

Code No: 154SE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, November/December - 2020

COMPUTER ORIENTED STATISTICAL METHODS

(Computer Science and Engineering)

Time: 2 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Three light bulbs are chosen at random from 12 bulbs of which 5 are defective. Find the probability that
 i) All are defective ii) One is defective
 b) A box I contains 7 red balls, 3 black and 5 white balls. Box II contains 9 red, 2 black and 4 white balls, Box III contains 10 red, 5 black balls and 5 white balls. A box is chosen at random and a ball is drawn from it, what is the probability that it is:
 i) Red ii) Black iii) White. [7+8]
- 2.a) Three students are in a swimming race. A and B have the same probability of winning and each is twice as likely to win as C. Find the probability that
 i) B wins ii) C wins iii) B or C wins.
 b) Three machines I, II and III produce 25%, 35% and 40% of the total number of items produced by the factory. The percentage of defective items produced by these machines are respectively 6%, 5% and 4%. An item is selected at random and found to be defective. Find the probability that it is from
 i) Machine-I ii) Machine-II iii) Machine-III. [7+8]
3. If $f(x) = K e^{-|x|}$ is p.d.f of a random variable in $-\infty \leq x \leq \infty$, find:
 a) K b) the mean c) Variance. [5+5+5]
4. A continuous Random variable has the p.d.f $f(x) = \begin{cases} e^{-x}; & \text{if } x \geq 0 \\ 0; & \text{otherwise} \end{cases}$
 Determine: a) $P(0 \leq x \leq 2)$ b) The mean c) Variance. [5+5+5]
- 5.a) The following values gives the lengths of 12 samples of Egyptian cotton taken from a consignment 48, 46, 49, 46, 52, 45, 47, 47, 46, 46, 45 and 50. Test whether the sample had been taken from a population whose average length is 50 at 0.05 level of significance.
 b) Suppose the weights of 1000 male students are normally distributed with mean $\mu = 80$ with a standard deviation of 10. Find the number of students whose weights are
 i) Between 90 and 100 ii) More than 105. [8+7]
6. The following figures refer to the observations in independent samples.
 Sample-I 25 30 28 34 24 20 13 32 22 38
 Sample-II 40 34 22 20 31 40 30 23 36 17
 Analyze whether the samples have been drawn from the same population. [15]

- 7.a) A Random sample of 1500 items is taken from a population whose standard deviation is 45. The mean of the sample is 102. Construct 95% confidence interval for the mean.
- b) The owner of a machine must decide which of two snack vending machines to install in the shop. If each machine is tested 250 times, the first machine fails to work 13 times and the second machine fails to work 7 times. Test the significance between the difference of two proportions at 5% level. [7+8]

8. If the transition probability matrix of market shares of three brands A, B and C is

$$\begin{bmatrix} 0.4 & 0.3 & 0.3 \\ 0.8 & 0.1 & 0.1 \\ 0.35 & 0.25 & 0.4 \end{bmatrix}$$

and the initial market shares are respective 50%, 25% and 25%.

Find:

- a) The market shares in second and third periods
- b) The limiting probabilities. [8+7]

---ooOoo---