BOARD QUESTION PAPER : MARCH 2014

Note:

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. Alex spends 20% of his income on food items and 12% on conveyance, If for the month of June 2010, he spent ₹ 900 on conveyance, find his expenditure on food items during the same month. (2)

ii. Find the premium on a property worth ₹ 12,50,000 at 3% if the property is fully insured. (2)

iii. The following table gives the age of the husbands and of the wives:

Age of wives (in years)	Age of husbands (in years)			
	20-30	30-40	40-50	50-60
15 – 25	5	9	3	–
25 – 35	–	10	25	2
35 – 45	–	1	12	2
45 – 55	–	–	4	16
55 – 65	–	–	–	4

Find the marginal frequency distribution of the age of husbands. (2)

iv. For a bivariate data $\bar{x} = 53$, $\bar{y} = 28$, $b_{YX} = -1.5$, $b_{XY} = -0.2$. Estimate Y, when X = 50. (2)

v. Values of two regression coefficients between the variables X and Y are $b_{YX} = -0.4$ and $b_{XY} = -2.025$ respectively. Obtain the value of correlation coefficient. (2)

vi. Verify whether the following function can be regarded as probability mass function (p.m.f.) for the given values of X: (2)

X	–1	0	1
P (X = x)	–0.2	1	0.2

vii. The p.m.f. of a random variable X is

$P(x) = \frac{1}{5}$, for $x = 1, 2, 3, 4, 5$

$= 0$, otherwise

Find E (X). (2)

viii. The time (in hours) required to perform the printing and binding operations (in that order) for each book is given in the following table:

Books	I	II	III	IV	V
Printing Machine M_1	3	7	4	5	7
Binding Machine M_2	6	2	7	3	4

Find the sequence that minimizes the total elapsed time (in hours) to complete the work. (2)

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

i. Find the present value of an annuity immediate of ₹ 18,000 p.a. for 3 years at 9% p.a. compounded annually. [Given $(1.09)^{-3} = 0.7722$] (3)

ii. Compute rank correlation coefficient for the following data:

R_x	1	2	3	4	5	6
R_y	6	3	2	1	4	5

(3)

iii. If the rank correlation coefficient is $\frac{2}{3}$ and $\sum d_i^2 = 55$, then find the number of pairs of observations. Assume that no rank is repeated. (3)

(B) Attempt any TWO of the following:

i. From the following data, find crude death rates (C.D.R.) for Town I and Town II, and comments on the results:

Age group (years)	Town I		Town II	
	Population	No. of deaths	Population	No. of deaths
0 – 10	1500	45	6000	150
10 – 25	5000	30	6000	40
25 – 45	3000	15	5000	20
45 and above	500	22	3000	54

(4)

ii. Calculate the quantities indicated by '?' for the following part of a life table:

x	l_x	d_x	q_x	L_x	T_x	e_x^0
4	9100	60	?	?	510000	?
5	?	45				

(4)

iii. The Probability that a bomb dropped from an aeroplane will strike a target is $\frac{1}{5}$. If four bombs are dropped, find the probability that

a. exactly two will strike the target.

b. at least one will strike the target. (4)

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

i. Amit and Rohit started a business by investing ₹ 20,000 each. After 3 months Amit withdrew ₹ 5,000 and Rohit put in ₹ 5,000 additionally. How should a profit of ₹ 12,800 be divided between them at the end of the year? (3)

ii. A bill of ₹ 7,500 was discounted for ₹ 7,290 at a bank on 28th October 2006. If the rate of interest was 14% p.a., what is the legal due date of the bill? (3)

iii. Let X be the number of matches played by the player and Y be the number of matches in which he scored more than 50 runs. The following data shown is obtained for 5 players:

No. of Matches Played (X)	Data of matches of 5 players				
	21	25	26	24	19
Scored more than 50 in a match (Y)	19	20	24	21	16

Find the regression line of X on Y. (3)

(B) Attempt any TWO of the following:

i. Find the sequence that minimizes total elapsed time (in hours) required to complete the following jobs on two machines M_1 and M_2 in the order $M_1 - M_2$. Also find the minimum elapsed time T and idle times for the two machines. (4)

Jobs / Machines	A	B	C	D	E
M_1	5	1	9	3	10
M_2	2	6	7	8	4

ii. Solve the following L. P. P. :

Minimize : $Z = 4x + 2y$

Subject to : $3x + y \geq 27$,

$x + y \geq 21$,

$x + 2y \geq 30$,

$x \geq 0, y \geq 0$ (4)

iii. Solve the following L. P. P.:

Maximize : $Z = 4x + 10y$

Subject to : $2x + 5y \leq 10$

$5x + 3y \leq 15$

$x \geq 0, y \geq 0$ (4)