2013

ECONOMICS

(Major)

Paper : 3.3

Time : 3 hours

The figures in the margin indicate full marks for the questions

(New Syllabus)

(*Marks* : 90)

(For Arts Stream)

(Statistical Methods for Economic Analysis)

1. Answer the following : 2×10=20

(a) Mention two merits of 'Schedule' as a method of collecting primary data.

(b) Distinguish between a population and a sample.

(c) Define coefficient of variation.

(d) The mean of 200 items was 50. Later on it was found that two items were wrongly read as 92 and 8 instead of 192 and 88. Find out the correct mean.

(e) Comment on the following :

(i) For a bivariate distribution $b_{yx} = 2 \cdot 8$ and $b_{xy} = -0 \cdot 3$

(ii) If $b_{yx} = -3 \cdot 2$ and $b_{xy} = -2 \cdot 04$, then $r_{xy} = 0 \cdot 9$

(f) Which of the following probability distributions is discrete?

(i) Binomial

(ii) Normal

(iii) Poisson

(g) State the multiplication theorem of probability.

(h) If Fisher's index number is 54 and Laspeyre's index number is 56, calculate Paasche's index number.

(i) Write the components of a time series.

(j) What is a life table?

2. Answer any *five* of the following : 6×5=30

(a) Draw a 'less than' and a 'more than' ogive from the following table and find the value of median from it :

Income (in ₹)	*No. of Workers*
100–200	60
200–300	170
300–400	200
400–500	60
500–600	50
600–700	40
700–800	20

(b) Write a short note on systematic sampling.

(c) What is the relationship among mean, median and mode? Find out the mode of the following data :

Class	*Frequency*
0–10	3
10–20	7
20–30	9
30–40	15
40–50	25
50–60	20
60–70	14
70–80	12
80–90	8
90–100	7

(d) If the two lines of regression are $4x - 5y + 30 = 0$ and $20x - 9y - 107 = 0$ which one is the line of regression of x on y ?

(e) A bag contains 20 tickets marked with numbers 1 to 20. One ticket is drawn at random. Find the probability that it will be a multiple of *(i)* 2 or 5, and *(ii)* 3 or 5.

(f) What are index numbers? Why are they called economic barometers?

(g) Briefly describe the merits and demerits of the least squares method of measuring trend in a time series.

3. Answer any *four* of the following : 10×4=40

(a) From the data given below, find—

(i) the two regression equations;

(ii) the coefficient of correlation between marks in Economics and Statistics : 8+2=10

Marks in Economics	:	25	28	35	32	31	36	29	38	34	32
Marks in Statistics	:	43	46	49	41	36	32	31	30	33	39

(b) Explain the methods for measurement of fertility. 10

(c) Explain the following in brief : 3+3+4=10

(i) Fixed base and Chain base index numbers

(ii) Wholesale price index number

(iii) Time reversal test and Factor reversal test

(d) *(i)* Define discrete random variables and continuous random variables. 4

(ii) The students of a particular college are engaged in various sports in the following proportions : 6

Football (F) : 60% of all students

Basketball (B) : 50% of all students

Both football and basketball : 30% of all students

If a student is selected at random, find the probability that he will—

(1) play football or basketball;

(2) play neither sports.

(e) *(i)* The ranks of the same 15 students in two subjects *A* and *B* are given below :

Rank in A	:	1	2	3	4	5	6	7	8
Rank in B	:	10	7	2	6	4	8	3	1
Rank in A	:	9	10	11	12	13	14	15	
Rank in B	:	11	15	9	5	14	12	13	

Use Spearman's formula to find the rank correlation coefficient. 5

(ii) What are the advantages and disadvantages of the census method in the collection of data? 5

(f) *(i)* What are various types of bar diagram? Mention the most suitable diagrams for representing the following sets of data : 5

(1) Plan outlay for India in different Five-Year Plans

(2) Sectoral composition of India's GDP in a given year

(ii) Calculate the arithmetic mean for the following distribution and also prove that

$$\sum f(X - \bar{X}) = 0 : \quad 5$$

Class	:	0–10	10–20	20–30	30–40	40–50	50–60	60–70
Frequency	:	6	5	8	15	7	6	3

(For Science Stream)

(Elements of Econometrics)

4. Answer the following questions : $2 \times 10 = 20$

(a) If a random variable X follows Poisson distribution such that $P(X = 1) = P(X = 2)$, find the mean of the distribution.

(b) State any two properties of the normal distribution.

(c) For a two-tailed normal test, what are the critical values of Z at 1% and 5% levels of significance?

(d) Mention two applications of χ^2 test of significance.

