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DATE:1-7-19

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

B.Sc. STATISTICS - VI SEMESTER

**Special Supplementary Examination, JUNE 2019**

**ST: 6217 – Operations Research**

**Time: 2½ hrs Max: 70 Marks**

Supplementary candidates only.

This question paper has **TWO** printed pages and **THREE** parts

**SECTION – A**

**I Answer any FIVE of the following: 5 x 3 = 15**

1. What is operations research? State characteristics of good OR model.
2. Write down the general form of Linear Programming Problem.
3. Explain the problem of job sequencing involving three machines
4. Explain max-min and min-max principle with reference to game theory
5. Explain any three time estimates used in Network Analysis
6. Define a) Demand b) Lead time c) Reorder level with reference to inventory theory
7. Give any three applications of Queuing Models.

**SECTION – B**

**II Answer any FIVE of the following: 5 x 7 = 35**

1. A) Explain three steps involved in formulating a LPP. (3)

B) Define Slack and Surplus variables. Illustrate with an example. (4)

1. A) What do you mean by unbalanced transportation problem? How do you solve it? (3)

B) Explain mathematical formulation of assignment problem (4)

1. A) Explain the principle of dominance rule with reference to game theory (4)

B) What is Decision making under risk? Discuss Expected Opportunity Loss (EOL) criteria. (3)

1. A) Explain the terms i) Network ii) Total float iii) Slack time (3)

B) Explain P- system with reference to inventory models. (4)

1. A) Explain the procedure for solving job sequencing problem involving two machines (4)

B) Differentiate between pure strategies and mixed strategies (3)

1. A) Explain the following with respect to a queuing system : (2)

 i) Customer behavior ii) Queue Discipline

 B) What do you mean by steady state solution? State it for M/M/1 queuing system? (5)

1. A) Obtain standard form of LPP (3)

 Min Z = 3x1 + 4x2 + 5x3

 s.t. 10x1 + 25x2  120

 20x1 - 30x2 + 4x3  260

 x1, x2 , x3  0

B) Construct network and find critical path from the following information pertaining to the project is given below: (4)

|  |  |  |  |  |  |  |  |  |  |  |
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| Activity(i, j) | A (1, 2) | B(2, 3) | C (2, 4) | D (3, 5) | E(2, 6) | F (4, 5) | G (4, 7) | H (7, 8) | I (5, 8) | J(6, 8) |
| Time | 2 | 4 | 4 | 6 | 1 | 3 | 4 | 6 | 3 | 9 |

**SECTION – C**

**III Answer any TWO of the following: 2 x 10 = 20**

1. A) Write down the simplex algorithm (7)

B) Define a) course of action b) state of nature c) payoff (3)

1. A) Discuss Forward Pass calculations in the process of finding critical path (5)

B) Define Economic Order Quantity (EOQ) and derive an expression for EOQ when shortages are not permitted (5)

1. A) Explain UV method for testing optimality in transportation problem. (7)

B) Explain Little’s formula with usual notations. (3)