

Code: R7220101

B.Tech II Year II Semester (R07) Supplementary Examinations December/January 2015/2016

PROBABILITY & STATISTICS

(Common to CE & ME)

(For 2008 Regular admitted batch only)

Time: 3 hours

Max. Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 (a) State and prove the Baye's theorem of probability.
(b) Three groups of children contain respectively 3 girls and 1 boy; 2 girls and 2 boys; and 1 girl and 3 boys. One child is selected at random from each group. What is the probability that the three children selected consists of 1 girl and 2 boys?
- 2 If $f(x) = ke^{-x}$ is probability density function, find (i) k. (ii) Variance.
- 3 (a) It has been claimed that in 60% of all solar-heat installations the utility bill is reduced by at least one-third. Accordingly, what are the probabilities that the utility bill will be reduced by at least one-third in (i) four of five installations (ii) at least four of five installations?
(b) In a photographic process, the developing time of prints may be looked upon as a random variable having normal distribution with mean of 16.28 seconds and a standard deviation of 0.12 seconds. Find the probability that it will take (i) anywhere from 16.00 to 16.50 seconds, (ii) at least 16.20 seconds, (iii) at most 16.35 seconds, to develop one of the prints.
- 4 A population consists of observations 2, 3, 6, 8 and 11. List out all possible samples of size 2 without replacement. Construct the sampling distribution (i) about mean (ii) about variance. And also show that mean of sample means is equal to the population mean.
- 5 Explain estimation, point estimation and interval estimation.
- 6 (a) Explain the procedure of null hypothesis.
(b) Write about type-I and type-II error.
- 7 (a) To compare the two kinds of bumper guards, 6 of each kind were mounted on a certain kind of compact car. Then each car was run into a concrete wall at 5 miles per hour and the following are the cost of the repairs
Bumper guard 1: 107 148 123 165 102 119
Bumper guard 2: 134 115 112 151 133 129
Use the 0.01 level of significance to test whether the difference between the means of these two samples is significant.
(b) Suppose that during 400 five minute intervals the air traffic control of an airport received 0, 1, 2, --- 13 radio messages with respective frequencies of 3, 15, 47, 76, 68, 74, 46, 39, 15, 9, 5, 2, 0 and 1. Use chi-square test to test the goodness of fit at 0.05 level of significance.
- 8 (a) Write characteristics of $(m/m/1): (\infty/FIFO)$ model.
(b) What is queuing problem?