

S.D.E.
M.B.A. (I.T.) Sem-III (2013 Course) : SUMMER - 2019
SUBJECT : OPERATIONS RESEARCH

Day : Saturday
Date : 18/05/2019

S-2019-5163

Time : 10.00 AM TO 1.00 PM
Max. Marks : 70

N.B.

- 1) Attempt any **FOUR** questions from Section – I and any **TWO** questions from Section – II.
- 2) Answer to both the sections should be written in the **SAME** answer book.
- 3) Figures to the right indicate **FULL** marks.
- 4) Graph Papers will be provided if necessary.
- 5) Use of Non-programmable Calculator is allowed.

SECTION – I

Q.1 Explain the Assignment Problem and its applications in business and management. **(10)**

Q.2. Given the following network details **(10)**

Task	1-2	1-3	1-4	2-3	2-6	3-5	3-6	4-5	5-6
Duration	23	8	20	16	24	18	4	19	10

- i) Draw a network diagram.
- ii) Find critical path and total project duration.

Q.3 A company manufactures around 150 scooters. The daily production varies from 146 to 154 depending upon the availability of raw material and other working conditions. **(10)**

Production Per Day	Probability
146	0.04
147	0.09
148	0.12
149	0.14
150	0.11
151	0.10
152	0.20
153	0.12
154	0.08

The finished scooters are transported in a specially arranged lorry with accommodation only 150 scooters. Using following random numbers 80, 81, 76, 75, 64, 43, 18, 26, 10, 12, 65, 68, 69, 61, 57 simulate the process for 15 days to find out i) Average number of scooters waiting in factory?
ii) Average number of space on the lorry.

Q.4 A workshop has four machines and four tasks for completion. Each of the machine can perform each of the four tasks. Processing time taken at each of the machines to complete each task is given in the matrix below: **(10)**

Task	Machine			
	A	B	C	D
I	51	77	49	55
II	32	34	59	68
III	37	44	70	54
IV	55	55	58	55

How should the tasks be assigned to machines to minimize requirement of machine hours?

P.T.O.

- Q.5** Write short notes on any **TWO**: (10)
- History of Operations Research
 - Maximization in Assignment problem
 - Monte-Carlo technique
 - Critical Path Method

SECTION – II

- Q.6** A company manufactures two products P_1 and P_2 . Each product undergoes two operations. The time required to perform each operations are given below: (15)

Operations	Time Required Per Unit for each product (Hrs)	
	P_1	P_2
I	2	4
II	3	2

The company has an available capacity of 200 hours for operation I and 180 hours for operation II. The profit per unit is Rs. 30 per unit of product A and 40 per unit of product B.

Formulate the above problem as LPP and determine graphically, the quantities the two products to be manufactured to maximize profit.

- Q.7** Draw a network diagram for the following data: (15)

Sr. No.	Activity	Immediate Preceding Activity	Activity Time (Weeks)
1	A	-	3
2	B	-	4
3	C	A	5
4	D	A	6
5	E	C	7
6	F	D	8
7	G	B	9
8	H	E,F,G	3

Find the critical path and project duration.

- Q.8** A firm has three plants A, B, C and three warehouse P, Q, and R. The transportation cost per unit dispatched along each route with capacity of each plant and requirement of each warehouse is given in table below. (15)

Plant	Warehouse			Capacity of Plant
	P	Q	R	
A	40	70	90	400
B	12	80	30	350
C	60	90	45	250
Requirement of Warehouse	300	300	300	

How should the units be transported to minimize transportation cost? Find optimal solution.

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