

R09**Code No: F3104****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****MCA I Semester Examinations, August - 2017****PROBABILITY AND STATISTICS****Time: 3hrs****Max.Marks:60**

Answer any five questions
All questions carry equal marks

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- 1.a) State and prove Baye's theorem.
b) If a ticket is drawn from a box containing 10 tickets numbered 1 to 10 inclusive, find the probability that the number X drawn is i) less than 4 ii) even number iii) prime number. [6+6]
- 2.a) Let $f(x) = 3x^2$, when $0 \leq x \leq 1$ be the probability density function of a continuous random variable X . Determine a and b such that:
i) $P(X \leq a) = P(X > a)$ ii) $P(X > b) = 0.05$.
b) If a bank receives on the average of 3 bad cheques per day. What is the probability that it will receive i) 4 bad cheques per day ii) 8 bad cheques. Over any three consecutive days. [6+6]
- 3.a) A manufacturer of pins knows that 2% of his product is defective. If he sells pins in boxes of 100 and guarantees that not more than 4 pins will be defective. What is the probability that a box will fail to meet the guaranteed quality?
b) Derive variance for the normal distribution. [6+6]
- 4.a) The mean voltage of a battery is 15 and standard deviation 0.2. Find the probability that four such batteries connected in series will have a combined voltage of 60.8 or more volts.
b) Construct sampling distribution of means for the population 3, 7, 11, 15 by drawing samples of size two with replacement. Determine:
i) Population mean
ii) Population standard deviation
iii) Sampling distribution of means
iv) $\mu_{\bar{x}}$
v) $\sigma_{\bar{x}}$. [6+6]
- 5.a) Why are interval estimates in most cases more useful than point estimates?
b) A biased coin was thrown 400 times and head resulted 240 times. Find the standard error of the observed proportion of heads and deduce that the probability of getting a head in a single throw of the coin lies almost certainly between 0.53 and 0.67. [6+6]

- 6.a) Discuss various types of alternative hypothesis with suitable example.
- b) The owner of a machine shop must decide which of two snack vending machines to install in his shop. If each is tested 250 times, the first machine fails to work 13 times and the second machine fails to work 7 times. Test at the 0.05 level of significance whether the difference between the corresponding sample proportions is significant. [6+6]
- 7.a) In 1950 in India the mean life expectancy was 50 years. If the life expectancies from a random sample of 11 persons are 58.2, 56.6, 54.2, 50.4, 44.2, 61.9, 57.5, 53.4, 49.7, 55.4, 57.0. Does it confirm the expected view?
- b) Explain why the larger variance is placed in the numerator of the statistic F. Discuss the application of F-test in testing if two variances are homogenous. [6+6]
- 8.a) The tangent of the angle between two regression lines is 0.6 and if $\sigma_x = (\frac{1}{2}) \sigma_y$, Find the correlation coefficient between x and y.
- b) Find the line of regression for the following marks obtained by 12 students in Mathematics and Statistics. [6+6]

Mathematics	78	56	36	66	25	75	82	62
Statistics	84	44	57	58	60	68	62	58

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