

Code: 9ABS304

R09

B.Tech II Year II Semester (R09) Supplementary Examinations May/June 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 The probabilities of A, B, C to become M.D's of a factory are $\frac{5}{10}, \frac{3}{10}, \frac{2}{10}$. The probabilities that bonus scheme will be introduced if they become M.D's are 0.02, 0.03 and 0.04. Find the probabilities that A, B, C to become M.D's if bonus schemes introduced.
- 2 A random variable x has the density function:

$$f(x) = K \cdot \frac{1}{1+x^2}, \text{ if } -\infty < x < \infty$$

$$= 0, \text{ other wise}$$
 Determine K and the distributive function.
- 3 A student takes a true or false examination consisting of 8 questions. He guesses each answer. The guesses are made at random. Find the smallest value of n that the probability of guessing at least n correct answers is less than $\frac{1}{2}$.
- 4 A population consists of five numbers 2, 3, 6, 8 and 11, consider all possible samples of size two which can be drawn without replacement from the population. Find:
 - (a) The mean of the population.
 - (b) Standard deviation of the population.
 - (c) The mean of the sampling distribution of means.
- 5
 - (a) Explain maximum error of estimation and give its relation?
 - (b) 10 bearings made by certain process have a mean diameter of 0.5060 cm with S.D. of 0.0040 cm. Assuming that the data may be taken as a random sample from a normal distribution, construct a 95% confidence interval for the actual average diameter of the bearings?
- 6
 - (a) 20 people were attacked by a disease and only 18 survived. Will you reject the hypothesis that the survival rate if attacked by this disease is 85% in favour of the hypothesis that is more at 5% level?
 - (b) A sample of 64 students has a mean weight of 70 kgs. Can this be regarded as a sample from a population with mean weight 56 kgs and S.D. 25 kgs?
- 7
 - (a) Write the properties of t – distribution.
 - (b) 8 students were given a test in Statistics and after one month coaching they were given another test of similar nature. The following table gives the increase of their marks in the second test over the first.

Students No.	1	2	3	4	5	6	7	8
Increase of Marks	4	-2	6	-8	12	5	-7	2

 Do the marks indicate that the students have gained from the coaching?
- 8 A fast food restaurant has one drive-in window. It is estimated that cars arrive according to a Poisson distribution at the rate of 2 every 5 min. and that there is enough space to accommodate a line of 10 cars. Other arriving cars can wait outside this space, if necessary. It takes 15 min. on the average to fill an order, but the service time actually varies according to an exponential distribution. Determine the following:
 - (a) The probability that the facility is idle.
 - (b) The expected number of customers waiting to be served?