R09

Code No: 54001

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, March/April – 2021
PROBABILITY AND STATISTICS
(Common to CE, IT)

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

Answer any five questions
All questions carry equal marks
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1. Three machines I, II and III produce 20%, 30% and 50% of the total number of items a factory. The percentage of defective items by these machines is respectively produced in 6%, 2% and 5%. If an item is selected at random and found to be defective, then find the probability that it is from
a) Machine- I   b) Machine-II   c) Machine-III. [15]

2.a) The probabilities of a Poisson variate "X" taking the values 1 and 2 are equal. Find:
i) μ(mean)   ii) $P(X \geq 1)$ iii) $P(1 < X < 4)$

b) Suppose the weights of 1000 male students are normally distributed with mean μ =80 kgs with a standard deviation of 10 kgs. Find the number of students whose weights are
i) Between 90 and 100 kgs
ii) More than 105 kgs. [8+7]

3.a) A sample of 900 items of circular rings has radius with mean 3.4 cms and S.D 2.61 cms. Is this sample has been taken from a large population of mean 3.25 cms and S.D 2.61 cms.

b) The average income of 100 people of a city is Rs.210 with a standard deviation of Rs. 10. For another sample of 150 persons the average income was Rs.220 with a standard deviation of Rs.12 Test the significance between the differences of two means at 5% level. [7+8]

4.a) In a large consignment of a random sample of 64 oranges revealed that oranges were bad. Is it reasonable to ensure that 20% of the oranges are bad?

b) In a sample of 500 students 15 use ball pen and in another sample of 800 students 80 use ball pens. Test the significance between the differences of two proportions at 5% level. [8+7]

5. Given below is the number of male births in 1000 families with 5 children in each family. Is this result supports the hypothesis that male and female births are equally probable? [15]

No. of boys	0	1	2	3	4	5
No. of families	40	300	250	200	30	180

6. Calculate the coefficient of correlation and the two lines of regression between the two variables x and y. [15]

x	65	66	67	67	68	69	70	72
y	67	68	65	68	72	72	69	71

7. Workers come to a tool store room to enquire about special tools. The average time between two arrivals is 90 seconds and the arrivals are assumed to be in Poisson distribution. The average service time is 50 seconds. Determine
a) Average queue length
b) Average length of non empty queue
c) Mean waiting time of an arrival. [5+5+5]

8. There are three stores of groceries. There will be a shift from one to another. A study was made on January first and it was found that $\frac{1}{4}$ was shopped at store A, $\frac{1}{3}$ at B and $\frac{5}{12}$ at C. Every month store A retain 90% of their customers and 10% transformed to store B. store B retain 5% of their customers and 85% transformed to store A and store C. Store C retain 40% of their customers and 50% transformed to store A and 10% to store B.
a) What proportion of customers retain by Feb 1^{st} and March 1^{st}
b) Find the long run proportions. [7+8]

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