BOARD QUESTION PAPER : MARCH 2018

Notes:

i. All questions are compulsory.
ii. Figures to the right indicate full marks.
iii. Graph paper is necessary for L.P.P
iv. Use of logarithmic table is allowed.
v. Answers to the question in Section – I and Section – II should be written in two separate answer books.
vi. Question from Section – I attempted in the answer book of Section – II and vice-versa will not be assessed / not be given any credit.
vii. Answer to every question must be written on a new page.

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. A shop valued at ₹ 2,40,000 is insured for 75% of its value. If the rate of premium is 90 paise percent, find the premium paid by the owner of the shop. (2)

ii. Find the Age-Specific Death Rate (Age-SDR) for the following date:

Age groups (in years)	Number of persons (in' 000)	Number of deaths
0 – 10	11	240
10 – 20	12	150
20 – 60	9	125
60 and above	2	90

(2)

iii. If $\sum d_i^2 = 25$, n = 6 find rank correlation coefficient where d_i is the difference between the ranks of i^{th} values. (2)

iv. The following table gives the ages of husbands and 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: a. The marginal frequency distribution of the age of husbands.
b. The conditional frequency distribution of the age of husbands when the age of wives lies between 25 – 35. (2)

v. The regression equation of Y on X is $y = \frac{2}{9}x$ and the regression equation of X on Y is $x = \frac{y}{2} + \frac{7}{6}$

Find: a. Correlation coefficient between X and Y.

b. σ_y^2 if $\sigma_x^2 = 4$. (2)

vi. Identify the regression equations of X on Y and Y on X from the following equations:

$2x + 3y = 6$ and $5x + 7y - 12 = 0$ (2)

vii. If X has Poisson distribution with parameter m = 1, find P[X ≤ 1]. (Use $e^{-1} = 0.3679$) (2)

viii. Three fair coins are tossed simultaneously. If X denotes the number of heads, find the probability distribution of X. (2)

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

i. Ramesh, Vivek and Sunil started a business by investing capitals in the ratio 4 : 5 : 6. After 3 months Vivek withdrew all his capital and after 6 months Sunil withdrew all his capital from the business. At the end of the year Ramesh received ₹ 6,400 as profit. Find the profit earned by Vivek. (3)

ii. Solve the following minimal assignment problem and hence find the minimum value:

	I	II	III	IV
A	2	10	9	7
B	13	2	12	2
C	3	4	6	1
D	4	15	4	9

(3)

iii. Calculate $e_0^\circ, e_1^\circ, e_2^\circ$ from the following data:

Age x	0	1	2
l_x	1000	900	700
T_x	–	–	11500

(3)

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

i. A bill was drawn on 12th April for ₹ 3,500 and was discounted on 4th July at 5% p.a. If the banker paid ₹ 3,465 for the bill, find period of the bill. (4)

ii. Find Karl Pearson's correlation coefficient for the following data:

X	3	2	1	5	4
Y	8	4	10	2	6

(4)

iii. Solve the following using graphical method:

Minimize: $Z = 3x + 5y$

Subject to $2x + 3y \geq 12$,

$-x + y \leq 3$

$x \leq 4, y \geq 3, x \geq 0, y \geq 0$ (4)

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

i. Given the following information:

Age groups (in years)	Population	Number of deaths
0 – 20	40,000	350
20 – 65	65,000	650
65 and above	15,000	X

Find X, if the CDR = 13.4 per thousand. (3)

ii. The manager of a company wants to find a measure which he can use to fix the monthly wages of persons applying job in the production department. As an experimental project, he collected data of 7 persons from the department referring to years of service and their monthly income:

Years of service	11	7	9	5	8	6	10
Income (₹ in thousands)	10	8	6	5	9	7	11

Find regression equation of income on the years of service. (3)

iii. Solve the following inequation:
$-8 < -(3x - 5) < 13$ (3)

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

i. Find the probability of guessing correctly at most three of the seven answers in a True or False objective test. (4)

ii. A person bought a television set paying ₹ 20,000 in cash and promised to pay ₹ 1,000 at the end of every month for the next 2 years. If the money is worth 12% p.a. converted monthly, what is the cash price of the television set?
$[(1.01)^{-24} = 0.7884]$ (4)

iii. There are four jobs to be completed. Each job must go through machines M_1, M_2, M_3 in the order $M_1 - M_2 - M_3$. Processing time in hours is given below. Determine the optimal sequence and idle time for Machine M_1.

Jobs	A	B	C	D
M_1	5	8	7	3
M_2	6	7	2	5
M_3	7	8	10	9

(4)