TDC Odd Semester Exam., 2020
held in July, 2021

ECONOMICS

(Honours)

(5th Semester)

Course No. : ECOH–502

Full Marks : 50

Pass Marks : 17

Time : 2 hours

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

Arts students will answer Option—A and
Science students will answer Option—B

OPTION—A

(For Arts Students)

Course No. : ECOH–502 (A)

(Statistics for Economics—I)

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

UNIT—I

1. *(a)* State the essential points to be observed in drafting a questionnaire.   4

(2)

(b) What is tabulation of data? Mention five essential requirements of a good table.   1+5=6

2. *(a)* Define data. Distinguish between primary data and secondary data.   1+3=4

(b) Draw the histogram and frequency polygon of the distribution given below :   6

Weight (gm) :	110–119	120–129	130–139	140–149
Frequency :	5	7	12	20

Weight (gm) :	150–159	160–169	170–179	180–189
Frequency :	16	10	7	3

UNIT—II

3. *(a)* Show that $AM \geq GM \geq HM$.   4

(b) Calculate the coefficient of skewness for the following frequency distribution of weekly wages :   6

Wages (₹) :	Below 30	30–40	40–50
No. of workers :	5	7	18

Wages (₹) :	50–60	60–80	above 80
No. of workers :	32	28	10

(3)

4. *(a)* Calculate the median and mode of the following :

Annual Sales (₹ '000)	Frequency
Less than 10	4
" " 20	20
" " 30	35
" " 40	55
" " 50	62
" " 60	67

Is it possible to calculate the arithmetic mean? If possible, calculate it. 4

(b) Standard deviation is independent of change of origin but depends on scale. Justify. 6

UNIT—III

5. *(a)* Show that correlation coefficient is independent of change of origin and scale. 4

(b) Given that $r_{xy} = 0.6$, cov$(X, Y) = 7.2$ and var$(Y) = 16$, find σ_x. 3

(4)

(c) Marks secured by five students in Mathematics and Statistics are given below :

Mathematics	:	76	96	86	80	82
Statistics	:	62	76	86	66	70

Calculate the coefficient of correlation using appropriate method. 3

6. *(a)* Explain the difference between Karl Pearson's (product moment) correlation coefficient and rank correlation coefficient. 3

(b) Explain with example, positive and negative correlations. 2

(c) The ranks of the ten students in two subjects *A* and *B* are as follows :

A	:	3	5	8	4	7	10	2	1	6	9
B	:	6	4	9	8	1	2	3	10	5	7

Calculate the coefficient of rank correlation and interpret the result. 5

UNIT—IV

7. *(a)* The equations of two regression lines are

$$x + 2y - 5 = 0 \quad \text{and} \quad 2x + 3y - 8 = 0$$

Find $\bar{x}$, $\bar{y}$ and r_{xy}. 2+3=5

(b) Define regression. Show that if one of the regression coefficients is greater than unity, the other must be less than unity. 2+3=5

8. *(a)* Obtain the regression equation X on Y and Y on X from the data given below :

X :	6	2	10	4	8	12	15	14	12
Y :	9	11	5	8	7	10	9	12	8

Also find correlation coefficient. 5+1=6

(b) From the following data

$\overline{X} = 36$, $\overline{Y} = 85$, $\sigma_x = 11$, $\sigma_y = 8$, $r_{xy} = 0 \cdot 66$

obtain the lines of regression. 4

UNIT—V

9. *(a)* Define the following concepts : 2×3=6

(i) Mutually exclusive events

(ii) Independent events

(iii) Equally likely events

(b) Let X be a random variable with probability distribution

X :	0	1	2	3
$p(x)$:	$\dfrac{1}{3}$	$\dfrac{1}{2}$	0	$\dfrac{1}{6}$

Find the expectations of X and X^2. 2+2=4

10. *(a)* State and prove Bayes' theorem. 4

(b) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is $\dfrac{1}{7}$ and that of wife's selection is $\dfrac{1}{5}$. What is the probability that—

(i) both of them will be selected;

(ii) only one of them will be selected;

(iii) none of them will be selected? 2×3=6

(**7**)

OPTION—B

(For Science Students)

Course No. : ECOH–502 (B)

(Elements of Econometrics—I)

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

UNIT—I

1. *(a)* Discuss various steps under an econometric investigation. 6

   (b) Add a note on the significance of studying econometrics in modern times. 4

2. *(a)* Make a comparison between econometrics and mathematical economics. 6

   (b) Is the knowledge of statistics essential for studying econometrics? Offer justifications in support of your answer. 4

UNIT—II

3. *(a)* Distinguish between stochastic and non-stochastic relationship with the help of a suitable example. 5

   (b) State the properties of mathematical expectation. 5

(**8**)

4. *(a)* Define the following terms : 2×3=6
   (i) Random variable
   (ii) Sample space
   (iii) Distribution function

   (b) Distinguish between probability distribution and frequency distribution. Show that $E(X) = \overline{X}$, where X is a discrete random variable. 2+2=4

UNIT—III

5. *(a)* Define sampling distribution of a statistic and its standard error. 4

   (b) Write a note on the utility of standard error in statistics. 4

   (c) Why is population mean considered as constant in statistics? 2

6. *(a)* Define probability density function of a random variable. 2

   (b) If X is a continuous random variable taking values in the interval (0, 1) with the probability density function

$$f(x) = kx^2; \ 0 \leq x \leq 1$$

   then find the values of the following : 2+2+3+1=8

   (i) K

(ii) $F(X)$

(iii) $V(X)$

(iv) $V(3X)$

UNIT—IV

7. Show that ordinary least square (OLS) estimators are best linear unbiased estimator (BLUE). 10

8. *(a)* State the important assumptions underlying two-variable classical linear regression model. 4

(b) Estimate the parameters of a two-variable classical linear regression model by using ordinary least square method (OLSM). 6

UNIT—V

9. Write short notes on any *two* of the following : 5×2=10

(a) Prediction of a regression model

(b) Assumptions of a multiple linear regression model

(c) One-tailed test *vs.* Two-tailed test

10. *(a)* Define statistical hypothesis. 2

(b) Distinguish between null hypothesis and alternative hypothesis. 2

(c) Write a note on hypothesis testing related to slope coefficient of a two-variable linear regression model. 6

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