(e) Under standard assumptions, OLS estimators are said to be BLUE, where B stands for 'best'. In what sense are they best?

(f) Name the problems that arise in the estimation of a linear regression model, when the assumptions of $E(u_i^2) = \sigma^2$ and $E(u_i u_j) = 0$ are violated.

(g) What additional assumption is required for a three-variable linear regression model as against the two-variable model?

(h) Mention any two problems that are likely to arise in a distributed lag model.

(i) What is a dummy variable?

(j) Explain very briefly the trend component of a time series.

5. Answer any *five* of the following : 6×5=30

(a) Out of 320 families with 5 children each, what percentage would be expected to have—

(i) 2 boys and 3 girls;

(ii) at least one boy?

Assume equal probability for boys and girls. 3+3=6

(b) Distinguish between—

(i) critical value and critical region;

(ii) point estimation and interval estimation. 3+3=6

(c) In the context of the two variable linear regression model, explain the testing of hypothesis of the regression parameters. 6

(d) Why is a deterministic relation like $Y_t = \alpha + \beta X_t$ not suitable for econometric study? How would you modify the relation for econometric use? Give justifications for the modification. 2+1+3=6

(e) Examine the consequences of autocorrelation on the OLS estimates of a linear regression model. 6

(f) Write a short note on the dummy variable trap. 6

(g) Given below is the production volume (in '000 tonnes) for a product :

Year	*Production* (in '000 tonnes)
1995	21
1996	22
1997	23
1998	25
1999	24
2000	22
2001	25
2002	26
2003	27
2004	26

Use the data to compute a three-year moving average for all available years. 6

6. Answer any *four* of the following : 10×4=40

(a) The amount of time consumed by an individual at a bank ATM is found to be normally distributed with mean $\mu = 120$ seconds and standard deviation $\sigma = 40$ seconds.

(i) What is the probability that a randomly selected individual will consume less than 80 seconds at the ATM?

(ii) What is the probability that a randomly selected individual will spend between 2 to 3 minutes at the ATM? 5+5=10

(b) In the context of hypothesis testing, explain the terms 'null hypothesis' and 'alternative hypothesis'.

The mean lifetime of a sample of 400 lights produced by a company is found to be 1600 hours with a standard deviation of 150 hours. Test the hypothesis that the mean lifetime of the bulbs produced in general is higher than the mean life of 1570 hours at $\alpha = 0 \cdot 01$ level of significance. 3+7=10

(c) In a two-variable linear regression model, show how the sum of squares is decomposed to obtain the coefficient of determination. 10

(d) In a two-variable linear regression model having heteroscedastic disturbances, show that the OLS estimators are unbiased but do not have minimum variance. 10

(e) With reference to distributed lag models, explain the adaptive expectations model. 10

(f) Explain the least squares method of fitting a linear trend. 10

(Old Syllabus)

(History of Economic Thought)

*Candidates **eligible** for Internal Assessment shall answer from PART—I only (Marks : 90)*

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*Candidates **not eligible** for Internal Assessment shall answer both from PART—I and PART—II (Marks : 100)*

PART—I

(*Marks* : 90)

7. Answer the following (within *50* words each) : 2×5=10

(a) State two main characteristics of mercantilism.

(b) What does the doctrine of laissez-faire mean?

(c) Mention the basic theme of Pigou's welfare economics.

(d) State the meaning of trusteeship as advocated by M. K. Gandhi.

(e) What is physiocracy?

8. Answer any *four* of the following questions (within *125* words each) : 5×4=20

(a) How did Marshall explain the theory of distribution?

(b) Briefly explain the concept of natural order of the physiocrats.

(c) Bring out Ricardian ideas on international trade.

(d) State the features of capitalism as explained by Marx.

(e) Give a brief outline of the drain theory as developed by Dadabhai Naoroji.

(f) Explain J. M. Keynes' concept of effective demand.

9. Answer any *four* of the following (within *350* words each) : 15×4=60

(a) Explain the main contributions of Adam Smith to the history of economic thought.

(b) Critically evaluate the Malthusian theory of population.

(c) Explain the concept of general equilibrium as developed by Leon Walras.

(d) Give an outline of the main features of Keynesian economics.

(e) Explain the economic ideas of Kautilya as narrated in the *Arthashastra*

(f) Discuss and comment on the main economic ideas of M. K. Gandhi.

PART—II

(*Marks* : 10)

(In lieu of Internal Assessment)

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

(a) Plato's Ideas on Economics

(b) Tableau Economique

(c) Fisher's Quantity Theory of Money

(d) Role of Innovation in Schumpeter's Theory of Growth

(e) Say's Law of Market

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