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Register Number:

DATE: 21-04-2018 (1PM)

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

B.SC. STATISTICS – VI SEMESTER

SEMESTER EXAMINATION –APRIL 2018

**ST 6215: Operations Research**

**Time: 2½Hours Max: 70 marks**

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

**PART-A**

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

1. Write a note on Operation research.
2. Define (a) Feasible Solution (b) Basic Feasible Solution (c) Optimum solution in LPP
3. For the following two-person zero-sum game, verify the existence of saddle point. If it has saddle point, write down the solution to the game. Is the game fair?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Player B | | | | |
| Player A |  | B1 | B2 | B3 | B4 |
| A1 | 4 | 2 | 0 | 5 |
| A2 | -1 | -2 | 0 | -3 |
| A3 | -3 | 1 | -3 | 0 |

1. Mention the advantages of maintaining inventory?
2. Explain mathematical formulation of Transportation Problem
3. Explain three time estimates used in project evaluation review technique (PERT)
4. What is steady state system?andgive steady state solution forM/M/1:FIFO/∞ model.

**PART-B**

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

1. Explain the Simplex Algorithm (7)
2. A) What is lead time, reorder level and economic order quantity? (3)

B) Discuss about various costs involved in replacement theory (4)

10. With usual notations, derive the expressions for expected queue size and average customer in queue in M/M/1 : FIFO/ model.

11. A) Give the mathematical formulation of Linear Programming Problem. (2)

B) Explain forward pass and backward pass used inproject evaluation review technique (5)

12. Explain principle of dominance for solving a game (7)

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13. A)Define replacement theory? (2)

B)Derive an expression for economic order quantity when shortages are not permitted. (5)

14.A) Define critical activity and critical path. (2)

B) The following table lists the jobs of a network along with their time estimates.

|  |  |  |  |
| --- | --- | --- | --- |
| Activity | To | Tm | Tp |
| 1-4 | 3 | 9 | 27 |
| 1-3 | 3 | 6 | 15 |
| 1-2 | 6 | 12 | 30 |
| 4-5 | 1 | 4 | 07 |
| 3-5 | 3 | 9 | 27 |
| 3-6 | 2 | 5 | 08 |
| 5-6 | 6 | 12 | 30 |
| 2-6 | 4 | 18 | 26 |

1. Draw the project network. (1)
2. Compute average time and variance of each activity (3)
3. Find the critical path (1)

**PART-C**

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

15. A) Explain the graphical method of solving mx2 game. (7)

B) Explain the terms a) Network b) Total float (3)

16.A)Explain the steps involved in Hungarian Algorithm for solving Assignment problem (7)

B) Explain unbounded and non-degeneracy solution for simplex problem (3)

17. A) Discuss decision making under risk? Discuss expected monetary value (EMV) and

expected opportunity loss (EOL) criterion (6)

B)Explain penalty method of solving a transportation problem? (4)

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