

Importance Questions

I<sup>st</sup> UNIT  
REGRESSION      PART - B

Q.1

① Define regression and what are the differences between Correlation and regression.

② Given

$$\Sigma x = 56, \Sigma y = 40, \Sigma x^2 = 524, \Sigma y^2 = 256, \Sigma xy = 364, N = 8$$

① Find the two regression equation and

② The correlation Coefficient.

③ From the following data obtain the two regression equation and calculate the correlation Co-efficient.

X	2	4	6	8	10	12	14	16	18	
Y	18	16	20	24	22	26	28	32	30	

④ Following are the marks in Statistics and English in an Annual Examination.

	Statistics (X)	English (Y)
Mean	40	50
Stand	10	16
Co-efficient of Correlation	0.5	

(i) Estimate the score of English, when the score in Statistics is 50

(ii) Estimate the score of Statistics, when the score in English is 30

⑤ What is meant by regression? what is the importance and limitation of Analysis?

- ⑥ From the following data obtain the two regression equations and calculate the correlation coefficient.

X	2	4	6	8	10	12	14	16	18
Y	18	16	20	24	22	26	28	32	30

Calculate the value of 'y' when  $x = 6.2$

- ⑦ From the following table obtain the two Regression Equations.

X	10	10	18	25	28	33	34	39	42	43
Y	11	22	22	19	35	27	33	40	42	47

- ⑧ Given the following data, calculate the expected value of Y when  $X = 12$ . Find the regression Equations.

	X	Y
Average	7.6	14.8
Standard Deviation	3.6	2.5

where,  $r_c = 0.99$

- ⑨ Given the following data

	X	Y
Arithmetic Mean	36	85
Standard Deviation	11	8

where, coefficient of correlation = 0.66

- ⑩ Find the regression Equation of X on Y  
 ⑪ Estimate the value of X when  $Y = 60$

⑩ From the following table find two regression Equations. ⑤

X	10	12	13	16	17	20	25	29
Y	10	12	24	27	29	33	37	42

## II<sup>nd</sup> UNIT = INDEX NUMBERS

(9)

### Q10 PART-B

① The following are the indices (2007, Base):

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Indices	100	120	122	116	120	120	137	136	149	156	137

Shift the base to 2012 and recast the index numbers.

② From the following data calculate Price Index Number by using

① Paasche's Method ② Marshal Edgeworth Method.

Item	Base year		Current year	
	Price (₹)	Expenditure (₹)	Price (₹)	Expenditure (₹)
P	6	300	10	560
Q	2	200	2	240
R	4	240	6	360
S	10	300	12	288
T	3	120	8	240

③ Define Index Number. what are its features and uses?

④ Compute Price Index Number by using.

① Paasche's ② Marshal and Edgeworth methods.

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
P	5	100	6	150
Q	4	80	5	100
R	2	60	5	72
S	12	30	9	33

⑤ The index of 2010 is 100. It rises by 5% in 2011, falls 2% in 2012, rises 4% in 2013, rises 10% in 2014, falls 3% in 2015, and rises 8% in 2016. Find out the indices for the 7 years assuming that all the increases and decreases are the percentages of the respective preceding year - Also recast the indices shifting base to 2014.

⑥ From the following data calculate price Index according to

- ① Laspeyres,
- ② Paasche and
- ③ Marshall - Edgeworth methods.

Item	Base year		Current year	
	Price (₹)	Expenditure (₹)	Price (₹)	Expenditure (₹)
A	5	50	8	40
B	7	25	12	30
C	9	10	15	25
D	12	5	20	18

⑦ Calculate Quantity Index by ① Laspeyres's Method, ② Pasche's Method and ③ Bowley's Method.

Commodity	Base year		Current year	
	Quantity	Rate	Quantity	Rate
Bread	10	3	8	3.25
Meat	20	15	15	20
Tea	2	25	3	23

⑧ Calculate Fisher's Ideal Index from the following data

Aedical	Base year		Current year	
	Quantity	Value	Quantity	Value
A	5	50	4	48
B	8	48	7	49
C	6	18	5	20

⑨ Using the data given below calculate price Index numbers from the year 2003 by (i) Laspeyres's formula (ii) Pasche's formula and (iii) Fisher's formula with the year 2002 as base.

Commodity	Price		Quantity	
	2002	2003	2002	2003
Rice	9.3	4.5	100	90
Wheat	6.4	3.7	11	10
Pulses	5.1	2.7	5	3

⑩ Construct with the help of the data given below Fisher's Ideal index and show how it satisfies the Time reversal Test and Factor reversal Test.

Article	Base Year		Current Year	
	Price	Quantity	Price	Quantity
Wheat	8	50	20	60
Ghee	2	15	6	10
Firewood	1	20	2	25
Sugarcane	2	10	5	8
Cloth	1	40	3	20

### III<sup>rd</sup> UNIT = TIME SERIES

(7)

① Find the 4 year moving averages from the following data.

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Production (in tonnes)	150	170	196	180	190	216	248	280	300	320

② Production figure of a Textile Industry as follows

Year	2011	2012	2013	2014	2015	2016	2017
Production (in '000 units)	12	10	14	11	13	15	16

From the above data

- ① Determine the straight line equation under the Least Square Method.
- ② Find the Trend Value and show the trend line on a graph paper.
- ③ From the following data, calculate trend values Four Yearly Moving Averages.

