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ECONOMICS

(Major)

Paper : 6.2

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

(For Arts Stream)

(Applied Statistics)

1. Answer as directed :   1×7=7

   (a) While Laspeyres' index generally has an upward bias, Paasche's index generally has a downward bias.

                              (Write True or False)

   (b) Why are index numbers called pure numbers?

   (c) Write one drawback of the moving average method of measuring trend of a time series.

(*Turn Over*)

(d) Seasonal variations of a time series occur

    (i) within a month

    (ii) within a week

    (iii) within a year

    (iv) within a day

        (Choose the correct answer)

(e) What does Lx column of the life table represent?

(f) What will happen to a specific population, if its GRR <1?

(g) A higher standard error of a sampling distribution implies a greater reliability of the sample.

        (Write True or False)

2. Give brief answer to the following :   2×4=8

(a) "The cost of living index number is essentially a consumer's price index." Justify.

(b) The trend line equation of a time series with middle year 2007 is given by

$$Y = 95 + 3 \cdot 9t$$

Estimate the trend value for the year 2015. Also eliminate the trend assuming the actual value to be 125.

(c) Write two uses of vital statistics.

(d) Distinguish between a parameter and a statistic.

3. Answer any *three* from the following : 5×3=15

(a) What do index numbers measure? Why are weights assigned to the items included in the construction of an index number? Calculate unweighted price index numbers for the following data :

2+1+2=5

Commodities	1994		2000	
	Price (₹)	Quantity (kg)	Price (₹)	Quantity (kg)
A	2	10	5	8
B	3	5	6	3

(b) Calculate trend values by the principle of least square for the following time series. Also eliminate the trend using multiplicative model : 3+2=5

Year	:	2001	2002	2003	2004	2005	2006	2007
Sales (₹ in lakh)	:	76	80	130	144	138	120	172

(c) Explain how exponential trend curves are fitted using the principle of least squares. 5

(Turn Over)

(d) What is general fertility rate? Mention its drawbacks. Can specific fertility rates give better picture of fertility compered to GFR? Justify your answer. 1+2+2=5

(e) Distinguish between census and sample survey methods of collecting samples. Mention the merits and demerits of the census method. 2+3=5

4. Answer any *three* from the following questions : 10×3=30

(a) Write the uses of index numbers. From the following data, derive the value of X given that the ratio between Laspeyres' and Paasche's index numbers is 28:27 : 4+6=10

Item	2004		2010	
	Price (₹)	Quantity (Q1)	Price (₹)	Quantity (Q1)
Rice	1	10	2	5
Cloth	1	5	X	2

(b) Define time series with example. Mention the uses of time series.

Calculate trend values using 4-yearly moving average for the time series below : 2+3+5=10

Year	: 2001	2002	2003	2004	2005
Demand for X (in '000 tons) :	80	84	80	88	98

Year	: 2006	2007	2008	2009	2010
Demand for X (in '000 tons) :	92	84	88	80	100

(c) What is crude death rate? Why are standardised death rates considered superior to crude death rates? Calculate crude death rate, age-specific death rates and standardised death rates for Area 1 and Area 2 considering the population of Area 1 as standard population : 2+2+2+2+2=10

Age-group	Area 1		Area 2	
	Population	Deaths	Population	Deaths
0–15	500	20	400	18
15–25	1500	25	1500	28
25–60	1000	22	2000	40
60 & above	800	10	600	14

(d) What is simple random sampling? Distinguish between stratified random sampling and systematic sampling. Discuss the merits and demerits of systematic sampling. 2+4+2+2=10

(e) Write short notes on any *two* from the following : 5×2=10

   (i) Chain base index number

   (ii) Graphical method of trend fitting

   (iii) Life table

   (iv) Sample survey

(For Science Stream)

(Econometric Methods)

1. Answer as directed :   1×7=7

    (a) With heteroscedasticity, the OLS parameter estimates are unbiased and consistent, but they are ——.

    (Fill in the blank)

    (b) Define a dummy variable trap.

    (c) In a time series, changes that occur as a result of general tendency of the data to increase or decrease is known as ——.

    (Fill in the blank)

    (d) The equation of the exponential curve is of the form $Y =$ ——.

    (Fill in the blank)

    (e) What is the role of the dummy variable in a model of the form $Y_t = \alpha + \beta D_t + u_t$?

    (f) In case of heteroscedasticity, the variances of error term are ——.

    (Fill in the blank)

(Turn Over)

(g) What does λ represent in the partial adjustment model

$$Y_t = Y_{t-1} + \lambda(Y_t^* - Y_{t-1}) + u_t, \quad 0 < \lambda < 1?$$

2. Answer the following : $\qquad$ 2×4=8

(a) Why the following consumption function cannot be estimated?

$$C_t = b_0 + b_1 Y_{dt} + b_2 Y_{dt-1} + b_3 \Delta Y_{dt} + u_t$$

Where $\Delta Y_{dt} = Y_{dt} - Y_{dt-1}$.

(b) Mention two limitations of the method of moving averages.

(c) Draw a figure showing positive and negative first-order autocorrelations.

(d) Mention any two procedures to overcome or reduce the problems resulting from multicollinearity.

3. Answer any *three* from the following : 5×3=15

(a) How is the presence of heteroscedasticity tested? Discuss briefly the Lagrange multiplier test for heteroscedasticity.

(b) Describe briefly the Koyck model.

(Continued)

(c) How is the presence of positive or negative first-order autocorrelation tested? Name a method how autocorrelation can be corrected.

(d) What is meant by a distributed lag model? Write the equation for a general distributed lag model with an infinite number of lags and for one with k lags.

(e) Briefly discuss the consequences of ignoring multicollinearity.

4. Answer any *three* from the following :

$10 \times 3 = 30$

(a) The following information gives hypothetical data on consumption expenditure C, disposable income Y_d, and wealth W, all in thousand rupees, for a sample of 15 families :

(i) Regress C on Y_d and W, and find $\bar{R}^2$ and $r_{Y_{dw}}$.

(ii) Regress C on Y_d only.

(iii) Regress C on W only.

(iv) What can you conclude from the preceeding with regard to multicollinearity? 4+2+2+2=10

Family :	1	2	3	4	5	6	7	8	9
C :	32	11	15	17	16	13	18	20	14
Y_d :	36	12	16	18	17	14	20	23	15
W :	144	47	63	70	67	52	79	90	58

Family :	10	11	12	13	14	15
C :	17	41	17	33	20	18
Y_d :	18	50	19	37	22	19
W :	70	204	76	149	86	76

(b) Why is the study of time series useful? Discuss the various components of a time series. 4+6=10

(c) Briefly discuss the importance of the adaptive expectations model. What are the problems faced in estimating the model? 5+5=10

(d) Fit a straight-line trend and calculate the trend values by the method of least squares to the following data. Assuming

that the same rate of change continues, what would be the predicted earning for the year 2020?   4+4+2=10

Year	:	2005	2006	2007	2008	2009	2010	2011	2012
Earnings (₹ in lakh)	:	38	40	65	72	69	60	87	95

(e) What are the consequences of applying OLS when there is autocorrelation?   10

(f) Write the equations to show how dummy variables can be used to capture changes in the intercept, changes in slope, and changes in both intercept and slope. If C = consumption, Y_d = disposable income, $D = 1$ for war years and $D = 0$ for peace years, draw the figures for the above equations showing a consumption function for peace years and one for war years.

5+5=10

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