

20/02/2017

Class: F.Y.B.COM.( SEM-II)

SUBJECT : Mathematical & Statistical techniques

Marks:75

Time:  $2\frac{1}{2}$  Hrs.

N.B.: 1. All questions are compulsory.

2. All questions carry equal marks.

3. Figures to the right indicate maximum marks allotted to the sub-questions.

4. Use of simple calculator is allowed

Q.1] Attempt any three of the following:

A) For the Demand function  $D = 75 + 6p - p^2$ , find the demand when price is 5 and also find the price when Demand is 75. [05]

B) The total cost function is given by  $C = 10 + 4x + x^2$ . Find the average cost and marginal cost when  $x = 3$ . [05]

C) Find second order derivative of  $y = 5x^7 + 4x^3 - 3\log x + 25$ . [05]

D) Find the price elasticity of demand when  $p = 5$ , for the demand function  $D = 25 - 3p - p^2$ . [05]

Q.2] Attempt any three of the following:

A) What amount kept for 4 years at 8%p.a. will generate the simple interest same as the simple interest generated by Rs. 12,000 for 3 years also at 8%p.a.? [05]

B) Compute the compound amount and compound interest of Rs.1200 If invested at 9% for 2 years and the interest compounded quarterly. [05]

C) After investing Rs. 20,000 at the end of each year for some years, Mr. Shah received an accumulated amount of Rs. 65,562. If interest was compounded at 9% p.a., find the number of years. [05]

D) Mr.Patil took a loan of Rs.60,000 with 10% p.a. to be repaid in 4 years. Calculate EMI using reducing balance method and flat interest rate method. [05]

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B) Using three yearly moving average determine the trend and short term fluctuations. [05]

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006
Production In (1000 units)	121	120	123	125	124	122	125	126	125

C) The following table gives the prices of certain commodities in the year 2000 and 2007. Find their Simple Average Relatives Index number. [05]

Commodities	I	II	III	IV	V
Price in 2000	50	165	25	60	45
Price in 2007	150	55	100	40	90

D) Find the Lespeyre's, Paasche's and Fisher's weighted index numbers for the following data. [05]

Commodities	Base Year		Current year	
	Price	Quantity	Price	Quantity
	$p_0$	$q_0$	$p_1$	$q_1$
A	30	3	40	5
B	15	2	20	4
C	10	6	30	3
d	6	5	12	10

Q.5] Attempt any three of the following:

A) For the Normal distribution the limits of middle 50% of the observations are 250 and 350.

Find Median, Standard deviation, Mean deviation.

[05]

At any three of the following:

1. Coefficient of correlation for the following data :

x	2	5	8	10	6	3	1
y	4	6	7	8	5	4	3

2. Data of 5 candidates with respect to attributes A and B are given by :

40	50	20	30	45
20	45	30	35	47

3. Spearman's coefficient of correlation.

the following data:

X:	2	4	6
Y:	6	2	1

Find: i). The coefficients of Regressions.

ii). The equation of the lines of Regression Y on X.

iii). Estimate the value of Y, when  $X = 1$ .

We are given two regression lines

y on x

$$4x + 3y = 10$$

x on y

$$5x + y = 7$$

Find  $\bar{X}$ ,  $\bar{Y}$ ,  $b_{yx}$  and  $b_{xy}$ .

Q.4] Attempt any three of the following:

A) Fit a linear trend by the least square method to the following data and estimate the trend value for 2008.

Year	2001	2002	2003	2004	2005	2006	2007
Disinvestment in PSU in cr's	265	270	280	290	300	320	310

P.T.O.



Q.3] Attempt any three of the following:

A) Find the coefficient of correlation for the following data:

x	2	5	8	10	6	3	1
y	4	6	7	8	5	4	3

B) Marks of 5 candidates with respect to attributes A and B are given by:

A	40	50	20	30	45
B	20	45	30	35	47

Find Spearman's coefficient of correlation.

C) For the following data:

X:	2	4	6
Y:	6	2	1

Find: i). The coefficients of Regressions.

ii). The equation of the lines of Regression Y on X.

iii). Estimate the value of Y, when  $X = 1$ .

D) We are given two regression lines

$$y \text{ on } x : 4x + 3y = 10$$

$$x \text{ on } y : 5x + y = 7$$

Find  $\bar{X}$ ,  $\bar{Y}$ ,  $b_{xy}$  and  $b_{yx}$ .

Q.4] Attempt any three of the following:

A) Fit a linear trend by the least square method to the following data and estimate the trend value for 2008.

Year	2001	2002	2003	2004	2005	2006	2007
Disinvestment In PSU in cr's	265	270	280	290	300	320	310

B) If 8% of the mobiles are produced by a Nokia a defective, the production of the company are 50 mobiles per day. Find the probability that, i). None of the defective mobile.

[05]

ii). 4 mobiles are defective.

B) It is observed that the average number of phone calls per minute coming into switchboard of a company is 3. Find probability that during a particular minute there will be i) no phone

[05]

calls, , ii) At least 1 phone calls.

[05]

D) State the properties of normal distribution.

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