



K23P 3252

Reg. No. :

Name :

**First Semester M.Com. Degree (CBSS-Supple. (One Time Mercy Chance)/
Imp.) Examination, October 2023
(2014 to 2022 Admissions)**

COM1C02 – QUANTITATIVE TECHNIQUES AND OPERATION RESEARCH

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer **any four** questions in this Section. **Each** question carries **one** mark for Part (a), **three** marks for Part (b), and **five** marks for Part (c).

1. a) Define Binomial distribution.
b) What are the properties of Normal distribution ?
c) The mean and variance of a binomial variate are 8 and 6. Find $P[X \geq 2]$.
2. a) State the Multiplication Theorem of probability.
b) One bag contains 4 white and 2 black balls. Another contains 3 white and 5 black balls. One ball is drawn from each bag. Find the probability that both are of the same color.
c) Three persons A, B and C shoot to hit a target. If in trials, A hits the target 4 times in 5 shots, B hits 3 times in 4 shots and C hits 2 times in 3 trials, find the probability that
 - I) Exactly two persons hit the target.
 - II) At least two persons hit the target.
3. a) What is degree of freedom ?
b) Explain Standard error. Distinguish it from standard deviation.
c) The mean life time of a sample of 100 light tubes produced by a company is found to be 1580 hours with standard deviation of 90 hours. Test the hypothesis that the mean life time of the tubes produced by the company is 1600 hours.

P.T.O.



4. a) Expand and explain LPP.
 - b) What are the assumptions in formulating LPP ?
 - c) What is a feasible region in LPP ? Explain with steps of LPP.
5. a) Define 'event' in network analysis.
 - b) What is meant by critical path ? Why should we know which activities are critical ?
 - c) Explain the usefulness of PERT and CPM techniques in decision-making.
6. a) State any one advantage of the simplex method of solving an LPP over the graphical method.
 - b) What is meant by an optimality test in a transportation problem ?
 - c) Explain the steps involved in solving a problem using the operations research technique.

(4×9=36)

SECTION – B

Answer the **two** questions in this section. **Each** question carries **12** marks.

7. a) Two random samples drawn from a normal population are

Sample I 20 16 26 27 23 22 18 24 25 19

Sample II 27 33 42 35 32 34 38 28 41 43 30 37

Obtain estimates of variances of the population and test whether the two populations have the same variance. (Use F test).

OR

- b) A box contains six tickets. Two of the tickets carry a prize of Rs. 5 each and the other four prizes of Re. 1 each.
 - a) If one ticket is drawn, what is the expected value of the prize ?
 - b) If two tickets are drawn, what is the expected value of the prize ?



8. a) Solve the following linear programming problem graphically.

Minimise $Z = 3x_1 + 5x_2$

Subject to $-3x_1 + 4x_2 \leq 12$

$$2x_1 - x_2 \geq -2$$

$$2x_1 + 3x_2 \geq 12$$

$$x_1 \leq 4, x_2 \geq 2$$

$$x_1, x_2 \geq 0$$

OR

b) What are unbalanced assignment problems ? How are they solved ? Explain the steps with an example. (2×12=24)

