

D 144200

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Name.....

Reg. No.....

**SECOND SEMESTER INTEGRATED P.G. DEGREE (SUPPLEMENTARY/
IMPROVEMENT) EXAMINATION, APRIL 2026**

Allied Core Course

STA2IC02—REGRESSION ANALYSIS AND PROBABILITY THEORY

(2020 Admission onwards)

Time : Two Hours

Maximum : 60 Marks

Section A*Answer all questions.**Each question carries 2 marks.**Ceiling 20 marks.*

1. What is meant by correlation ?
2. State two applications of regression analysis.
3. Define a continuous random variable.
4. What is the classical definition of probability ?
5. Define intersection of two sets with an example.
6. What are mutually exhaustive events ?
7. State the addition theorem of probability for two events.
8. What is meant by the distribution function of a discrete random variable?
9. If X is a discrete random variable and $P(X = 1) = 0.2$, $P(X = 2) = 0.5$, $P(X = 3) = 0.3$, find $P(X > 1)$.
10. If two events A and B are independent, show that $P(A \cap B) = P(A)P(B)$.
11. Write down the properties of Spearman's rank correlation.
12. Define simple linear regression.

Turn over

13. Explain the methods used to study correlation. Give examples.
14. Define regression co-efficient. Derive the expression for regression co-efficient of Y on X.

Section B

*Answer all questions.
Each question carries 2 marks.
Ceiling 30 marks.*

15. If X and Y have the following values :

X : 3 6 8 10

Y : 2 4 5 7

Find the correlation co-efficient.

16. Define probability using set theory. Also give an example using Venn diagram.
17. Two cards are drawn from a pack of 52 cards. What is the probability that ?
- (a) Both are kings.
 - (b) One is king and one is queen.
 - (c) Both are red cards.
18. Let X be a discrete random variable with p.m.f :
- X : 0, 1, 2, 3
- P (X = x) : 0.3, 0.2, 0.4, 0.1
- Find the mean and variance of X.
19. Explain the difference between partial correlation and multiple correlation with an example.

Section C

Answer any **one** question.

The question carries 10 marks.

20. (i) Define random variable. Distinguish between discrete and continuous random variables.

(ii) A discrete random variable X has the following distribution:

$$X : 0, 1, 2, 3$$

$$P(X = x) : k, 2k, 3k, 4k.$$

(a) Find the value of k .

(b) Find the distribution function of X

(c) Find $P(X > 2)$.

21. (i) Define correlation co-efficient. State and prove any *two* properties.

(ii) Calculate the rank correlation for the following data :

X :	40	60	80	100	120
Y :	38	70	72	110	140

(1 × 10 = 10 marks)