

MAY 2015

**P/ID 77602/PBE1B/
PBEXB**

Time : Three hours

Maximum : 100 marks

PART A — (5 × 6 = 30 marks)

Answer any FIVE questions.

1. A bag contains 5 white and 3 black balls. Two balls are drawn at random one after the other with replacement. Find the probability that both balls drawn are black.
2. Explain the difference between expected opportunity loss and expected value of perfect information.
3. For 10 observations on price (x) and supply (y), the following data were obtained (in appropriate units)
 $\sum x = 130, \sum y = 220, \sum x^2 = 2288$
 $\sum Y^2 = 5506, \sum XY = 3467$
obtain the line of regression of y on x and estimate the supply when the price is 16 units.
4. Calculate the correlation coefficient between the height of sisters and height of brothers from the given data.
Height of sisters (in cm) : 64 65 66 67 68 69 70
Height of brothers (in cm) : 66 67 65 68 70 68 72

5. Use the graphical method to solve the following LP problems.

$$\text{Minimize } z = 3x_1 + 2x_2$$

Subject to the constraints

$$5x_1 + x_2 \geq 10$$

$$x_1 + x_2 \geq 6$$

$$x_1 + 4x_2 \geq 12$$

$$x_1, x_2 \geq 0$$

6. Solve the following Mixed – integer programming problems.

$$\text{Maximize } z = -3x_1 + x_2 + 3x_3$$

Subject to the constraints

$$-x_1 + 2x_2 + x_3 \leq 4$$

$$2x_2 - \frac{3}{2}x_3 \leq 1$$

$$x_1 - 3x_2 + 2x_3 \leq 3$$

$$x_1, x_2 \geq 0; x_3$$

non negative integer.

7. How does PERT technique help a business manager in decision making?
8. Discuss various steps involved in the applications of PERT and CPM.

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Find the mean and variance of binomial distribution.
10. Explain briefly decision trees.

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11. Define systematic random sampling and give an example.
12. Differentiate between correlation and regression.
13. Five men are available to do five different jobs. From past records the time (in hours) that each man takes to do each job is known as given in the following table.

	I	II	III	IV	V
A	2	9	2	7	1
B	6	8	7	6	1
Men C	4	6	5	3	1
D	4	2	7	3	1
E	5	3	9	5	1

Find the assignments of men jobs that will minimize the total time taken.

14. Let x_1, x_2 be the number of batches containing 100 hard cover and paper back books respectively. Then the LP problem can be formulated as follows.

Minimize $z = 600x_1 + 500x_2$

Subject to the constraints

$$2x_1 + x_2 \geq 80$$

$$x_1 + 2x_2 \geq 60$$

$$x_1, x_2 \geq 0$$

Solve the L.P.P using graphical method.

15. A project is represented by the network shown below and has the following data :

Task :	A	B	C	D	E	F	G	H	I
Optimistic time :	5	18	26	16	15	6	7	7	3
Pessimistic time :	10	22	40	20	25	12	12	9	5
Most likely time :	8	20	33	18	20	9	10	8	4

Determine the following :

- (a) Expected task times and their variance.
 - (b) The critical path.
16. Explain report writing in Business Research.

PART C — (1 × 20 = 20 marks)
(Compulsory)

17. The following data gives the correlation coefficient, means and standard deviation of rainfall and yield of paddy in a certain tract :

	Yield per acre in lbs	Annual rainfall
Mean	973.5	18.3
S.d	38.4	2.0

Coefficient of correlation = 0.58

Estimate the most likely yield of Paddy when the annual rainfall is 22. Other factors being assumed to remain the same.