

BOARD QUESTION PAPER : JULY 2017

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. In a class, 60% students are boys and 40% are girls. By admitting 16 boys and 8 girls, the ratio of boys to girls becomes 8 : 5. Find the original number of boys and girls in the class. (2)
- ii. An agent charges 12% commission on the sales. How much does he earn if the total sales amount to ` 36,000? How much does the seller get from this sale? (2)
- iii. Find the Age – Specific Death Rate (SDR) for the following data:

Age groups (in years)	Population	Number of deaths
0 – 10	11, 000	220
10 – 20	12,000	240
20 – 60	9, 000	180
60 and above	2,000	90

(2)

- iv. If the Crude Death Rate (CDR) for the following data is 13.4 per thousand, find x :

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

(2)

- v. If a fair die is rolled four times, what is the probability that two of the rolls will show '1'. (2)
- vi. Solve the inequation $-8 \leq 3x - 5 < 7$ and represent it on the real number line. (2)
- vii. Sketch the graph $|y| \leq 3$ in a co-ordinate plane. (2)
- viii. Find the sequence that minimizes the total elapsed time (in hours) required to complete the following jobs on the machines M_1, M_2 and M_3 in the order $M_1 M_2 M_3$:

Jobs Machines	A	B	C	D
M_1	5	6	9	5
M_2	2	4	5	3
M_3	3	5	6	7

(2)

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

- Find accumulated value after 1 year of annuity immediate in which ` 20,000 is invested every quarter, at 16% p.a. compounded quarterly. [Given : $(1.04)^4 = 1.1699$] (3)
- If a random variable X follows Poisson distribution such that $P(X = 1) = P(X = 2)$, find :
 - the mean and
 - $P(X = 0)$. (3)
 [Given : $e^{-2} = 0.1353$] (3)
- The probability of defective bolts in a workshop is 40%. Find the mean and variance of defective bolts out of 10 bolts. (3)

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

- Given the following table which relates to the number of animals of a certain species at age x. Complete the life table with dx , qx , Lx and Tx .

X	0	1	2	3	4	5
l_x	1000	850	760	360	25	0

- Coefficient of correlation between the variables X and Y is 0.3 and their covariance is 12. The variance of X is 9, find the standard deviation of Y. (4)
- Compute correlation coefficient for the following data: (4)

X	9	7	6	8	5
Y	19	17	16	18	15

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

- Surabhi, Simona and Shruti started a business in partnership by investing ` 60,000, ` 40,000 and ` 75,000 respectively. At the end of the year they found that they have incurred a loss of ` 24,500. Find how much loss each one had to bear. (3)
- Three cars were sold through an agent for ` 1,60,000, ` 1,48,000 and ` 1,50,000 respectively. The rates of commission were 17.5% on the first, and 12.5% on the second. If on the whole, the agent received 14% commission on the total sales, find the rate of commissions paid on the third car. (3)
- The equations of two regression lines are $2x + 3y - 6 = 0$ and $5x + 7y - 12 = 0$. Find
 - Correlation coefficient.
 - $\frac{\sigma_x}{\sigma_y}$

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

- If $\sum x_i = 56$, $\sum y_i = 56$, $\sum x_i^2 = 476$, $\sum y_i^2 = 476$, $\sum x_i y_i = 469$ and $n = 7$, find
 - the regression equation of y on x.
 - y, if $x = 12$.
- Solve the following minimal assignment problem:

Machines	Jobs				
	A	B	C	D	E
M_1	27	18	∞	20	21
M_2	31	24	21	12	17
M_3	20	17	20	∞	16
M_4	21	28	20	16	27

- Solve the following L. P.
 P.: Maximize $Z = 4x + 5y$
 Subject to $2x + y \geq 4$,
 $x + y \leq 5$,
 $0 \leq x \leq 3$,
 $0 \leq y \leq 3$