

**5/ECO-300 Syllabus-2023**

**2 0 2 5**

( Nov-Dec )

**FYUP : 5th Semester Examination**

**MAJOR**

**ECONOMICS**

**( Statistical Methods for Economics )**

**ECO-300**

*Marks : 75*

*Time : 3 hours*

*The figures in the margin indicate full marks  
for the questions*

Answer **five** questions, taking at least **one**  
from each Unit

**UNIT—I**

1. (a) What is the difference between probability and non-probability sampling? Explain briefly the simple random sampling technique. 3+5=8
- (b) Define average. Prove the relationship  $AM \geq GM \geq HM$ , where AM is the arithmetic mean, GM is the geometric mean, and HM is the harmonic mean.

2+5=7

2. (a) The mean wage of 100 labourers working in a factory running two shifts of 60 and 40 labourers respectively is ₹ 38. The mean wage of 60 labourers working in the morning shift is ₹ 40. Find the mean wage of 40 labourers working in the evening shift. 4
- (b) From the statistical distribution given below, calculate the most suitable average, giving reasons for your choice : 6

Value	Frequency
less than 10	4
10-20	12
20-30	24
30-40	36
40-50	20
50-60	16
60-70	8
70 and above	5

- (c) What do you understand by the term 'dispersion' of a frequency distribution? Distinguish between absolute and relative measures of dispersion. 2+3=5
3. (a) The weekly sales of two products A and B are recorded as follows :

Product A :	59	75	27	63	26
Product B :	150	280	125	310	330

Find out which of the given two products shows greater fluctuations in sales. 10

- (b) (i) What do you understand by skewness of a distribution?
- (ii) If the coefficient of skewness of a distribution is 0.4, its standard deviation is 6.5 and mean is 29.6, find the mode of the distribution. 2+3=5

## UNIT—II

4. (a) Prove that the coefficient of correlation is invariant of the change of scale and origin. 5
- (b) Calculate the coefficient of correlation from the following data :
- Height of father : 65 66 67 68 69 70 71  
(in inches)
- Height of son : 67 68 66 69 72 72 69  
(in inches)
- Also estimate the probable error and interpret the significance of the coefficient of correlation obtained. 6+4=10
5. (a) What is regression? Why are there two regression lines? Under what conditions can there be only one regression line? 2+3+1=6
- (b) Two lines of regression are given by  $x+2y=5$  and  $2x+3y=8$ . The variance of  $x=12$ . Calculate the mean values of  $x$  and  $y$ , variance of  $y$ , and the coefficient of correlation. 3+3+3=9

6. (a) Point out the significance of regression analysis. 4
- (b) Show that the coefficient of correlation is the geometric mean of two regression coefficients. 3
- (c) The following data are given for marks in subjects  $X$  and  $Y$  in a certain examination :
- Mean marks in  $X = 39.5$   
 Mean marks in  $Y = 47.5$   
 Standard deviation of marks in  
 $X = 10.8$   
 Standard deviation of marks in  
 $Y = 16.8$   
 Coefficient of correlation between  
 $X$  and  $Y = 0.42$
- Form the two lines of regression. Also give the expectation of marks in subject  $Y$  for candidates who secured 30 marks in subject  $X$ . 5+3=8

## UNIT—III

7. (a) "Index numbers are economic barometer." Explain the statement and mention its limitations. 4+4=8
- (b) What do you understand by price relative? 2

- (c) Calculate a price index for the following data by—
- (i) simple aggregative method;  
 (ii) average price relative method  
 using geometric mean :

Commodity	A	B	C	D	E	F
Price in 2012 :	20	30	10	25	40	50
Price in 2017 :	25	30	15	35	45	55

2+3=5

8. (a) Discuss the various problems involved in the construction of index numbers. 9
- (b) From the following data, calculate Laspeyres' and Paasche's index numbers : 3+3=6

Items	2015		2019	
	Price (₹)	Quantity (kg)	Price (₹)	Quantity (kg)
A	6	50	10	56
B	2	100	2	120
C	4	60	6	60
D	10	30	12	24
E	8	40	12	36

9. (a) Distinguish between quantity index number and value index number. 3
- (b) Why is Fisher's index number called ideal index number? 6

- (c) Calculate Fisher's index number from the following data : 6

Commodity	2012		2017	
	Price (₹)	Expenditure	Price (₹)	Expenditure
A	5	50	4	48
B	8	48	7	49
C	6	18	5	20

## UNIT—IV

10. (a) Distinguish between independent and dependent events. 3
- (b) State and prove the addition theorem of probability. 6
- (c) Five balls are drawn from a bag containing 6 red and 4 white balls. What is the probability that 3 red and 2 white balls are drawn? 6
11. (a) Define mathematical expectation of a random variable  $X$ . If  $X$  is a random variable and  $a$  and  $b$  are constants, then show that—
- (i)  $E(aX + b) = aE(X) + b$  ;
- (ii)  $V(aX + b) = a^2V(X)$ . 3+3+3=9
- (b) Derive the mean of binomial distribution. 6

12. (a) What is a null hypothesis? What are Type I and Type II errors in connection with testing of hypothesis? 3+4=7
- (b) Write notes on the following : 4+4=8
- (i) Properties of  $t$ -distribution
- (ii) Uses of Chi-square test

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