

Code No: 861AD
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I Semester Examinations, October/ November - 2020
COMPUTER ORIENTED STATISTICAL METHODS
Time: 2 Hours
Max.Marks:75

Answer any five questions
All questions carry equal marks

- 1.a) A random variable X has the following probability function.

x	0	1	2	3	4	5	6	7
f(x)	k	k	k	2k	3k	k ²	2k ²	7k ² + k

Determine

- (i) k
 - (ii) Evaluate $p(x < 6)$, $p(x \geq 6)$ and $p(0 < x < 5)$
 - (iii) Mean and Variance
- b) In a poker hand consisting of 5 cards, find the probability of holding 2 aces and 3 jacks. [10+5]

- 2.a) In a certain assembly plant, three machines, B_1 , B_2 , and B_3 , make 30%, 45%, and 25%, respectively, of the products. It is known from past experience that 2%, 3% and 2% of the products made by each machine, respectively, are defective. Now, suppose that a finished product is randomly selected. What is the probability that it is defective? If it is defective find the probability that it is from

 i) B_1 ii) B_2 iii) B_3

- b) State and prove Bayes theorem. [10+5]

3. Two ball point pens are selected at random from a box that contains 3 blue pens, 2 red pens, and 3 green pens. If X is the number of blue pens selected and Y is the number of red pens selected, find

- a) The joint probability function $f(x, y)$,
- b) $P[(X, Y) \in A]$, where A is the region $\{(x, y) | x + y \leq 1\}$.
- c) The covariance of X and Y.

[15]

4. Fit the binomial distribution

[15]

x	0	1	2	3	4	5
f	2	14	20	34	22	8

- 5.a) If X is a normal variate with mean 30 and standard deviation of 5. Find the probabilities that
- $26 \leq X \leq 40$,
 - $X \geq 45$,
 - $X \leq 22$.
- b) Find
- $P(t < 2.365)$ when $\nu = 7$ degrees of freedom
 - $P(t > 1.318)$ when $\nu = 24$ degrees of freedom
 - $P(-1.356 < t < 2.179)$ when $\nu = 12$ degrees of freedom. [8+7]

6. An experiment was performed to compare the abrasive wear of two different laminated materials. Twelve pieces of material 1 were tested by exposing each piece to a machine measuring wear. Ten pieces of material 2 were similarly tested. In each case, the depth of wear was observed. The samples of material 1 gave an average wear of 85 units with a sample standard deviation of 4, while the samples of material 2 gave an average of 81 with a sample standard deviation of 5. In testing for the difference in the abrasive wear of the two materials, we assumed that the two unknown population variances were equal. Were we justified in making this assumption? Use a 0.10 level of significance. [15]

7. A pair of dice are through 360 times and the frequency of each sum is indicated below

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	8	24	35	37	44	65	51	42	26	14	14

Would you say that the dice are fair on the basis of the chi-square test at 0.05 level of significance? [15]

8. Calculate the linear regression of Y on X from the data given below. Taking deviation from actual means of X and Y . Estimate the likely demand when price is Rs. 20. [15]

X	10	12	13	14	16	15
Y	40	38	43	45	37	43

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