

NOVEMBER/DECEMBER 2019

MCM14 — ADVANCED BUSINESS
STATISTICS

Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) Explain multiple Regression Analysis? What are its objectives?

Or

- (b) If $r_{12} = 0.77$, $r_{13} = 0.72$ and $r_{23} = 0.52$, Find the Partial correlation co-efficient $r_{12.3}$ and multiple correlation co-efficient $R_{1.23}$.

2. (a) State the properties of Binomial distribution. What are its importance?

Or

- (b) 1,000 light bulbs with a Mean life of 120 days are installed in new factory their length of life is normally distributed with standard deviation 20 days.

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- (i) How many bulbs will expire in less than 90 days.
- (ii) If H is decided to replace all the bulbs together, what intervals should be allowed between replacement if not more than 10 percent should expire before replacement?
3. (a) Discuss the procedure for testing of hypothesis.

Or

- (b) Given the following information relating to two place. A and B test whether there is any significant difference between their Mean wages.

	A	B
Mean Wages (Rs.)	47	49
Standard deviation (Rs.)	28	40
Number of Workers	1000	1500

4. (a) What is hypothesis testing? Explain the procedure of testing hypothesis.

Or

- (b) From the data given below about the treatment of 250 patients suffering from a disease, state whether the new treatment is superior to the conventional treatment.

- (b) From the following information find the value of $r_{23.2}$, $r_{13.2}$ and $r_{23.1}$, if $r_{12} = 0.8$, $r_{13} = 0.4$ and $r_{23} = 0.56$.
7. (a) The probability that a contractor will get a Plumbing contract is $\frac{2}{3}$ and the probability, that he will not get an electric contract is $\frac{5}{9}$ if the probability of getting at least one contract is $\frac{4}{5}$ what is the probability that he will get both the contracts?
- (b) The odds against students X solving a Business statistics problem are 8 to 6 and odds in favour of student Y solving the problem are 14 to 16.
- (i) What is the probability that the problem will be solved if they both try independently of each other?
- (ii) What is the probability that none of them is able to solve the problem?

8. In a random sample of 1,000 persons from town A 400 are found to be Consumers of Wheat. In a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B. So far as the proportion of wheat Consumers is concerned?
9. Given below is the contingency table for production in three shifts and the number of defective goods turn out. Find the value of C. is the possible that the number of defective goods depends on the shift run by the factor?

No. of defective goods in 3 weeks:

Shift	1 st Week	2 nd Week	3 rd Week	Total
I	15	5	20	40
II	20	10	20	50
III	25	15	20	60
Total	60	30	60	150

10. The following figures related to the number of units sold in five different areas by four salesmen.

Area	A	B	C	D
1	80	100	95	70
2	82	110	90	75
3	88	105	100	82
4	85	115	105	88
5	75	90	80	

Is there a significant difference in the efficiency of these salesmen?

The value of $F_{0.05}$ for $V_1=3$; $V_3=16$ is 3.24.

Treatment	No. of Patients		Total
	Favourable	Not Favourable	
New	140	30	170
Conventional	60	20	80
Total	200	50	250

(Given for degree of freedom =1, chi-square 5%=3.84)

5. (a) In a sample of 8 observation, the sum of the squared deviation of items from their mean was 94.5. In another sample of 10 observation, the value was found to be 101.7. Test whether the difference is significant at 5% level.

You are given that 5% level, critical value of F for $V_1 = 7$, and $V_2 = 9$ degree of freedom is 3.29 and for $V_1 = 8$ and $V_2 = 10$, degree of freedom its value is 3.07.

Or

- (b) Define Analysis of variance. What are the assumptions for ANOVA test?

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. (a) The sample correlation co-efficient between temperature (X_1); Corn yield (X_2) and rainfall (X_3) are $r_{12} = 0.59$, $r_{13} = 0.46$ and $r_{23} = 0.77$ calculate partial correlation co-efficient $r_{12.3}$ and multiple correlation co-efficient $R_{.23}$.