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B.C.A. (IV-Semester) Examination, 2017

(Optimization Techniques)

(BCA-403)

Time : Three Hours / [Maximum Marks : 70

Note : Attempt questions from all sections as per instructions.

Section - A

(Very Short Answer Type Questions)

Note: Attempt all questions. Give answer of each parts in about 50 words. $1\frac{1}{2} \times 10 = 15$

1. ✓ (i) Define LPP. Also list three of its applications. 1.5
- (ii) Explain the concept of Duality. 1.5
- (iii) What do you understand by Degeneracy?
- ✓ (iv) Mention three applications of transportation model. 1.5
- (v) What are unbalanced assignment problems? 1.5
- (vi) Define the term queuing theory. 1.5
- ✓ (vii) Give an example of PERT network. 1.5
- (viii) State Bellman's principle of optimality. 1.5

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- (ix) List atleast three practical applications of dynamic programming problem. 1.5
- (x) Discuss the role of CPM in problem solving. 1.5

Section - B

(Short Answer Type Questions)

Note : Attempt all questions. Give answer of each question in about 200 words. $5 \times 7 = 35$

2. Explain how you will formulate a mathematical model to a given linear programming problem. 7

OR

Give a brief outline of simplex method support your answer with suitable example. 7

3. ✓ Explain how the assignment problem can be treated as a particular case of transportation problem. 7

OR

Explain the main characteristics of the queuing system. 7

4. Explain the nature of travelling salesman problem and give its mathematical formulation.

OR

Explain the solution of multistage decision problem using dynamic programming. 7

5. ✓ Write short notes on the following: 7
- (i) Sequencing problem

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(ii) Min-Max flows

OR

Write an explanatory note on processing n jobs through two machines. 7

6. Maximize $Z = 30x_1 + 40x_2$ subject to: 7

$$60x_1 + 120x_2 \leq 12000$$

$$8x_1 + 5x_2 \leq 600$$

$$3x_1 + 4x_2 \leq 500$$

$$x_1, x_2 \geq 0$$

OR

Discuss the steps for finding solution of LPP by DPP. 7

Section - C

(Long Answer Type Questions)

Note: Attempt any two questions. Give answer of each question in about 500 words.

$$10 \times 2 = 20$$

7. Consider the game of matching coins. Two players A and B each put down a coin. If the coins match i.e. both are heads or both are tails, A gets rewarded otherwise B gets rewarded. However, matching on heads gives double premium. Obtain the best strategies for both players and the value of the game.

8. Solve the following Transportation problem by least cost method. The unit costs of shipment

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are given as follows:

To	D	E	F	Supply
From				
A	6	4	1	50
B	3	8	7	40
C	4	4	2	60
Demand	20	95	35	150

9. At a public telephone booth in a post office arrivals are considered to be Poisson with an average interval time of 12 minutes. The length of the phone call may be assumed to be distributed exponentially with an average of 4 minutes calculate the following:

- What is the probability that a fresh arrival will not have to wait for phone?
- What is the probability that an arrival will have to wait more than 10 minutes before the phone is free?

10. Define the Markov's property for a discrete space continuous time process. Prove that a process having independent and stationary increments is Markov.

11. What do you understand by dynamic programming? List some of the practical applications of integer programming problem. Also discuss the method for finding solution of discrete dynamic programming problem.

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