

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL/MAY 2015

(U.G.—CCSS)

Complementary Course—Statistics

ST 4C 04—APPLIED STATISTICS

Time : Three Hours

Maximum : 30 Weightage

Part A

Answer all questions.

Weightage 1 for a bunch of 4.

1. For a positively skewed frequency curve, the inequality that holds is :

(a) $Q_1 + Q_3 > 2Q_2$.

(b) $Q_1 + Q_3 > 2Q_3$.

(c) $Q_1 + Q_3 > Q_2$.

(d) $Q_3 - Q_1 > Q_2$.

2. The value of coefficient of kurtosis β_2 can be :

(a) Less than.

(b) Greater than 3.

(c) Equal to 3.

(d) All the above.

3. If all the plotted points in a scatter diagram lie on a single line, then correlation is :

(a) Perfect Positive.

(b) Perfect Negative.

(c) Both (a) and (b).

(d) None of the above.

4. If $\rho = 1$, the angle between the two lines of regression is :

(a) Zero degree.

(b) Ninety degree.

(c) Sixty degree.

(d) Thirty degree.

5. In the usual notation $R_{1.23}^2$ can be expressed as :

(a) $1 - (1 - r_{12}^2)(1 - r_{1.32}^2)$.

(b) $1 - (1 - r_{12}^2)(1 - r_{1.32})$.

(c) $(1 - r_{12}^2)(1 - r_{1.32}^2)$.

(d) $(1 - r_{12})(1 - r_{1.32})$.

Turn over

6. The hypothesis for a specific known value of the correlation coefficient ρ can be tested by :
- (a) t test. (b) z test.
 (c) χ^2 test. (d) F-test.

7. Trend in a time series means :

- (a) Long term regular movement.
 (b) Short term regular movement.
 (c) Both (a) and (b).
 (d) Neither (a) nor (b).

8. For the given five values 15, 24, 18, 33, 42. The three yearly moving averages are :

- (a) 19, 22, 33. (b) 19, 25, 31.
 (c) 19, 30, 31. (d) None of the above.

9. Control charts consist of :

- (a) Three control lines. (b) Upper and lower control lines.
 (c) The level of the process. (d) All the above.

10. The control limit for 'C'-chart for equal size samples are given as :

- (a) $UCL = \bar{C} + 3\sqrt{\bar{C}}$, $CL = \bar{C}$ and $LCL = \bar{C} - 3\sqrt{\bar{C}}$.
 (b) $UCL = \bar{C} + \sqrt{2\bar{C}}$, $CL = 2\bar{C}$ and $LCL = \bar{C} - \sqrt{2\bar{C}}$.
 (c) $UCL = \bar{C} + 2\sqrt{\bar{C}}$, $CL = \bar{C}$ and $LCL = \bar{C} - 2\sqrt{\bar{C}}$.
 (d) $UCL = \bar{C} + 2\sqrt{\bar{C}}$, $CL = C$ and $LCL = \bar{C} - 2\sqrt{\bar{C}}$.

11. The underlying assumption in the analysis of variance technique is :

- (a) The observations are correlated random variables.
 (b) The observations are un-correlated random variables.
 (c) The observations are independent random variables.
 (d) None of the above.

12. The statistic used to testing the hypothesis in the case of one-way classification is :
- (a) F-statistic.
 (b) χ^2 -statistics.
 (c) t-statistic.
 (d) None of the above.

(12 × ¼ = 3 weights)

Part B

*Answer all questions.
 Weightage 1 each.*

13. What is meant by kurtosis ?
14. What is principles of least squares ?
15. What are the limits with in which the correlation coefficient can vary ?
16. Define partial correlation coefficient.
17. What are the demerits of ratio-to moving average method ?
18. Give the merits of the simple average method.
19. Write the control limits of *d*-chart.
20. What is meant by quality of a product ?
21. Write the observational equation in the case of one-way classification.

(9 × 1 = 9 weights)

Part C

*Answer any five questions.
 Weightage 2 each.*

22. Obtain the different method of measuring skewness.
23. Obtain the procedure for fitting the curve of the form $y = ax + b$.
24. Derive the formula for Spearman's rank correlation coefficient.
25. Explain cyclic variation.
26. How will you prepare the control charts for fraction defectives ?
27. Give five situations in which C-charts can be used.
28. Discuss the analysis of one-way classification.

(5 × 2 = 10 weights)

Part D

Answer any two questions.
Weightage 4 each.

29. Show that $r = \frac{\sigma_x^2 + \sigma_y^2 - \sigma_{x-y}^2}{2\sigma_x \sigma_y}$ where σ_x^2 , σ_y^2 and σ_{x-y}^2 are the variances of x , y and $x-y$

respectively.

30. Explain the various methods for obtaining trend in time series.

31. Prove that $r_{123} = \frac{r_{12} - r_{13}r_{23}}{\sqrt{(1 - r_{13}^2)(1 - r_{23}^2)}}$.

(2 × 4 = 8 weightage)