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**5-06-2017**

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

B.Sc. STATISTICS - VI SEMESTER

**SPECIAL SUPPLEMENTARY EXAMINATION: MAY 2017**

**ST: 6214 – Operations Research**

**Time: 3 Hours Max Marks: 100**

ATTACH THE QUESTION PAPER WITH THE ANSWER SCRIPT

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

**SECTION – A**

**I Answer any TEN of the following: 10 x 3 = 30**

1. Define Linear Programming Problem and differentiate between surplus and slack

variable with examples

1. State different phases in Operations Research.
2. Mention the steps involved in formulating a Linear Programming Problem (LPP).
3. Define: a) Pure Strategy b) Value of a game c) Pay-off
4. Explain degeneracy with reference to a transportation problem.
5. Give mathematical model for an assignment problem?
6. Define an activity and critical path
7. What is an inventory system? Mention any two advantages of it.
8. Differentiate between transient and steady state with reference to queuing system
9. Briefly explain different phases involved in Network Analysis
10. Write down expression for average annual total cost in replacement theory with usual notations
11. Write a note on decisions under conflict

**SECTION – B**

**II Answer any FOUR of the following: 4 x 10 = 40**

1. A) Write a note on replacement theory? (3)

B) What do you mean by unbalanced transportation problem? How do you solve it? (3)

 C) Discuss about four time estimates used in Program evaluation review technique (PERT) (4)

1. A) Mention the properties of a game and write a note on two person zero sum fair game (5)

B) Explain graphical method of solving a linear programming problem (5)

1. A) State the features of Standard form of a linear programming problem. (5)

B) Derive expression for (EOQ) economic order quantity in inventory model when shortages are not allowed. (5)

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1. A) Define: i) Basic Feasible Solution ii) Optimal Solution (4)

B) Explain Hungarian Algorithm (6)

1. A) What are the advantages of replacement theory? (2)

B) Define (i) Network (ii) Node (iii) activity (iv) Total float (4)

C) With usual notations, derive the expression for expected queue size in M/M/1: FIFO/$\infty $ model. (4)

**SECTION – C**

**III Answer any TWO of the following: 2 x 15 = 30**

1. A) Write a note on different types of models in Operations Research (4)

B) Explain the North-West corner rule and Vogel’s method of obtaining initial basic feasible solution in a transportation problem. (3+3)

C) What is Decision making under risk? Discuss EMV criteria. (5)

1. A) With usual notations, obtain inter-relationship between waiting time and average customers

 (Little’s formula) M/M/1 : FIFO/$\infty $ model. (3)

B) Define: i) Inventory ii) Lead time iii) Shortage cost (3)

C) Write a note on traffic intensity or utilization factor. (3)

D) Construct network from the following information and find the critical path by forward and backward pass calculations (6)

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| Activity | 0-1 | 0-2 | 2-3 | 1-3 | 1-5 | 3-5 | 3-6 | 2-4 | 4-6 | 4-7 | 6-8 | 5-8 | 7-8 |
| A | B | C | D | E | F | G | H | I | J | K | L | M |
| Time | 5 | 4 | 3 | 5 | 7 | 5 | 4 | 6 | 3 | 7 | 5 | 8 | 6 |

1. A) Explain max-min criteria and dominance principle of solving a two person game (5)

B) Explain different steps involved in simplex algorithm for solving a linear programming

 problem (10)

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