

C. 82460

(Pages: 2)

Name.....

Reg. No.....

SECOND SEMESTER B.A./B.Sc. DEGREE EXAMINATION, APRIL 2020

(CBCSS—UG)

Statistics

STA 2C 02—REGRESSION ANALYSIS AND PROBABILITY THEORY

(2019 Admissions)

Time : Two Hours

Maximum : 60 Marks

Section A

*Each question carries 2 marks.*

*Maximum marks that can be scored from this part is 20.*

1. Define Karl Pearson's correlation coefficient.
2. Distinguish between Positive and Negative correlation.
3. If sum of the product of the deviation of the variables X and Y from their means is zero, find the product moment correlation coefficient..
4. State any two properties of regression coefficients.
5. If  $COV(X, Y) = -30$  and the regression coefficient of Y on X is  $-0.3$ , find the variance of X.
6. Define partial and multiple correlations.
7. Define equally likely the mutually exclusive events.
8. Give classical definition of probability.
9. State addition theorem of probability for three events.
10. If X and Y are two independent event, then  $P(A/B) = \text{_____}$ .
11. Define random variable.
12. The p.m.f., of a random variable X if  $f(x) = kx$ ,  $x = 1, 2, 3, 4, 5$ . Find the value of k.

Section B

*Each question carries 5 marks.*

*Maximum marks that can be scored from this part is 30.*

13. What is meant by correlation ? Explain different methods of measuring correlation.
14. Explain the difference between correlation and regression analysis.
15. Explain frequency approach to probability. What are its merits over classical approach ?

Turn over

16. From the following data compute correlation between X and Y :

		X series	Y series
No. of items	...	15	15
Mean	...	25	18
Sum of squares of deviation from mean	...	136	138

and the sum of product of deviations of X and Y from their respective means is 122.

17. If  $r_{12} = 0.77$ ,  $r_{13} = 0.72$  and  $r_{23} = 0.52$ , find the partial correlation coefficient  $r_{12.3}$  and multiple correlation coefficient  $R_{1.23}$ .
18. A town has two doctors A and B operating independently. If the probability that doctor A is available is 0.9 and that for B is 0.8. What is the probability that at least one doctor is available when needed ?
19. A bag contains 10 balls, two of which are red, three blue and five black. Three balls are drawn at random from the bag. What is the probability that :
- Three balls are of different colours.
  - Two balls are of the same colour.

### Section C

Answer any one question and carries 10 marks.

20. A random variable X has the following probability mass function :

Values of X	...	-2	-1	0	1	2	3
Probability	...	0.1	$k$	0.2	$2k$	0.3	$k$

- Find the value of  $k$ .
  - Find  $P(X > 0)$  and  $P(X \leq 2)$
  - Find distribution function of X.
21. Ten competitors in a musical contest were ranked by three judges. A, B and C in the following order :

Rank by A	:	1	6	5	10	3	2	4	9	7	8
Rank by B	:	3	5	8	4	7	10	2	1	6	9
Rank by C	:	6	4	9	8	1	2	3	10	5	7

Using rank correlation method, discuss which pair of judges has nearest approach to common taste in music.