



K15P 0323

Reg. No. :

Name :

I Semester M.Com. Degree (Reg./Sup./Imp.)

Examination, November 2015

(2014 Admn. Onwards)

COMMERCE

COM 1C02 : Quantitative Techniques and Operation Research

Time : 3 Hours

Max. Marks : 60

Instructions : 1) Answer **any 4** bunches of questions from **6** bunches of questions in Section – A.

2) Answer **any one** question **each** from the **2** sets of questions in Section – B.

SECTION – A

1. a) Define a Poisson Distribution. 1
- b) Explain the management application of Linear Programming Problems. 3
- c) A talcum powder manufacturing company was distributing a particular brand of talcum powder through a large number of retail shops. Before a heavy advertisement campaign, the mean sales per week per shop were 100 dozens. After the campaign, a sample of 10 shops was taken and the mean sales were found to 120 dozen with standard deviation of 10. Can you consider the advertisement effective ? 5
2. a) Differentiate between a parameter and a statistic. 1
- b) A committee of 5 is to be formed from a group of 8 boys and 7 girls. Find the probability that the committee consists of :
 - i) 3 boys and 2 girls
 - ii) Atleast one girls. 3
- c) Write notes on :
 - i) Type I and Type II error
 - ii) Addition theorem
 - iii) Mutually exclusive and exhaustive events. 5

P.T.O.



3. a) What do you mean by Null Hypothesis ? 1
- b) A food manufacturing company must produce atleast 350 kg of a mixture consisting of ingredients A and B daily. A cost ₹ 6 per kg and B costs ₹ 15 per kg. Not more than 200 kg of A can be used and atleast 150 kg of B must be used. Formulate a LPP to minimise cost. 3
- c) A speaks truth in 65% cases and B in 90% cases. In what percentage of cases are likely to contradict each other in stating the same fact. 5
4. a) What is an iconic model ? 1
- b) The distribution of marks obtained by a group of students is normal with mean 70 marks and standard deviation 5 marks. Estimate the percentage of students with marks below 63. 3
- c) The following table shows the jobs of a network along with their time estimates. The time estimates are in days :
- | Job | 1-2 | 1-6 | 2-3 | 2-4 | 3-5 | 4-5 | 5-8 | 6-7 | 7-8 |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Optimistic | 3 | 2 | 6 | 2 | 5 | 3 | 1 | 3 | 4 |
| Most likely | 6 | 5 | 12 | 5 | 11 | 6 | 4 | 9 | 19 |
| Pessimistic | 15 | 14 | 30 | 8 | 17 | 15 | 7 | 27 | 28 |
- Draw a project network and find critical path and project duration. 5
5. a) What is slack ? 1
- b) Draw a network diagram to the following activities : 3
- | Activities | A | B | C | D | E | F | G | H | I | J |
|----------------------|---|---|---|---|---|---|------|------|---|------|
| Pre-requisite | - | - | A | B | A | B | C, D | G, F | E | H, I |
- c) From the production process which turns 10% defectives on an average, a sample of size 5 is drawn. Using Binomial Distribution model find the probability that the sample contains :
- i) No defective
 - ii) At most one defective
 - iii) Atleast one defective
 - iv) Exactly 3 defectives. 5
6. a) List any 2 assumptions of LPP. 1
- b) What are the uses of 't' distribution. 3



c) Solve the following LPP graphically :

Maximise $Z = 5x_1 + 3x_2$
 Subject to $2x_1 + x_2 \leq 1000$
 $x_1 \leq 400$
 $x_2 \leq 700$
 $x_1, x_2 \geq 0.$

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SECTION – B

7. a) Set up an analysis of variance table for the following per acre production data for 3 varieties of wheat, each grown on 4 plots and state if the variety differences are significant :

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Per acre production data

Plot of land	Variety of wheat		
	A	B	C
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

OR

b) Using the area method, find the frequencies of the normal distribution which has the same mean, same standard deviation and the same total of frequencies as the distribution given below :

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X :	60 – 65	65 – 70	70 – 75	75 – 80	80 – 85	85 – 90	90 – 95	95 – 100
f :	3	21	150	335	326	135	26	4

8. a) Explain the various tools and techniques used in Operations Research.

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OR

b) Bharath Electric Company produces 2 products P₁ and P₂. Products are produced and sold on weekly basis. The weekly production cannot exceed 25 for product P₁ and 35 for product P₂ because of limited available facilities. The company employs total 60 workers. Product P₁ requires 2 man weeks of labour, while P₂ requires one man weeks of labour. Profit margin on P₁ and P₂ is ₹ 60 and ₹ 40 respectively. Formulate LPP and solve graphically for maximising profit.

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