

**R09**

Code: 9ABS304

B.Tech II Year I Semester (R09) Supplementary Examinations December 2015

**PROBABILITY & STATISTICS**

(Common to CSE &amp; MCT)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

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- 1 A person writes letters to six friends and addresses the corresponding envelopes. What is the probability that the letter be placed in the envelopes so that:
  - (a) At least two of them are in the wrong envelopes.
  - (b) All the letters in the wrong envelopes.
- 2 If the probability density of a random variable is given by  $f(x) = K(1-x^2)$  for,  $0 < x < 1 = 0$  elsewhere. Find the value of K and the probabilities that a random variable will take a value:
  - (a) Between .1 and .2.
  - (b) Greater than .5.
- 3 If X is the number appearing on a die when it is thrown, show that the Chebyshev's theorem gives  $P(|X - \mu| > 2.5) < 0.47$ . While the actual probability is zero.
- 4 Find  $P(\bar{x} > 66.75)$  if a random sample of size 36 is drawn from an infinite population with mean  $\mu = 63$  and s.d  $\sigma = 9$ .
- 5 (a) Define unbiased estimator. What is more efficient unbiased estimator? Explain briefly.  
(b) Show that  $\bar{x}$  is an unbiased estimator of the population mean  $\mu$ .
- 6 (a) Write a note on one tailed test and two tailed test?  
(b) The mean life time of a sample of 100 light tubes produced by a company is found to be 1560 hours with a population S.D. of 90 hours. Test the hypothesis for  $\alpha = 0.05$  that the mean life time of the light tubes produced by the company is 1580 hours.
- 7 Fit a Poisson distribution to the following data and test the goodness of the fit at  $\alpha = 0.05$  level of significance.
- 8 (a) Write about (M/M/1) : ( $\infty$ /FIFO) Queuing system.  
(b) Derive the formula for the probability distribution density function of the waiting time distribution.

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