R19

Code No: 861AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I Semester Examinations, May - 2022
COMPUTER ORIENTED STATISTICAL METHODS

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks
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1.a) In a bolt factory machines A, B, C manufacture 20%, 30% and 50% of the total of their output and 6%, 3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured form (i) Machine A (ii) Machine B (iii) Machine C.

b) The daily consumption of electric power (in millions of kw-hours) is a random variable having the probability density function $f(x)=\begin{cases}\frac{1}{2}xe^{-x/3}, & x>0\\ 0, & x<0\end{cases}$

If the total production is 12 million kw-hours, determine the probability that there is power cut (shortage) on any given day. [5+10]

2.a) A random variable x has the following probability distribution.

$X = x$	1	2	3	4	5	6	7	8
$P(X = x)$	k	$2k$	$3k$	$4k$	$5k$	$6k$	$7k$	$8k$

Find the value of
$i)k$ ii) $p(x\leq 2)$ iii) $p(2\leq x\leq 5)$.

b) Find the constant K such that $f(x)=\begin{cases}Kx^2, & \text{if } 0<x<3\\ 0, & \text{otherwise}\end{cases}$ is probability density function. Also find mean of X. [5+10]

3.a) If two cards are drawn from a pack of 52 cards which are diamonds, using Poisson distribution, find the probability of getting two diamonds at least 3 times in 51 consecutive trials of two cards drawing each time.

b) Out of 800 families with 5 children each, how many would you expect to have i) 3 boys ii) 5 girls iii) either 2 or 3 boys? Assume equal probabilities for boys and girls.

c) If X is a Poisson Variate such that $3p(x=4)=\frac{1}{2}p(x=2)+p(x=0)$, find i) mean of x ii) $p(x\leq 2)$ [5+6+4]

4.a) Fit a Poisson distribution to the following data:

x	0	1	2	3	4	5	6	7
f	305	365	210	80	28	9	2	1

b) The probability that an entering student will graduate is 0.4. Determine the probability that out of 5 students i) one will graduate ii) at least one will graduate. [10+5]

5.a) Prove that mean, median and mode of a Normal distribution are equal.

b) If X is a normal variate with mean 30 and standard deviation 5. Find the probabilities that i) $26 \leq x \leq 40$ ii) $x \geq 45$. [10+5]

6.a) Population consists of five numbers 2,3, 6, 8 and 11. Consider all possible samples with replacement from this population.
Find
i) The mean of population
ii) The standard deviation of population.
iii) The mean of sampling distribution of means.
iv) The standard deviation of sampling distribution of means.

b) A sample of size 300 was taken whose variance is 225 and mean 54. Construct 95% confidence interval limits for the mean μ. [9+6]

7.a) Write a short notes on Type-I and Type-II errors

b) A random sample of size 81 was taken whose variance is 20.25 and mean is 32. Find the maximum error and construct 98% confidence interval.

c) A sample of size 300 was taken whose variance is 225 and mean 54. Construct 95% confidence interval limits for the mean μ. [5+5+5]

8.a) The two regression equations of the variables x and y are $x = 19.13 - 0.87y$ and $y = 11.64 - 0.50x$ find i) mean of $x's$ ii) mean of y's iii) correlation coefficient between x and y

b) Calculate the regression equations of y on x from the data given below, taking deviations from actual mean of x and y

x	10	12	13	12	16	15
y	40	38	43	45	37	43

Estimate the value of y when $x = 20$. [7+8]

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