C 6097 **(Pages : 2)** **Name.....**

Reg. No.....

SECOND SEMESTER INTEGRATED P.G. REGULAR DEGREE EXAMINATION, APRIL 2021 (FOR 2020 ADMISSIONS) AND APRIL 2022 (FOR 2021 ADMISSIONS)

M.Sc. Psychology

STA 2IC 02—REGRESSION ANALYSIS AND PROBABILITY THEORY

Time : Two Hours Maximum : 60 Marks

Use of calculator and Statistical table are permitted.

Part A (Short Answer Type Questions)

Each question carries 2 *marks.*
Maximum marks that can be scored from this part is 20.

1. Define Spearman's rank correlation co-efficient.
2. Distinguish between discrete and continuous random variables.
3. Write a short note on sample space.
4. Define probability mass function of discrete random variables.
5. What is meant bv linear regression ?
6. A random variable X has the following probability density function.

$$fx = \begin{cases} kx, 0 < x < 1 \\ 0, \text{otherwise} \end{cases}$$ Find k.

7. If A and B are independent events, with P(A) = 0.6 and P(B) = 0.3, find $P(A \cap B)$.
8. If $r_{12} = 0.65$, $r_{23} = 0.9$, $r_{31} = 0.6$ find $r_{12.3}$.
9. Explain axiomatic definition of probability.
10. Define disjoint set and universal set.
11. What are the properties of regression co-efficients ?
12. Define independence of two events.

Turn over

Part B (Short essay/Paragraph Type Questions)

Each question carries 5 *marks.*
Maximum marks that can be scored from this part is 30.

13. State the important properties of Karl Pearson's correlation co-efficient.

14. If two dice are thrown, what is the probability that the sum is :

    a) Greater than 8,

    b) Neither 7 nor 11.

15. Calculate Karl Pearson's co-efficient of correlation for the following heights of fathers (X) and their sons(Y) :

X	:	65	66	67	67	68	69	70	72
Y	:	67	68	65	68	72	72	69	71

16. Distinguish between partial correlation and multiple correlations.

17. Fit a regression line of Y on X for the following data :

X	:	1	2	3	4	5	6	7
Y	:	7	13	19	25	32	40	50

18. The following is the distribution function of a discrete random variable X :

X	:	– 3	– 1	0	1	2	3	5	8
F(x)	:	0.1	0.3	0.45	0.5	0.75	0.9	0.95	1

    i) Find the probability mass function of X.

    ii) Find P(X is even).

19. Define probability distribution function of a continuous random variable. Also state its properties.

Part C (Essay Type Questions)

Answer any **one** *question.*
The question carries 10 *marks.*
Maximum marks that can be scored from this part is 10.

20. Let X be a continuous random variable with pdf

$$f(x)=\begin{cases} kx, 0 \le x \le 1 \\ k, 1 \le x \le 2 \\ -kx+3k, 2 \le x \le 3 \\ 0, \text{elsewhere} \end{cases}$$

    a) Determine the constant k ;

    b) Compute P(X $\le$ 1.5)

21. a) Explain different approaches of theory of probability.

    b) State and prove addition theorem on probability.

(1 × 10 = 10 marks)