISTICS

(Common to MCT & CSE)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

- 1 (a) The probability that certain electronic component fails when first used is 0.10. If it does not fail immediately, the probability that it lasts for one year is 0.99. What is the probability that a new component will last for one year?
- (b) Three groups A, B, C are contesting for positions on the Board of Directors of a company. The probabilities of their winning are 0.5, 0.3, 0.2 respectively. If the group A wins, the probability of introducing a new product is 0.7 and the corresponding probabilities for group B and C are of 0.6 and 0.5 respectively. Find the probability that the new product will be introduced.

- 2 A continuous random variable X is defined by:

$$f(x) = \frac{(3+x)^2}{16} \text{ if } -3 \leq x < -1$$

$$= \frac{(16-2x^2)}{16} \text{ if } -1 \leq x < 1$$

$$= \frac{(3-x)^2}{16} \text{ if } 1 \leq x \leq 3 = 0 \text{ else where}$$

Verify that f(x) is a density function and find also the mean of x.

- 3 Find the mean and the variance of the uniform probability distribution given by:

$$f(x) = \frac{1}{n} \text{ for } x = 1, 2, \dots, n$$

- 4 Find the mean and s.d of sampling distribution of variances (S.D.V) for the population 2, 3, 4, 5 by drawing samples of size two:

- (a) With replacement.
- (b) Without replacement

- 5 (a) Define estimate, estimator and estimation.
- (b) How many ways the estimation can be done and what are they? Explain in detail.

- 6 (a) During a country wide investigation the incidence of tuberculosis was found to be 1%. In a college of 400 strength 5 reported to be affected whereas in another 1200 strength 10 were affected. (i) Does this indicate any significant difference. (ii) If the population proportion of the tuberculosis is not known test whether the difference is significant.

- (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?

- 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) Explain about Poisson distribution in the queuing system.
- (b) Explain about Exponential distribution in the queuing system.
