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Your Roll No. :

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Name of the Paper : Statistics for Business-
(GE)

Name of the Course : B.A. (H) Business
Economics

Semester : II/IV/VI

Time : 3 Hours Maximum Marks : 90

1. Attempt any three parts: $6 \times 3 = 18$
- (i) From the following data draw ogives and calculate Median marks.

Marks	Below 10	10-20	20-30	30-40	40-50	Above 50
No of Students	10	20	30	50	40	30

- (ii) If 20 is subtracted from every observation in a data set, then the coefficient of variation of the resulting data set is 20%. If 40 is added to every observation of the same data set, then the coefficient of variation of the resulting set of data is 10%. Find the mean and standard deviation of the original set of data.

P.T.O.

- (iii) Distinguish between dispersion and skewness. From the following data calculate Karl Pearson's Coefficient of skewness.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No of Students	10	30	30	50	40	20

- (iv) Pearson's Coefficient of Skewness for a distribution is 0.4 and Coefficient of variation is 30%. Its mode is 88. Find the mean and the median.

2. Attempt any **three** parts: $6 \times 3 = 18$

- (i) The probability that a contractor will get a plumbing contract is $2/3$ and the probability that he will not get an electric contract is $5/9$. If the probability getting at least one contract is $4/5$, what is the probability that he will get both the contracts? Are the event of getting a plumbing contract and getting an electric contract independent?
- (ii) Define Probability. Discuss the importance of probability in decision making.

- (iii) (a) Find out correlation coefficient of X and Y.

X	90	96	94	98	112	110	120
Y	88	88	86	84	118	116	130

- (b) State the relationship between coefficient of correlation and regression coefficients.

5. Attempt any **two** :

$9 \times 2 = 18$

- (i) (a) In the process of computing the correlation coefficient between two variables X and Y from 12 paired observations, a data analyst obtained the following summary statistics:

$$\Sigma X = 30, \Sigma X^2 = 670, \Sigma Y = 5, \Sigma Y^2 = 285, \Sigma XY = 344$$

It was, however, discovered at the time of checking that the pair (X = 11, Y = 4), was copied wrongly, the correct values being (X = 10, Y = 14) After making necessary corrections, find;

1. the two regression coefficients.
2. the two regression equations.
3. the correlation coefficients.

- (b) A correlation coefficient of 0.5 does not mean that 50% of the data are explained. Comment.

- (ii) (a) Given that the variance of $x=9$ and the regression lines are $8x-10y+66=0$, $40x-8y=214$, find the coefficient of correlation between x and y. Also find the standard deviation of Y.

- (b) If all the points in a scatter diagram lie exactly on the regression line, the two variables are perfectly correlated. Comment.

- (iii) A multiple-choice test consists of 8 questions with 3 answers (of which only one is correct). A student answers each question by rolling a balanced dice and checking the first answer if he gets 1 or 2, The second answer if he gets 3 or 4 and the third answer if he gets 5 or 6. To get a distinction, the student must secure at least 75% correct answers. If there is no negative marking, what is the probability that the student secures a distinction.

- (iv) Under what conditions can a binomial distribution be applied? Suppose a man takes step forward with probability 0.25 and backward with probability 0.75. Find the probability that at the end of 11 steps, he is one step away from the starting point

3. Attempt any **three** parts:

$6 \times 3 = 18$

- (i) Define hypothesis testing. Distinguish between 'Null Hypothesis' and 'Alternative Hypothesis'. Write in brief the various steps required to conduct an hypothesis test?
- (ii) A company estimates that the time required to complete a special project follows a normal distribution with a mean of 120 days and a standard deviation of 15 days.

- The management commits to delivering the project within 130 days. If the delivery is delayed beyond 130 days, the company agrees to pay a penalty of ₹ 5,000 per day of delay.

Find:

- (a) What is the probability that the company incurs a penalty of ₹25,000 or more?
- (b) What is the probability that the company completes the project within 135 days?
- (iii) A random sample of size 65 was taken to estimate the mean. The mean & std. deviation of 1,000 families were found to be ₹ 6300 and ₹ 950 respectively. Find a 95% confidence interval for the population mean.
- (iv) Gold brand edible Oil is packed in tins holding 16 kg each. The filling machine can maintain this but with a standard deviation of 0.5 kg. Samples of 25 are taken from the production line. If a sample mean is (i) 16.35 kg (ii) 15.85 kg, can we be 95% sure that the sample has come from a population of 16 kg tins?

4. Attempt any **two** parts: $9 \times 2 = 18$

- (a) (i) Splice the following two series with a common base of 2021.

Year	Old Series	New Series
2019	- 100	-
2020	110	-
2021	120	100
2022		105
2023	-	110

- (ii) Verify whether Laspeyres Price Index and Paasche's Price Index satisfy the time reversal test.

- (b) Construct (i) Fixed base and (ii) Chain base Index numbers from the following data relating to production of electricity:

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Production ('000kwt)	25	27	30	24	28	29	31	35	40	41

- (c) (i) "Fisher Index is an Ideal Index Number". Explain.
- (ii) Explain the uses of index numbers. Describe the procedure followed in the preparation of cost-of-living index numbers