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63/2 (SEM-1) MCO 104

2021

(held in 2022)

COMMERCE

(Theory Paper)

Paper : MCO-104

(Business Statistics)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer :

$1 \times 8 = 8$

(a) If A is any even, then

(i) $P(A) < 1$

(ii) $0 \leq P(A) \leq 1$

(iii) $P(A) \geq 0$

(iv) $0 < P(A) < 1$

[Turn over

(b) If $P(A) = P(B)$, then two events A and B are

- (i) Independent
- (ii) Dependent
- (iii) Equally likely
- (iv) Both (i) and (iii)

(c) If only two variables are chosen to study correlation between them, then such correlation is called as

- (i) Simple correlation
- (ii) Multiple correlation
- (iii) Partial correlation
- (iv) Partial Regression correlation

(d) If the correlation coefficient between the two variables x and y is positive, then the regression coefficient of x and y is

- (i) Positive
- (ii) Negative
- (iii) Positive but less than 1
- (iv) Positive but more than 1

(e) Main tools of SQC are

- (i) Shewhart's charts
- (ii) Acceptance sampling plans
- (iii) Both (i) and (ii)
- (iv) None of the above

(f) Which of the following is the main limitation of range as a measure of Income Inequality.

- (i) It ignores the distribution in between the extremes
- (ii) It does not focus on overall distribution
- (iii) It ignores the main differences
- (iv) None of the above

(g) Formula of Standard Error (S.E) is

- (a) $S.E. (\bar{x}) = \frac{\sigma}{s}$
- (b) $S.E. (\bar{x}) = \frac{\sigma}{\sqrt{n}}$
- (c) $S.E. (\bar{x}) = \sqrt{\sigma + n^2}$
- (d) $S.E. (\bar{x}) = \sum \frac{1}{n} + \frac{1}{\sqrt{n}}$

- (h) A sample is considered to be large one if
- (i) > 30 (ii) < 30
 (iii) > 10 (iv) None of the above.

2. Answer the following briefly : $4 \times 4 = 16$

(a) Define any *four* of the following :

- (i) Random Experiment
 (ii) Trial © Event
 (iii) Equally likely Event
 (iv) Exhaustive Event
 (v) Mutually Exclusive.

(b) Write four differences between Correlation and Regression

(c) Mention four objectives of SQC

(d) Write a short note on statement of central limit theorem.

3. 3 coins are tossed simultaneously at random. Find the probability of getting

- (i) No Head
 (ii) Exactly one head

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- (iii) At least two heads
 (iv) All heads
 (v) All tails
 (vi) At least two tails.

Or

2 dice are rolled simultaneously. Find the probability of getting

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- (i) a doublet
 (ii) the sum of the numbers on the two dice is 8
 (iii) the sum of the number on the two dice is 9, but one of the dice must show 3
 (iv) sum of numbers on the two dice is at least 10
 (v) sum is neither 7 nor 11
 (vi) at least one of the dice must show 4.

4. Calculate Karl Pearson Correlation Coefficient from the data given below :

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X :	2	4	5	6	8	11
Y :	18	12	10	8	7	5

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Or

Define Regression Analysis and explain its different types. 14

5. You are given the values of sample mean ($\bar{x}$) and the range (R) for the ten samples of size 5 each. Draw mean and range charts and comments on the state of control of the process. 14

$\bar{x}$:	43	49	37	44	45	37	51	46	43	47
R :	5	6	5	7	7	4	8	6	4	6
Sample No.:	1	2	3	4	5	6	7	8	9	10

You may use the following control chart constants

For $n = 5$, $A_2 = 0.58$, $D_3 = 0$ and $D_4 = 2.115$

Or

Define Statistical Quality Control. What are the causes of variation in Quality? Explain the techniques of SQC. 2+4+8=14

6. (a) Write the conditions for applying χ^2 test. 4

- (b) In a remote village out of 120 people vaccine was administered to 76 people to control viral fever and the following results were obtained :

	Affected	Not affected
Vaccinated	24	52
Not-vaccinated	32	12

Calculate χ^2 and discuss the usefulness of vaccine in controlling viral fever.

(5% value of χ^2 for one degree of freedom = 3.84) 10

Or

Write a details note on types I and type II error in testing hypothesis with suitable example? 14