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(November)

ECONOMICS

(Major)

Course : 302

(Statistical Methods in Economics)

Full Marks : 80
Pass Marks : 32/24

Time : 3 hours

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

1. Choose the correct answer : 1×8=8

   (a) In case of symmetrical distribution, relationship among mean, median and mode is

      (i) mean > median > mode

      (ii) mean = median = mode

      (iii) mean < median < mode

      (iv) None of the above

(b) Which of the following is not a characteristic of a good measure of dispersion?

 (i) Clearly defined

 (ii) Easy to calculate

 (iii) Based on all observations

 (iv) Should be affected by extreme values

(c) The probability of getting at least one tail, when two coins are tossed, is

 (i) $\frac{1}{4}$

 (ii) $\frac{1}{2}$

 (iii) $\frac{3}{4}$

 (iv) None of the above

(d) The decision of rejecting H_0, when H_0 is actually true, is called as

 (i) type I error

 (ii) type II error

 (iii) both type I and type II errors

 (iv) degrees of freedom

(*Continued*)

(e) Which of the fallowing can measure any type of relationship?

  (i) Scatter diagram

  (ii) Karl Pearson's coefficient of correlation

  (iii) Spearman's rank correlation

  (iv) All of the above

(f) If one of the regression coefficients is greater than unity, then the other must be

  (i) zero

  (ii) greater than unity

  (iii) equal to unity

  (iv) less than unity

(g) An index number which accounts for the relative importance of the items is known as

  (i) simple aggregate index

  (ii) simple average of price relatives

  (iii) weighted index

  (iv) None of the above

(h) In Laspeyre's method of index number, weights are represented by the quantities of the commodities in

  (i) current year

  (ii) base year

  (iii) both current year and base year

  (iv) None of the above

(Turn Over)

(4)

2. Write short notes on any *four* of the following (**within 150 words** each) : 4×4=16

(a) Skewness

(b) Dependent events and conditional probability

(c) Distinction between sampling and census method

(d) Degree of correlation

(e) Problems in the construction of index number

(f) Difference between correlation and regression

3. (a) Calculate the arithmetic mean and median of the frequency distribution given below. Hence calculate the mode using the empirical relation among the three : 5+4+3=12

Class Limit	:	130–134	135–139	140–144
Frequency	:	5	15	28

Class Limit	:	145–149	150–154	155–159	160–164
Frequency	:	24	17	10	1

(*Continued*)

Or

(b) Calculate the coefficient of quartile deviation and coefficient of variation from the following data : 6+6=12

Marks (Below)	:	20	40	60	80	100
No. of Students	:	8	20	50	70	80

4. (a) (i) Write down the basic properties of binomial probability distribution.

(ii) The probability of defective item manufactured by a firm is $\frac{2}{10}$. In a sample of 5 items, find the probability of getting at least one defective item. 5+6=11

Or

(b) (i) If $P(A) = 0 \cdot 5$, $P(B) = 0 \cdot 3$ and $P(AB) = 0 \cdot 2$, obtain the probability that—

(1) A occurs but not B;

(2) at least one of A and B occurs;

(3) neither of A and B occurs.

(ii) A problem of statistics is given to five students A, B, C, D and E. Their chances of solving it are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$ and $\frac{1}{6}$. What is the probability that the problem will be solved? 6+5=11

5. *(a)* Explain the following : $4+3+4=11$

 (i) Non-probability sampling methods

 (ii) Errors in hypothesis testing

 (iii) Null hypothesis and alternative hypothesis

Or

(b) The following information is obtained in a sample survey :

Condition of Child	Condition of Home		
	Clean	Dirty	Total
Clean	70	50	120
Fairly Clean	80	20	100
Dirty	35	45	80
Total	185	115	300

State whether the two attributes, i.e., condition of home and condition of child are independent. Use χ^2-test for this purpose. (For $v = 2$, the table value of χ^2 at 5% level of significance is 5·99)   11

6. *(a)* What is rank correlation coefficient? Ten participants in a beauty contest are ranked by three judges in the following order :

1st Judge	:	1	6	5	10	3	2	4	9	7	8
2nd Judge	:	3	5	8	4	7	10	2	1	6	9
3rd Judge	:	6	4	9	8	1	2	3	10	5	7

Use the rank correlation coefficient to determine which pair of judges has the nearest approach to common taste in beauty. $2+9=11$

(Continued)

Or

(b) You are given below the following information about advertising and sales :

	Adv. Exp. (X) (in crore)	Sales (Y) (in crore)
Mean ($\bar{X}$)	10	90
SD (σ)	3	12

Correlation coefficient = 0·8.

(i) Calculate the two regression lines.

(ii) Find the likely sales, when advertisement expenditure is ₹ 50 crores.

(iii) What should be the advertisement expenditure, if the company wants to attain sales target of ₹ 150 crores? 6+2½+2½=11

7. (a) From the following data, construct
(i) Paasche's index number and
(ii) Fisher's index number : 4+7=11

	1999		2009	
Commodity	Price	Value (₹)	Price	Value (₹)
A	5	50	6	72
B	7	84	10	80
C	10	80	12	96
D	4	20	5	30
E	8	56	8	64

Or

(b) (i) Construct chain base index number using the following data :

Year → Items ↓	2005	2006	2007	2008	2009
A	5	8	10	12	15
B	3	6	8	10	12
C	2	3	5	7	10·5

(ii) Given the following data :

Year	Weekly Pay	Consumer Price Index
2004	109·50	112·8
2005	112·20	118·2
2006	116·40	127·4
2007	125·08	138·2
2008	135·40	143·5
2009	138·10	149·8

(1) What was the real average weekly pay for each year?

(2) In which year did the employees have the greatest buying power?

$5+6=11$

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