

Code: 17FBS101

MCA I Semester Supplementary Examinations May/June 2019

PROBABILITY & STATISTICS

(For students admitted in 2017 & 2018 only)

Time: 3 hours

Max. Marks: 60

Answer all the questions

- 1 (a) The mean and variance of a binomial distribution are 4 and $4/3$ respectively. Find $P(X \geq 1)$.
(b) If the variance of a Poisson variate is 3, then find the probability that:
(i) $x = 0$. (ii) $0 < x \leq 3$. (iii) $1 \leq x < 4$.

OR

- 2 (a) Find the probability of getting a sum of 10 if we throw two dice.
(b) A bag A contains 2 white and 3 red balls and a bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball drawn is from bag B.
- 3 In a random sample of 60 workers, the average time taken by them to get to work is 33.8 minutes with a standard deviation of 6.1 minutes. Can we reject the null hypothesis $\mu = 32.6$ minutes in favor of alternative null hypothesis $\mu > 32.6$ and $\alpha = 0.025$ level of significance.

OR

- 4 A random sample of size 25 from a normal population has the mean $\bar{x} = 47.5$ and standard deviation $s = 8.4$. Does the information tend to support or refute the claim the mean of population is $\mu = 42.5$?
- 5 A tea company appoints four salesmen A, B, C and D and observe their sales in three seasons- summer, winter and monsoon. The figures (in lakhs) are given in the below table.

Seasons	Sales men				Seasons total
	A	B	C	D	
Summer	36	36	21	35	128
Winter	28	29	31	32	120
Monsoon	26	28	29	29	112
Sales totals	90	93	81	96	360

- (i) DO the salesmen significantly differ in performance?
(ii) Is there significant difference between the seasons?

OR

- 6 To assess the significance of possible variation in performance in a certain test between the convent schools of a city, a common test was given to a number of students taken at random from fifth class of each of the four schools concerned. The results are given below. Make analysis of variance of data.

Schools			
A	B	C	D
8	12	18	13
10	11	12	9
12	9	16	12
8	14	6	16
7	4	8	15

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- 7 In a glass factory the task of quality control was done with the help of means (\bar{X}) and standard deviation (σ) charts. 18 samples of 10 items each were chosen and $\sum X$ and $\sum \sigma$ were found to be 595.8 and 8.28 respectively. Determine 3σ limits for mean and standard deviation charts. You may use the following control factors for your calculation.

N	A1	B2	B4
10	1.03	0.28	1.72

OR

- 8 Construct a control chart for the proportion of defectives obtained in repeated random samples of size 100 from a process which is considered to be under control when the proportion of defective p is equal to 0.20. Draw the control line and the upper and lower control limits.
- 9 Calculate the coefficient of correlation between X and Y .

X	1	2	3	4	5	6	7	8	9
Y	12	11	13	15	14	17	16	19	18

OR

- 10 Determine the equation of a straight line which best fits the data.

X	10	12	13	16	17	20	25
Y	10	22	24	27	29	33	37

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