

**INSTRUCTIONS:**

- I. Figures to the right indicate maximum marks
- II. Start each answer on a fresh page.
- III. All questions are compulsory
- IV. Non scientific, non programmable calculator allowed.
- V. Graph paper will be provided on request

**[6x2=12 marks]****1. Attempt the following**

- A. Define time series. What are the components of time series? Explain
- B. Taking smaller year as the base year, find Index number for the following using
  - i. Simple Aggregative method
  - ii. Simple average of price relative method

Vegetables	Price in kg	
	2014	2015
Tomatoes	14	28
Green peas	15	60
Beet root	16	24
Cauliflower	17	51
Onions	20	10

**OR**

- X. Calculate the trend values by the method of least squares for the data given below.  
Estimate the sales for 2008

Year	2002	2003	2004	2005	2006	2007
Sales	70	74	80	86	140	90

- Y. Find the Laspyeres, Paasche's and Fisher's Index number for the following

Commodities	Base year		Current year	
	price	quantity	price	quantity
I	30	3	40	3
II	60	4	50	1
III	50	9	50	4
IV	70	2	60	2

[6x2=12 marks]

2. Attempt the following

A. Compute Karl Pearson's coefficient of correlation

X	1	2	3	5	4	3
y	2	4	5	5	3	1

B. Define the following terms

- Independent events
- Mutually exclusive events
- Exhaustive events
- Equally likely events
- Impossible and certain events
- Complementary events

OR

- X. What is scatter diagram? Explain correlation and types of correlation using scatter diagram
- Y. A bag contains 30 counters numbered 1 to 30. One counter is drawn at random. Find the probability that the number on the counter is a multiple of 5 or 7?

[6x2=12 marks]

3. Attempt the following

A. For the following data, find the weighted index number using

- Weighted Aggregative index number
- Weighted average of price relative index number

commodities	Prices per kg		Weightage w
	2016	2017	
A	33	11	3
B	40	30	8
C	24	12	2
D	10	4	5
E	6	7	6

B. Using 5 yearly moving averages find the trend for the data. Also plot the original data and trend values on the same graph.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Value	110	120	150	125	120	118	110	140	1676

OR

X. Define index number. What are the different classifications of index numbers? Also state a few uses of index numbers

Y. Using three yearly moving average determine the trend. Plot the original data and trend values on the same graph

Year	2008	2009	2010	2011	2012	2013	2014	2015
Value	35	38	42	45	42	41	50	48

4. Attempt the following

[6x2=12 marks]

A. Two perfect dice are thrown. Find the probability that the sum of the numbers on their upper faces is atleast 10.

B. Find spearman's rank correlation coefficient for the following

Marks 1	30	40	50	10	40	70
Marks 2	75	32	45	15	20	45

OR

X. A has won 20 out of 30 games of chess with B. In a new series of 6 games, what is the probability that A would win

- 4 or more games
- Only 4 games

Y. Two regression lines of a bivariate data are given below. Find both coefficients of regression and coefficient of correlation.

$$2x-3y=4 \text{ and } 3x-5y=18$$

5. Attempt the following

[6x2=12 marks]

A. In a partially destroyed laboratory record of correlation data only the following results are legible.

- Variance of  $x=9$
- Regression equations are  
 $8x-10y+66=0$   
 $40x-18y=214$

Find mean of  $x$  and  $y$  and standard deviation of  $y$ .

B. The average number of customers, who appear at the counter of a bank in one minute is

2. Find the probability that in a given minute

- No customer appears
- At most two customers appear  
 (Take  $e^{-2}=0.135$ )

OR

- X. For the following data find  $b_{yx}$ ,  $b_{xy}$  and  $r$ . Also find equations of lines of regression.  
Estimate the value of  $y$  when  $x=2$ .

	x	Y
Mean	3	5
variance	2.5	0.5

Covariance= 0.25

- Y. Write a short note on normal distribution and hence find the area

- Between  $z = -1.3$  and  $z = 0$
- $Z > 1.93$
- $Z < -0.73$
- Between  $z = 0.7$  and  $z = 1.3$
- Between  $z = -0.7$  and  $z = 1.3$

Z	1.3	0.7	0.73	1.93
P	0.4032	0.2580	0.2673	0.4732

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