BOARD QUESTION PAPER : MARCH 2016

Notes:

i. All questions are compulsory.
ii. Figures to the right indicate full marks.
iii. Answer to every question must be written on a new page.
iv. L.P.P. problem should be solved on graph paper.
v. Log table will be provided on request.
vi. Write answers of Section – I and Section – II in one answer book.

Section − I

*Question 1 to 3 (based on section I) are given in our book **STD XII (COMMERCE) MATHEMATICS AND STATISTICS - I***

Section − II

Q.4. Attempt any SIX of the following: **[12]**

i. Anandi and Rutuja invested ` 10,000 each in a business. Anandi withdrew her capital after 7 months. Rutuja continued for the year. After one year, the profit earned by them was ` 5,700. Find the profit earned by each person. (2)

ii. Calculate age specific death (A-SDR) rates for the following data:

Age group (in years)	Population ('000)	Number of Deaths
Below 10	25	50
10 – 30	30	90
30 – 45	40	160
45 − 70	20	100

(2)

iii. For a bivariate data $b_{YX} = -1 \cdot 2$ and $b_{XY} = -0 \cdot 3$, find the correlation coefficient between x and y. (2)

iv. A random variable x has the following probability distribution:

x	0	1	2	3	4	5	6
P(X = x)	k	3k	5k	7k	9k	11k	13k

Find 'k'. (2)

v. The probability distribution function of continuous random variable X is given by

$f(x) = \frac{x}{4}$, $0 < x < 2$

$= 0$, otherwise

Find $P(x \leq 1)$. (2)

vi. From the two regression equations $y = 4x - 5$ and $3x = 2y + 5$ find $\bar{x}$ and $\bar{y}$. (2)

vii. Draw scatter diagram for the following data and interpret it:

x	10	20	30	40	50	60	70
y	32	20	24	36	40	28	38

(2)

viii. If $\Sigma d^2 = 66$ and n = 10 then find the rank correlation coefficient. (2)

Q.5. (A) Attempt any TWO of the following: **(6)[14]**

i. Determine l_{92} and l_{93}, given that $l_{91} = 97$, $d_{91} = 38$ and $q_{92} = \frac{27}{59}$. (3)

ii. Calculate CDR for districts A and B and compare them.
Also state which district is more healthy. (3)

Age group (in years)	District A		District B	
	No. of Persons ('000)	No. of Deaths	No. of Persons ('000)	No. of Deaths
0 – 15	1	20	2	50
15 – 60	3	30	7	70
60 and above	2	40	1	25

iii. If for a bivariate data $\bar{x} = 10$, $\bar{y} = 12$, Var(X) = 9, $\sigma_Y = 4$ and r = 0.6, estimate y when $x = 5$. (3)

(B) Attempt any TWO of the following: **(8)**

i. Calculate the coefficient of correlation between X and Y series from the following data:
n = 15, $\bar{x}$ = 25, $\bar{y}$ = 18, $\sigma_X = 3.01$, $\sigma_Y = 3.03$, $\sum (x_i - \bar{x})(y_i - \bar{y}) = 122$ (4)

ii. Solve the following minimal assignment problem and hence find minimum time where '–' indicates that job connot be assigned to the machine:

Machines	Processing time in hours				
	A	B	C	D	E
M_1	9	11	15	10	11
M_2	12	9	–	10	9
M_3	–	11	14	11	7
M_4	14	8	12	7	8

(4)

iii. Solve the following maximal assignment problem:

Branch Manager	Monthly Business (` lakh)			
	A	B	C	D
P	11	11	9	9
Q	13	16	11	10
R	12	17	13	8
S	16	14	16	12

(4)

Q.6. (A) Attempt any TWO of the following: **(6)[14]**

i. Find the true discount, banker's discount and banker's gain on a bill of ` 36,600 due 4 months hence at 5% p.a. (3)

ii. Mr. Anil wants to invest at most ` 60,000 in Fixed Deposit (F.D.) and Public Provident Fund (P.P.F.). He wants to invest at least ` 20,000 in F.D. and at least ` 15,000 in P.P.F. The rate of interest on F.D. is 8% p.a. and that on P.P.F. is 10% p.a. Formulate the above problem as L.P.P. to determine maximum yearly income. (3)

iii. Find graphical solution for the following system of linear inequations:
$3x + 2y \leq 180$; $x + 2y \leq 120$, $x \geq 0$, $y \geq 0$
Hence find co-ordinates of corner points of the common region. (3)

(B) Attempt any TWO of the following: **(8)**

i. Mrs. Menon plans to save for her daughter's marriage. She wants to accumulate a sum of ` 4,00,000 at the end of 4 years. How much should she invest at the end of each year from now, if she can get interest compounded at 10% p.a.? [Given : $(1.1)^4 = 1.4641$] (4)

ii. A car valued at ` 4,00,000 is insured for ` 2,50,000. The rate of premium is 5% less 20%. How much loss does the owner bear including the premium if value of the car is reduced to 60% of its original value? (4)

iii. If a random varibale X has probability distribution function
$f(x) = \frac{c}{x}$, $1 < x < 3$, $c > 0$,
find c, E(X) and Var (X). (4)