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Reg. No. : .....

Name : .....

Fifth Semester B.A./B.Sc./B.Com. Degree Examination, December 2019

First Degree Programme under CBCSS

Mathematics

Open Course

MM 1551.1 : OPERATIONS RESEARCH

(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** the **ten** are compulsory. They carry 1 mark each.

1. Write standard form of a Linear programming Problem.
2. Define a feasible solution to an a Linear programming Problem.
3. Define a basic variable in a Linear programming Problem.
4. Name any two methods to solve a Linear programming Problem.
5. Define a transportation problem.
6. If a standard transportation problem has $(m+n)$ constraints, then find the number of positive value variables?
7. Which is the superior method to find the initial solution of a transportation problem?

P.T.O.

24. Use simplex method to solve

Maximize $Z = 2x_1 + 3x_2$

Subject to the constraints

$x_1 + x_2 \leq 1$

$3x_1 + x_2 \leq 40$

$x_1, x_2 \geq 0.$

25. A firm produces three products. These products are processed on three different machines. The time required to manufacture one unit of each of the three products and the daily capacity of the three machines are given in the table below :

Machine	Time per unit (minutes)			Machine capacity (minutes/day)
	Product 1	Product 2	Product 3	
M_1	2	3	2	440
M_2	4	-	3	470
M_3	2	5	-	430

It is required to determine the daily number of units to be manufactured for each product. The profit per unit for product 1, 2 and 3 is Rs. 4, Rs. 3 and Rs. 6 respectively. It is assumed that all the amounts produced are consumed in the market. Formulate the Linear programming Problem that will maximize the daily profit.

26. Explain a model of a transportation problem.

27. Solve the following transportation problem with North West Corner Rule.

	M_1	M_2	M_3	Supplies
W_1	5	8	4	50
W_2	6	6	3	40
W_3	3	9	6	60
Demand	20	95	35	

28. Find the optimal assignment of three jobs and three machines when the cost of assignment is given by the following table.

	J_1	J_2	J_3
M_1	8	5	6
M_2	7	7	8
M_3	6	8	7

29. Solve the following cost matrix of an assignment problem ; where J_1, J_2, J_3 are jobs and M_1, M_2 and M_3 are machines.

	J_1	J_2	J_3
M_1	250	400	350
M_2	400	600	350
M_3	200	400	250

30. Draw a Network for the following activities in a project.

Active	Predecessor Activity
A	–
B	A
C	A
D	B
E	B, C

31. Find the average time and standard deviation of the following activities.

Activity	Time estimates in weeks		
	Optimistic	Most likely	Pessimistic
A	5	8	11
B	3	6	9