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
Production (in tons)	506	620	1036	673	588	696	1116	738	663

④ Fit a straight line Least Square Method and tabulate the trend values for the above data.

Year	2011	2012	2013	2014	2015	2016	2017
Production (in tons)	77	88	94	85	91	98	90

⑤ Calculate the 3 yearly the 5 yearly moving averages for the following time series. ⑧

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Production (in quintals)	500	540	550	530	520	560	600	640	620	610	640

⑥ Obtain the straight line trend equation for the following data by the method of the least square. Tabulate the trend value.

Year	2010	2011	2012	2013	2014	2015	2016
Sale (in '000 units)	140	144	160	152	168	176	180

⑦ Calculate a 7-year Moving Average for the following data on the number of Commercial and industrial failures in a country during 1987-2002

Years	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
No. of Failures	23	26	28	32	20	12	12	10	9	13
	1997	1998	1999	2000	2001	2002				
	11	14	12	9	3	1				

8) Use the method of Least Squares to fit a straight line trend to the following data.

Year	1992	1993	1994	1995	1995	1997	1998	1999	2000	2001	2002
Avg. Monthly Demand	61	66	72	76	82	90	96	100	103	110	114

9) Estimate the trend values using the data given below by taking a four yearly Moving Average.

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Value	12	25	39	54	70	87	105	100	82	65	49	34

10) Use the method Least Squares to fit a straight-Line Trend to the following data.

Year	1995	1996	1997	1998	1999	2000	2001
Profits	75	70	72	65	50	54	41

## IV<sup>th</sup> UNIT = PROBABILITY

(10)

- ① From 30 tickets marked with first 30 numerals, 1 ticket is drawn at random. It is then replaced and a second draw is made. Find the probability that in the first draw it is multiple of 5 or 7 and in second draw it is a multiple of 3 or 7.
- ② In a bolt factory, the machines P, Q and R manufacture respectively 25%, 35% and 40% of the total of their outputs. 5, 4, 2 percents respectively are defective bolts. A bolt is drawn at random from the product, and is known to be defective. What are the probabilities that it was manufactured by the machines P, Q and R.
- ③ A bag contains 4 defective and 6 good Electronic calculators. Two calculators are drawn at random one after the other without replacement. Find the probability that
- ① Two are good
  - ② Two are defective and
  - ③ One is good and one is defective.
- ④ A Company has two Plants for manufacturing Scooters. Plant-I manufactures 80% of the Scooters and Plant-II manufactures 20%. At the Plant I 85% Scooters are stated to be of standard quality and at Plant II 65% Scooters are stated to be of standard quality. One Scooter was selected at random. What is the probability that
- (i) It is manufactured by Plant-I
  - (ii) It is manufactured by Plant-II → which is of standard quality.

⑩ (5) A box contains 8 Red 5 White balls. Two successive draws of 3 balls are made at random. Find the probability that the first three are white and second three are red. (11)

- (i) when there is replacement and
- (ii) when there is no replacement.

(6) A factory has two machines. Empirical evidence has established that machines I and II produce 30% and 70% of output respectively. It has also been established that 5% and 1% of the output produced by these machines respectively was defective.

A defective item is drawn at random. What is the probability that the defective item was produced by either machine I<sup>st</sup> or machine II<sup>nd</sup>?

(7) When two dice are thrown, find the probability that the sum of numbers is either 10 or 11.

(8) Define Probability. Explain the various basic concepts involved in Probability.

(9) A card is drawn at random from a probability that it is (i) Either a Spade or a Queen

(ii) Either a King or a black Card.

(10) State the various methods or approaches to probability.

① Five Coins are tossed 3,200 times, find the frequencies of the distribution of heads and tails; and tabulate the results and also calculate Mean and Standard Deviation of fitted distribution.

② A study of past participants indicates that the mean length of time spent on the programme is 500 hours and that, this normal distribution random variable has a standard deviation of 100 hours, what is the probability that a participant selected at random will be required to complete the programme in the following cases:

- (i) More than 500 hours
- (ii) Between 500 and 650 hours
- (iii) Between 550 and 650 hours
- (iv) Less than 580 hours
- (v) Between 420 and 570 hours.

③ Ten unbiased coins are tossed simultaneously. Find the probability of obtaining,

- (i) Exactly 6 Heads
- (ii) At least 8 Heads
- (iii) No Heads
- (iv) At least one Head
- (v) Not more than 3 Heads and
- (vi) At least 4 heads.

④ Fit a poisson distribution to the following data:

X	0	1	2	3	4
Y	211	90	19	5	0

⑤ 8 Coins are tossed at a time, 256 times. Find the expected frequencies of successes (Getting a Head) and tabulate the result obtained. (13)

⑥ Fit a poisson distribution to the following data...

$x:$	0	1	2	3	4
$f:$	123	59	14	3	1

( $e^{-m} = 0.6065$ ).

⑦ What is a Normal Distribution? Explain the Properties of Normal Distribution?

⑧ What do you mean by Binomial Distribution? Is there any fallacy in the statement the mean of a Binomial Distribution is 20 and its standard Deviation is 7.

⑨ A book contains 100 misprints distributed randomly throughout its 100 pages. What is the probability that a page observed at random contains at least two misprints? Assume Poisson distribution.

⑩ What do you mean by Normal Distribution? Explain the importance of Normal Distribution

\*\*\* ALL THE BEST \*\*\*