3 SEM TDC ECO M 2

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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. Answer the following as directed :   1×8=8

   (a) Variance of Poisson distribution is

       (i) n

       (ii) np

       (iii) npq

       (iv) $\sqrt{npq}$

              (Choose the correct answer)

(*Turn Over*)

(b) The third moment about the mean measures

   (i) variance

   (ii) skewness

   (iii) kurtosis

   (iv) coefficient of standard deviation

      (Choose the correct answer)

(c) When 3 dices are thrown, the exhaustive number of cases is _____.

      (Fill in the blank)

(d) When a dice is thrown, occurrence of an even number and an odd number are _____ events.

   (i) exhaustive

   (ii) compound

   (iii) complementary

   (iv) simple

      (Choose the correct answer)

(e) When we reject a true null hypothesis, _____ error occurs.

   (i) Type I

   (ii) Type II

   (iii) Both (i) and (ii)

   (iv) None of the above

      (Choose the correct answer)

(f) When $r = +1$, it means there is _____ relationship.

(Fill in the blank)

(g) If $r = 0 \cdot 6$ and $N = 64$, the probable error will be

(i) 0·074   *(ii)* 0·064

(iii) 0·054   *(iv)* 0·044

(Choose the correct answer)

(h) The base period should be a

(i) year of distant past

(ii) year when earthquake occurs

(iii) year when war happens

(iv) normal one

(Choose the correct answer)

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

(a) Kurtosis

(b) Binomial distribution

(c) Methods of sampling

(d) Point estimation

(e) Time-reversal and factor-reversal test

(f) Spearman's rank correlation test

(Turn Over

3. *(a)* Find the standard deviation and its coefficient from the following data :

$$8+4=12$$

Variable			No. of frequency	Variable			No. of frequency
more than		90	0	more than		40	110
"	"	80	5	"	"	30	150
"	"	70	14	"	"	20	170
"	"	60	34	"	"	10	176
"	"	50	65	"	"	0	180

Or

(b) Calculate Karl Pearson's coefficient of skewness : 12

Variable	Frequency	Variable	Frequency
70–80	11	30–40	21
60–70	22	20–30	11
50–60	30	10–20	6
40–50	35	0–10	5

4. *(a)* *(i)* Explain the addition theorem of probability using Venn diagrams in case of mutually exclusive events and events not mutually exclusive.

(ii) If from a pack of cards a single card is drawn, what is the probability that it is either a spade or a king?

$$7+4=11$$

Or

(b) One ticket is drawn at random from a bag containing 30 tickets numbered from 1 to 30. Find the probability that—

(i) it is a multiple of 5 or 7;

(ii) it is a multiple of 3 or 5.   5+6=11

5. *(a)* *(i)* Explain briefly the procedure followed in testing a hypothesis.

(ii) Distinguish between Type–I and Type–II errors. How to avoid such errors?   5+6=11

Or

(b) The following table gives the classification of 100 workers according to sex and the nature of work. Test whether nature of work is independent of the sex of the worker :   11

	Skilled	Unskilled
Males	40	20
Females	10	30

(For $v = 1$, the table value of χ^2 at 5% level of significance is 3·84)

6. *(a)* The following data relate to age of employees and the number of days they were reported sick in a month :

Age (X)	: 30	32	35	40	48	50	52	55	57	61
Sick days (Y)	: 1	0	2	5	2	4	6	5	7	8

Calculate Pearson's coefficient of correlation and interpret it. 9+2=11

Or

(b) From the following data, obtain the two regression equations using the method of least squares : 11

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

7. *(a)* (i) Given below are two price index series. Splice them on the base 1974 = 100. By what percentage did the price rise between 1970 and 1975?

Year	Old price index for base (1965 = 100)	New price index for base (1974 = 100)
1970	141·5	
1971	163·7	
1972	158·2	
1973	156·8	
1974	157·1	99·8
1975		100·0
		102·3

(Continued)

(ii) During a certain period the cost of living index goes up from 110 to 200 and the salary of a worker also raised from ₹ 325 to ₹ 500. Does the worker really gain and if so, by how much in real terms?   7+4=11

Or

(b) Using the following data, construct Fisher's ideal index number and show that it satisfies both time-reversal test and factor-reversal test :   7+4=11

Commodity	Base Year		Current Year	
	Price	Expenditure	Price	Expenditure
A	2	40	5	75
B	4	16	8	40
C	1	10	2	24
D	5	25	10	60

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