

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



U.G. DEGREE EXAMINATION – ALLIED

SECOND SEMESTER – APRIL 2022

UST 2301 – BUSINESS STATISTICS

(2019, 2020 – BATCH ONLY)

Date: 27-06-2022

Dept. No.

Max. : 100 Marks

Time: 01:00 PM – 04:00 PM

Answer all the questions

(10 x 2 = 20)

1. The number of runs scored by 11 players of a cricket team of a school are 5,19, 42,11,50,30,21,0,52,36,27. Find the median.
2. Explain the procedure of locating mode using graphical method.
3. Explain cyclical variation in time series with the help of an example.
4. Write the measures you can suggest for the following.
 - i. Marks obtained by 10 students
 - ii. Average height of students in a class.
5. Differentiate raw moments and central moments.
6. Write down the general formulation of a linear programming problem.
7. Briefly define simple linear regression.
8. When are two variables said to be independent with respect to correlation? Explain with a scatter diagram.
9. Give a merit and a demerit of freehand graphical method in finding trend in time series.
10. Enlist the types of distribution with respect to kurtosis. What is the value of kurtosis which acts as a bench value for comparison?

Section B

Answer any 5 questions.

(5 x 8 = 40)

11. Calculate the median and three quartiles from the following data:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Students	5	7	8	12	28	22	10	8

12. The following table shows the distribution of 100 students according to their marks in a statistical paper. The median of the distribution is 30 marks. Find the missing frequencies.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Freq.	10	-	25	30	-	10

13. In order to find the coefficient of correlation between two variables x and y from 12 pairs of observations, the following calculations were made. $\sum x = 30$, $\sum y = 5$, $\sum x^2 = 670$, $\sum y^2 = 285$ and $\sum xy = 334$. On subsequent verifications, it was found that the pair ($x=11, y=14$) was copied wrongly, the correct being ($x=10, y=4$). Find the correct value of the correlation coefficient.
14. Briefly explain the components of a time series data.
15. Maximize $z=22x_1+18x_2$ subject to the constraints
- $$360x_1+240x_2 \leq 5760$$
- $$x_1+x_2 \leq 20$$
- $$x_1, x_2 \geq 0$$
- Use the graphical method to solve the above L.P.P.

16. Calculate Pearson's coefficient of correlation from the following data.

X	12	9	8	10	11	13	7
Y	14	8	6	9	11	12	3

17. Below are given the figures of production (in thousand quintals) of a sugar factory.

Year	1999	2000	2001	2002	2003	2004	2005
Prod.	80	90	92	83	94	98	92

- i) Fit a straight line trend.
- ii) Plot the figures in the graph and show the trend line
- iii) Estimate the production in 2010. (4+2+2)

18. Consider the following distribution.

	Distribution A	Distribution B
Mean	100	90
Median	90	80
Standard Deviation	10	10

- i. Distribution A has the same degree of variation as distribution B. True or False?
- ii. Both distributions have same degree of skewness. True or False (4+4)

Section C

Answer any two questions (2 x 20 = 40)

19. Calculate first four moments taking A= 35 as assumed mean from the following dataset. Hence compute β_1 and β_2 . Also comment upon the nature of the frequency distribution.

Marks in Statistics	0-10	10-20	20-30	30-40	40-50	50-60	60-70
students	8	12	20	30	15	10	5

20. Obtain an Initial Basic Feasible Solution to the following transportation problem by (i). North-West corner rule (ii) Least cost method and (iii) Vogel's approximation method. (5+5+10)

	D	E	F	G	Availability
A	6	4	1	5	14
B	8	9	2	7	16
C	4	3	6	2	5
Requirement	6	10	15	4	

21. Apply the method of link relatives to the following data and calculate the seasonal indices.

Quarter\Year	2001	2002	2003	2004
1	75	86	90	100
2	60	65	72	78
3	54	63	66	72
4	59	80	82	93

22. a) From the following data, draw a trend line by method of semi averages.

Year	2000	2001	2002	2003	2004	2005	2006	2007
Sales	100	105	109	96	102	108	112	114

b) A random sample of 101 weekly personal incomes in a city A and city B gives the following results:

City A: $\bar{X} = 100$ and $\sigma = 30$; City B : $\bar{X} = 72.93$ and $\sigma = 13.49$ and median = 75.

- i. In Which city is the distribution of income more variable?
- ii. Compute the coefficient of skewness in city B.
- iii. Is the distribution positively or negatively skewed?

(10 = 10)

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