28/04/11 F.Y.B.Com

Sub:- Mathematics & Statistics.

Note : 1) All questions are compulsory and carry equal marks.
2) Use of simple calculator is allowed
3) figures to right indicate full marks

SECTION - I

Q.1] a) Calculate Karl pearson's coefficient of correlation for the following data: ( )

x	17	8	12	13	10	12
y	13	7	10	11	8	9

b) Find five yearly moving average ( )

Year	1997	1998	1999	2000	2001
Time Series	87	90	92	98	105

2002	2003	2004	2005
93	100	110	125

OR

Q.1] p) The rank of 10 students in ... subject ( ) A, ... and ... find the rank correlation coefficient for each of the three possible pair.

Rank in A	1	3	4	2	5	10	8	6	7	9
Rank in B	3	5	1	2	6	10	4	9	7	8

q) Using least Squares method, find the trend ( ) value. Also find trend for 2006.

Year	2000	2001	2002	2003	2004	2005
Assets	105	118	125	130	150	172

Q2] From the following data, find the regres... equations and further estimate Y if X = 16 and X if Y = 18

X	3	4	6	10	12	13
Y	12	11	15	16	19	17

OR

Q2] A producer of product P has estimated the following distribution of demand:

No. of Units demanded	0	1	2	3	4
Probability	0.15	0.25	0.30	0.20	0.10

Each unit of P cost him Rs 70 and he sell them at Rs 100 each. Any item left unsold is disposed at Rs 60 each. How many units of P should be produced so at maximize his expected profit?

Q3] a) Calculate for the following data the index ( ) No. as given below:

(i) Unweighted aggregative method
(ii) Weighted aggregative method
(iii) Unweighted average of price relatives
(iv) weighted average of price relatives:

Commodity	weight	Price in Rs. Base Year	Current Year
A	130	550	1345
B	450	630	1250
C	75	150	335
D	225	450	778
E	120	225	886

b) for a bivariate distribution, the following results are obtained: ( )

Mean value of $x = 65$, Mean value of $y = 53$
Standard deviation of $x = 4.7$, Standard deviation of $y = 5.2$, Correlation coefficient, $r = 0.78$

Find the two regression equations and hence obtain

(i) the most probable value of y when $x = 63$
(ii) the most probable value of x when $y = 50$

OR

Q3] p) From the following data calculate (i) I_L (ii) I_P (iii) I_F ( )

Commodity	Base Year Price	Base Year Quantity	Current Year price	Current Year Quantity
Rice	4	15	5	20
Pulses	8	20	12	30
Sugar	6	25	8	20
D	6	3	8	4
E	14	2	20	3

q) A businessman has option to buy 3 plants, the choice depends on the expected sale volume. The payoff matrix is given as

plant	Demand		
	Low	Moderate	High
A_1	-5	5	20
A_2	2	8	8
A_3	4	5	5
Prob	0.3	0.4	0.3

Construct a decision tree and recommend which plant should be bought.

Section - II

Q.4 a) Given $f(x) = 3x^2 - 2$ for $-5 \leq x < -2$
$= 4x - 1$ for $-1 \leq x \leq 1$
$= x^3 + x - 4$ for $2 \leq x < 6$

find $f(0)$, $f(-3)$ & $f(4.5)$

b) A person borrowed totally RS. 160,000 from two known people. For one loan he paid 18% p.a. and for the second loan, he paid ₹ 25% p.a. After one year, he paid Rs. 31,600 as Simple Interest. How much money did he borrow at each rate.

OR

Q.4 p] Examine the following function for maxima & minima

$f(x) = 10x^3 - 15x^2 + 10$

q] A cottage industry of toys has 29 workers. The Fixed cost turns out to be Rs. 30 per worker daily. the cost of producing a unit toy is Rs. 2.07.

i) If each toy is sold for Rs. 6, find the no. of toys that should be produced and sold to ensure no loss.

ii) If to promote sale, price is reduced by 50 paise per toy, what would be the Break-Even point

5 a) Find $\frac{dy}{dx}$, where

i) $y = \frac{5x+4}{4x+5}$

ii) $y = (x^2 - 3x + 5)(e^x + 1)$

b) A loan of Rs. 50,000 is to be returned in 3 equal monthly instalments, the rate of Interest being 2% per month.

i) Calculate the EMI using reducing balance method.

ii) Find Interest & principle repayment Components of the EMI for each month.

OR

5 p) On what Sum of money will the difference between the Compound Interest and the Simple Interest for two years at 4% p.a. be Rs. 56 ?

q) The demand for a Commodity when its price is x is given by

$y = \frac{2x+5}{3x-4}$.

Find the elasticity of demand when the price is 5 units.