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(Printed Pages 4)

Roll No. _____

18/2666

B.C.A. Examination, 2018

Fourth Semester

Fourth Paper

(Optimization Techniques)

Time : Three Hours

Maximum Marks : 75

Note: Attempt any **five** questions . **All** questions carry equal marks.

Note: The answers to short questions should not exceed **200** words and the answers to long questions should not exceed **500** words.

1. (a) Explain the general formulation of linear programming. 4
- (b) Describe the characteristics of the standard form of LPP. 7
- (c) Discuss the basic assumptions of linear programming problems. 4

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2. Solve by using two phase simplex method:

15

Maximize: $Z = 5x_1 + 8x_2$

Subject to the constraints:

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

$$x_1 + 4x_2 \geq 4$$

$$x_1 + x_2 \leq 0$$

$$x_1, x_2 \geq 0$$

3. In a single server, Poisson arrival and exponential service time queuing system, show that the probability P_n of n customers in steady state satisfies the following equations: 15

$$\lambda P_0 = \mu P_1 \quad n = 0$$

$$(\lambda + \mu)P_1 = \mu P_2 \quad n = 1$$

$$(\lambda + \mu)P_n = \mu P_{n+1} + \lambda P_{n-1} \quad n \geq 2$$

4. (a) Define queue with example. Discuss the characteristics of queuing models. 10

- (b) Draw a diagram showing the physical layout of a queuing system with multi server multi channel service facility. 5
5. Describe the replacement procedure of an item when value of money changes with constant rate during the period.
6. (a) A vehicle has been purchased at a cost of Rs. 1,60,000/. The value of the vehicle is depreciated in the first three years by Rs.15000/ each year and Rs. 12,000/ per year there after Its maintainance and operating costs for the first three years are Rs. 14,000/ Rs.17,000/ and Rs 20,000/ respectively and increase by Rs 4000/ every year. Assuming an interest rate of Rs. 10% find the economic life on the vehicle.
7. Discuss inventory system, its types and basic characteristics. 15

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8. (a) Discuss job sequencing, terminology used in, its assumptions and solution of a sequencing problem. 10
- (b) Explain the term lead time, reorder point, stock out cost and set-up cost.

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