

[Total No. of Questions: 09]

Uni. Roll No.

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Program: B.Tech. (Batch 2018 onward)

Semester: 3

Name of Subject: Engg Maths III (Probability and Statistics)

Subject Code: BSEE-101

Paper ID: 16062

Scientific calculator is Allowed

Detail of allowed tables - Tables for t-test, z-test, chi square test, normal table

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

Part – A

[Marks: 02 each]

Q1.

- a) State the difference between Mutually Exclusive and Exhaustive events.
- b) Arithmetic mean and standard deviation of Binomial distribution are 4 and $\sqrt{\frac{8}{3}}$ respectively. Find the values of p and q.
- c) Find the area between $Z=-0.45$ and $Z=2.5$.
- d) What is Rank correlation?
- e) The probability of defective bolt is 3%. Find mean and standard deviation in the total of 50 packets?
- f) Obtain correlation coefficient, when two regression coefficients b_{yx} and b_{xy} are given to be 0.697 and 0.904 respectively.

Part – B

[Marks: 04 each]

- Q2. A problem of statistics is given to two students A and B whose chances of solving it independently are 1/2 and 1/3 respectively. What is the probability that only one of them will solve the problem?

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Q3. 2 % of the items made by a machine are defective. Find the probability using Poisson that 3 or more items are defective in a sample of 100 items. (Given $e^{-1} = 0.368$, $e^{-2} = 0.135$, $e^{-3} = 0.0498$)

Q4. In a sample of 1000 workers, the mean weight is 45 kg and S.D. is 15 kg. Assuming the distribution to be normal, find the number of workers weighing between 40 and 60 kg?

Q5. Find the coefficient of skewness for the data:

X	0	1	2	3	4	5	6
F	7	10	16	25	18	11	8

Q6. The number of automobiles accidents per week in a certain city were as follows: 12,8,20,2,14,10,15,6,9,4. Are these frequencies in agreement with the belief that number of accidents were the same during these 10 week period?

Given that χ^2 (5% significance level, d. f. 9) = 16.

Q7. Following information is available in respect of two brands of bulbs:

	Brand A	Brand B
Mean Life (in hrs.)	1300	1248
S.D. (in hrs.)	82	93
Sample Size	100	100

Which Brand should be preferred? (Given z at 5% level of significance = 1.645)

Part – C

[Marks: 12 each]

Q8. A company produce certain type of sophisticated item by three machines. The respective daily production figures are: Machine A 300 units, Machine B 450 units and Machine C 250 units. Defective percentage of each machine is 0.1%, 0.2% and 0.7% respectively. An item is drawn at random from a days production and is found to be defective. What is the probability that it is not produced by machine A or B.

OR

The following table gives the joint distribution of x and y

x \ y	2	3	7	Total
1	.10	.25	.05	.40
3	.30	.15	.15	.60
Total	.40	.40	.20	1

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- (a) Show the marginal distribution of x and y.
- (b) Show the conditional distribution of y, given x = 3.
- (c) Find the probabilities $P(x < y)$, $P(2x + y \geq 9)$.

Q9. Calculate the Karl Pearson coefficient of correlation from the following data:

X	10	12	18	16	15	19	18	17
Y	30	35	45	44	42	48	47	46

Hence Discuss the type of correlation .

OR

Fit the second order parabola to the data:

X	7.5	10.0	12.5	15.0	17.5	20.0	22.5
Y	1.9	4.5	10.1	17.6	27.8	40.8	56.9
