QP CODE: 24803756

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Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, JUNE 2024

Second Semester

INTEGRATED MSC BASIC SCIENCE-STATISTICS

CORE - IST2CR02 - APPLIED STATISTICS

2020 Admission Onwards

683FFF2F

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Write down the normal equations for fitting a parabola
2. What are the demerits of scatter diagram?
3. For two correlated variables x and y, if coefficient of correlation between x and y is 0.8014, variance of x and y are 16 and 25 respectively. Then the covariance between x and y is:
4. Write down the expression for $r_{13.2}$
5. Define Marshall Edgeworth index number
6. Explain how can we convert chain index number to fixed base index number.
7. What is splicing?
8. What are the uses of time series analysis?
9. Briefly explain components of time series.
10. Briefly explain aditive and multiplicative models of the composition of components of time series.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Fit a parabola to the following data:

X	1	2	3	4	5
Y	2.18	2.44	2.78	3.25	3.83

12. The ranks of same 16 students in mathematics and physics are as follows.Two numbers within brackets denote the ranks of the students in Mathematics and Physics:
(1,1) (2,10) (3,3) (4,4) (5,5) (6,7) (7,2) (8,6) (9,8)(10,11) (11,15) (12,9) (13,14) (14,12) (15,16) (16,13).
Calculate the rank correlation coefficient for proficiencies of this group in Mathematics and Physics?

13. Explain coefficient of partial correlation

14. Explain characteristics of index numbers.

15. Explain quantity index number.

16. Test whether Fisher's index number satisfies factor reversal test.

17. Briefly explain method of least squares.Fit a straight line by the method of least squares for the following data.

X	0	1	2	3	4
Y	1	1.6	2.2	2.8	4

18. Explain ratio-to-moving average method to find seasonal indices .Write down its merits and limitations.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Derive the expression for the angle between two regression lines. Hence show that ,if r =0 ,the regression lines are perpendicular

20. For the vriables x_1,x_2 and x_3, it is given that σ_1^2=2 ,σ_2^2=1, σ_3^2=3,r_{12}=0.8,r_{23}=r_{31}=0.5
Find i) $r_{23.1}$ ii) $R_{1.23}$ and iii) $b_{13.2}$

21. **i**) Write a short note on splicing
ii) Price indices upto 1983 were calculated with 1980 as base.In 1984 the system of calculation was revised and 1984 was choosen as base.The indices from 1980 to 1984 of the old series and 1984 to 1987 in the new series are given
a) Splice the old series to the new.
b) Splice the newseries to the old.

Year	1980	1981	1982	1983	1984	1985	1986	1987
Old indices	100	96	105	108	115			
New indices					100	110	108	123

22. Explain measurement of cyclic variation and irregular variation.

(2×5=10 weightage)