

MASTER OF BUSINESS ADMINISTRATION (C.B.C.S.) (2016 COURSE)
M.B.A. Sem - III : WINTER : 2021
SUBJECT: OPERATIONS RESEARCH

Day : Thursday
Date : 20-01-2022

W-15412-2021

Time : 10:00 AM-01:00 PM
Max. Marks: 60

N.B.:

- 1) Attempt **ANY THREE** questions from Section-I and **ANY TWO** questions from Section-II.
- 2) Figures to the right indicates **FULL** marks.
- 3) Answers to both the sections should be written in **SAME** answer book.
- 4) Use of Non-programmable **CALCULATOR** is allowed.
- 5) Graph paper will be provided if necessary.

SECTION-I

Q.1 Discuss the significance of Operation Research in business decision making with suitable examples. **(10)**

Q.2 A carpenter manufactures two wood items, A and B. The total number of items that the carpenter can handle per day at the most, is 24. It takes one hour to make item A and half an hour to make item B. It is assumed that the carpenter can work for a maximum of 16 hours a day. Further, the profit on item A is ₹300 and that on item B is ₹100. Formulate this LPP and also calculate the maximum number of both items that can be produced daily to maximize the profit. **(10)**

Q.3 Find the optimal solution for following transportation problem: **(10)**

	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	Available
O ₁	9	12	9	6	9	10	5
O ₂	7	3	7	7	5	5	6
O ₃	6	5	9	11	3	11	2
O ₄	6	8	11	2	2	10	9
Requirement	4	4	6	2	4	4	

Q.4 Solve the following Assignment problem to find optimal solution: **(10)**

Jobs

		I	II	III	IV	V
Machines	A	5	11	10	12	4
	B	2	4	6	3	5
	C	3	12	5	14	6
	D	6	14	4	11	7
	E	7	9	8	12	5

Q.5 Write short notes on **(ANY TWO)**: **(10)**

- a) Types of Floats
- b) Limitations of operations research
- c) North – West corner method

P.T.O.

SECTION-II

Q.6 Consider the following project: **(15)**

Activity	t_o	t_m	t_p	Activity	t_o	t_m	t_p
(1,2)	6	8	11	(3,6)	7	9	13
(1,3)	19	20	23	(4,7)	8	10	13
(1,4)	27	33	41	(5,7)	8	8	10
(2,5)	17	18	21	(6,7)	4	4	6
(2,6)	16	20	26	-	-	-	-

Draw the network diagram. Find the critical path and the variance of the expected duration of the project.

Q.7 A company manufactures around 200 mopeds. Depending upon the availability of raw materials and other conditions, the daily production has been varying from 196 mopeds to 204 mopeds, whose probability distribution is as given below: **(15)**

Sales of Cars:	196	197	198	199	200	201	202	203	204
Probability:	0.05	0.09	0.12	0.14	0.20	0.15	0.11	0.08	0.06

The finished mopeds are transported in a specially designed three-storeyed lorry that can accommodate only 200 mopeds. Using the given 15 random numbers, viz., 82, 89, 78, 24, 53, 61, 18, 45, 04, 23, 50, 77, 27, 54, 10 simulate the process to find out:

- i) What will be the average number of mopeds waiting in the factory?
- ii) What will be the average number of empty spaces on the lorry?

Q.8 a) Solve the following LP problem using graphical method: **(08)**

$$\text{Min } Z = 3x_1 + 2x_2$$

$$\text{Subject to } x_1 - x_2 \leq 1$$

$$x_1 + x_2 \geq 3$$

$$\text{and } x_1, x_2 \geq 0$$

b) Explain the steps of Hungarian methods with illustration. **(07)**

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