

(6 pages)

MAY 2011

P/ID 77602/PBE1B

Time : Three hours

Maximum : 100 marks

PART A — (5 × 6 = 30 marks)

Answer any FIVE questions.

All questions carry equal marks.

1. How would you interpret the value of a co-efficient of correlation?
2. What are the advantages and limitations of Karl Pearson's co-efficient of correlations?
3. Fit the regression line of X on Y and estimate the value of X when Y is 135.
4. If the probability of answering a question correctly is 5 times the probability of answering it incorrectly. What is the probability of answering it correctly?

5. (a) Define a Normal Distribution. What are its principal properties?

(b) What is a unit normal curve?

6. What are the assumptions underlying product moment correlation? When should it be preferred to Rank Difference Correlation?

7. Calculate Pearson's product moment r from the following set of scores :

X 23 21 19 18 17 15 15 13 11 8

Y 15 19 13 17 15 13 12 11 10 5

8. Define a binomial random variable. Give any two applications of binomial distribution.

PART B — ($5 \times 10 = 50$ marks)

Answer any FIVE questions.

All questions carry equal marks.

9. A banker claims that the life of a regular saving account opened with his bank averages 18 months with a standard deviation of 6.45 months. Assuming normal distribution :

- (a) The probability that there will still be money in 22 months in a saving account opened with the said bank by a depositor.
- (b) What is the probability that the account will have been closed before 2 years?

10. Given the following fit the two regression lines X on Y , and Y on X

X 5 10 15 20 25 30

Y 18 34 54 72 84 98

11. The arrival rate of customers arriving at a petrol bunk follows Poisson distribution with a mean arrival rate of 10 per 15 minutes interval find the following :
- (a) The probability that no customer will arrive in a 15 minutes interval.
 - (b) The probability that exactly 3 customers will arrive in a 15 minutes interval.

12. Solve the following problem using the simplex method :

Maximize $D + 2F$

Subject to $D + 3F \leq 50$

$6D + 9F \leq 150$

$3D + 8F \leq 120$

$D, F \geq 0.$

13. Solve the following Linear Programming problem using the simplex method :

Minimize $2x + 7Y - 3W$

subject to $3x + 2w = 9$

$2x + 3y \geq 4$

$x + y \geq 1$

$x, y, w \geq 0.$

14. A project has the following characteristics :

Activity	Time	Predecessors
A	6	None
B	8	A
C	4	A
D	9	B
E	2	C
F	7	D

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[P.T.O.]

Construct a PERT network and compute ES, LS and slack time for each activity, find the critical path.

15. A complex project has the following characteristics :

Activity Predecessors Time Activity Predecessors Time

<i>A</i>	None	8	<i>K</i>	<i>J, F</i>	4
<i>B</i>	None	2	<i>L</i>	<i>H, G, K</i>	6
<i>C</i>	None	3	<i>M</i>	<i>H, G, K</i>	8
<i>D</i>	<i>C</i>	9	<i>N</i>	<i>J, F</i>	5
<i>E</i>	<i>B, D</i>	4	<i>O</i>	<i>I, L</i>	4
<i>F</i>	<i>C</i>	6	<i>P</i>	<i>J, F</i>	4
<i>G</i>	<i>B, D</i>	7	<i>Q</i>	<i>I, L</i>	3
<i>H</i>	<i>A, E</i>	1	<i>R</i>	<i>O, M, N</i>	2
<i>I</i>	<i>A, E</i>	2	<i>S</i>	<i>O, M, N</i>	1
<i>J</i>	<i>B, D</i>	3	<i>T</i>	<i>Q, R</i>	6

Construct a PERT network and compute the ES, LS and Slack time for all activities.

16. Draw the structure at Academic and Business Research Reports.

PART C — (1 × 20 = 20 marks)

(Compulsory)

17. Table showing weekly wages drawn by number of workers in a factory :

Weekly wages	No. of workers
0–20	40
20–30	39
30–40	34
40–50	30
50–100	49

From the above data calculate (a) mean deviation (b) quartile deviation (c) standard deviation. Test empirical relationship between them.
