19U434S (Pages: 3) Name: ….……

Reg. No……

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2021

(CUCBCSS-UG)

CC15U ST4 C04 - APPLIED STATISTICS

(Statistics- Complementary Course)

(2015 to 2018 Admissions – Supplementary/Improvement)

Time: Three Hours Maximum: 80 Marks

Part A.

Answer ***all*** questions. Each question carries 1 mark

1. In simple random sampling the probability of a particular individual is to be included in the sample is ----------
2. List of all units of the population is called ----------
3. The third sample in a systematic sampling method with r =7 and k=11 is ---------- item in the sampling frame.
4. ANOVA is for testing equality of ---------- of a set of populations.
5. In an ANOVA the rejection criteria for null hypothesis is ----------
6. Variation occurring in a time series in a time in all years is ---------- component.
7. Ratio to moving average is to know ---------- component of time series
8. If one or more assignable causes are acting on the process, then process in ----------
9. In Laspayer's price index number ---------- is considered as weightage.
10. ---------- index number is the AM of Laspayer's and Paasche's index numbers.

(10 × 1 = 10 Marks)

Part B

Answer any ***seven*** questions. Each question carries 2 marks.

11. Explain cluster sampling.
12. Explain irregular variation in time series.
13. What are the basic assumptions for ANOVA?
14. Explain quantity Index Numbers.
15. Explain cause of variation acting on quality.
16. Explain various control lines in a control chart.
17. Distinguish between control chart for variables and control chart for attributes.

(7 × 2 = 14 Marks)

Part C

Answer any ***three*** questions. Each question carries 4 marks.

18. Explain sampling and non sampling errors.

19. Explain the procedure for construction of c chart.

20. Find the linear trend line using least square method for the following time series data

Year:	2005	2006	2007	2008	2009	2010	2011	2012
Value:	38	40	65	72	69	60	87	95

21. Prove the Fisher's index number satisfies the time reversal test.

22. Calculate the control limits for x-bar and R charts using the data from 8 samples of size 4

Sample no.:	1	2	3	4	5	6	7	8
Sample mean:	3.4	3.6	3.5	3.6	3.45	3.3	3.48	3.5
Sample range:	0.4	0.3	0.4	0.6	0.1	0.35	0.4	0.2

(3 × 4 = 12 Marks)

Part D

Answer any ***four*** questions. Each question carries 6 marks.

23. Explain merits and demerits of sampling over census.

24. Explain the procedure followed in the ANOVA of a one-way classified data.

25. Explain the procedure for plotting an *np* chart.

26. Obtain the trend line using the method of semi average for the following data

Year: 2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Value: 98	107	112	110	107	114	118	112	116	120

27. From the following data, find Fisher's index number for the year 2018 based on 2010.

Item	Price (2010)	Quantity (2010)	Price (2018)	Quantity (2018)
A	21	4	24	4
B	26	5	34	8
C	52	9	61	14
D	9	12	13	18
E	16	8	15	6

28. Explain out-of-control criteria in a control chart.

(4 × 6 = 24 Marks)

Part E

Answer any ***two*** questions. Each question carries 10 marks.

29. (i) Define probability and non probability sampling.

    (ii) Explain the principle steps in a sample survey.

30. The yield per acre (in '000 kg) obtained from four different plots treated under three different types of seeds is given below

	Plots			
Seeds	I	II	III	IV
A	4.8	6.4	6.8	6.2
B	7.8	7.5	8.6	8.0
C	5.4	6.5	6.7	5.9

Using two way ANOVA, at 5% sig. level to test whether (i) there is any significance difference in yield per acre due to plots (ii) there is any significance difference in yield per acre due to seeds.

31. Find seasonal indices by the method of ratio to trend for each quarter using the following data by fitting a straight line.

Year	I quarter	II quarter	III quarter	IV quarter
2015	76	84	88	93
2016	94	103	107	113
2017	105	111	116	112

32. Five samples of size 3 are considered from a production process to check the diameter of shafts. The data is given below. Construct an x bar and R chart and comment the state of the process.

Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
112.1	110.4	109.6	112.2	110.2
109.2	111.4	112.5	110.6	111.3
112.4	109.9	111.9	111.4	112.0

(2 × 10 = 20 Marks)

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