 **Reg No**

 **Date:**

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| **ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27** |
| **M.COM -II SEMESTER** |
| **SEMESTER EXAMINATION: APRIL 2019** |
| **CO 8318– Operations Research**  |
|  |  |  |  |  |  |  |
| **Time- 2.5 hrs** |  | **Max Marks-70** |  |
|  |  |  |  |  |  |  |
| **This paper contains \_\_\_printed pages and four parts** |

**Section A**

**(Answer any 10 questions.)** **(10\*2=20marks**)

1. Define Operations Research
2. State any two differences between PERT and CPM
3. Mention any four tools of OR
4. What is a transhipment problem?
5. What is an unbounded solution
6. Graphically depict x>y
7. Give the meaning of physical models
8. What do you mean by an unrestricted variable?
9. Convert the following into the standard form:

Max Z=2x+8y

Subject to:

X+y <= 40

2x +5y =25

Where x,y >= 0

1. What is a multiple optimal solution?
2. What do you mean by Pay-off in decision making?
3. What is looping in a network diagram?

**Section B**

**(Answer any three questions).** (**3\*5=15 marks)**

1. Explain the various applications of OR.
2. A rubber manufacturing co.is engaged in the production of three different types of tyres A,B,C. These different tyres are produced at two different plants of the company. In a normal working day, Plant 1 produces 100,200 and 200 tyres of A,B,C respectively .Plant 2 on the other hand produces 120,120 and 400 tyres respectively. The minimum demand for A,B,C are 5000,6000 and 14000 units respectively. The cost of operating plants 1 and 2 are 5000 and 7000 respectively. Formulate an LPP to find out the number of days the plants must operate in order to minimise the cost and meet the demand.
3. In a project,the following details are known.Draw the network diagram

Activities A,B,E may be started at the beginning of the project

When activity B is complete,D and G may start

When activity A is complete,F can start

C can start only when both F and D are complete and is a final activity

H can start after G is complete and is a final activity

K must follow the finish of E

L cannot start until G and K are complete

J can start when L is complete and is a final activity

1. Find out the basic Feasible solution Using NWCM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | D1 | D2 | D3 | supply |
| F1 | 11 | 21 | 16 | 14 |
| F2 | 07 | 17 | 13 | 26 |
| F3 | 11 | 23 | 21 | 36 |
| Demand | 18 | 28 | 25 |  |

1. Which strategy should an executive choose on the basis of

a.Maximin criteria b.Maximax Criteria c.Minimax Regret Criteria d.Laplace Criteria

|  |  |  |  |
| --- | --- | --- | --- |
|  | Strategy 1 | Strategy 2 | Strategy 3 |
| Nature 1 | 7,00,000 | 5,00,000 | 3,00,000 |
| Nature 2 | 3,00,000 | 4,50,000 | 3,00,000 |
| Nature 3 | 1,50,000 | 0 | 3,00,000 |

**Section C**

**Answer any two questions**  (**2\*10=20 marks)**

1. Solve the Following LPP using Simplex Method:

Max Z=5x1+10x2+8x3

Sub to:

3x1+5x2+2x3<= 60

4x1+4x2+4x3<=72

2x1+4x2+5x3<= 100

Where x1,x2,x3>= 0.

1. Draw a network Diagram,calculate the critical path and obtain total and free float for each activity.

|  |  |
| --- | --- |
| Activity | Duration |
| 1-2 | 10 |
| 2-3 | 2 |
| 2-5 | 6 |
| 3-4 | 12 |
| 3-7 | 9 |
| 4-5 | 8 |
| 4-6 | 5 |
| 4-8 | 10 |
| 5-8 | 4 |
| 6-7 | Dummy |
| 7-9 | 7 |
| 8-10 | 5 |
| 9-11 | 8 |
| 10-11 | 10 |

1. A manufacturer wants to transport products from 3 different factories to three different destinations.The kms from each factory to each destination are given below and the costs of transportation is Rs 10 per unit per km.Find out the optimal transportation schedule.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | D1 | D2 | D3 | Supply |
| F1 | 50 | 30 | 220 | 1 |
| F2 | 90 | 45 | 170 | 3 |
| F3 | 50 | 200 | 50 | 4 |
| Demand | 3 | 3 | 2 | 8 |

**Section D**

**COMPULSORY Question (1\*15=15 marks)**

1. There are 5 tailors in a garment Factory and the factory produces 5 different types of Garments.The output of each tailor is given along with the profit per unit.Find out the optimal assignment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Garment 1 | Garment 2 | Garment 3 | Garment 4 | Garment 5 |
| Tailor A | 7 | 9 | 4 | 8 | 6 |
| Tailor B | 4 | 9 | 5 | 7 | 8 |
| Tailor C | 8 | 5 | 2 | 9 | 8 |
| Tailor D | 6 | 5 | 8 | 10 | 10 |
| Tailor E | 7 | 8 | 10 | 9 | 9 |
| Profit/ut | 2 | 3 | 2 | 3 | 4 |

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