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M.B.A. SEM–III / M.B.A.(HR) SEM–III (2016 COURSE) CBCS :
SUMMER - 2018
SUBJECT : OPERATIONS RESEARCH

Day : **Monday** Time **10.00 AM TO 01.00 PM**
Date : **07/05/2018** Max. Marks : 60

S-2018-1819

N.B.

1) Attempt any **THREE** questions from Section – I. Each questions carries 10 marks.
2) Attempt any **TWO** questions from Section – II. Each questions carries 15 marks.
3) Answers to both the sections should be written in **SEPARATE** answer book.
4) Use of non-programmable scientific calculator is **ALLOWED**. Graph paper will be provided if necessary.

SECTION – I

Q.1 Define 'simulation'. What are the applications and limitations of simulation?

Q.2 Five groups of computer users must be trained for five new types of software. Since the users have different computer skill levels, the total cost of trainings depend on assignments made.

User Groups	Software Types			
	S_1	S_2	S_3	S_4
A	5	4	6	1
B	2	5	4	5
C	10	12	10	8
D	1	3	4	6
E	2	5	8	7

a) Find the optimal assignment of user groups and software.
b) Which group is unassigned?

Q.3 A tourist car operator finds that during the past few months, the car's use has varied so much that the cost of maintaining the car varied considerably. During the past 200 days the demand for the car fluctuated as follows:

Trips per week	0	1	2	3	4	5
Frequency	16	24	30	60	40	30

Using the following random numbers, simulate the demand for the next 12 weeks: 11, 82, 96, 20, 84, 56, 12, 52, 03, 70, 88,40. Also find average demand.

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Q.4 Given the following transportation table:

Destinations	Origins				
	I	II	III	IV	Supply
M	5	3	7	3	12
N	4	5	8	2	28
O	3	6	6	7	35
P	4	5	7	4	10
Demand	15	30	40	15	

a) Find initial basic feasible solution by least cost method.
b) Check whether it is optimal or not?

Q.5 Write short notes on any **TWO**:
a) Degeneracy in transportation problem
b) History of Operations Research
c) Limitations of Linear Programming Problem

SECTION – II

Q.6 A small maintenance project consists of the following jobs:

Job	(1-2)	(1-3)	(2-3)	(2-5)	(3-4)	(3-6)	(4-5)	(4-6)	(5-6)	(6-7)
Duration (days)	15	15	3	5	8	12	1	14	3	14

a) Draw the network diagram.
b) Find the total float for each activity.
c) Find the critical path and total project duration.

Q.7 A chocolate manufacturing company produces only two types of chocolate – A and B. Both the chocolates require Milk and Choco only. To manufacture each unit of A and B following details are available. Each unit of A requires 1 unit of Milk and 3 units of Choco; whereas each unit of B requires 1 unit of Milk and 2 units of Choco. The company kitchen has a total of 5 units of Milk and 12 units of Choco. On each sale, the company makes a profit of Rs. 6 per unit of A and Rs. 5 per unit of B sold. Formulate as LPP and solve graphically.

Q.8 A company manufacturing televisions has four plants with a capacity of 125, 250, 175 and 100 units respectively. The company supplies TV sets to its four showrooms which have a demand of 100, 400, 90 and 60 units respectively. The transportation cost per unit (in Rs) are given in the following table.

Plants	Showrooms			
	I	II	III	IV
A	90	100	120	110
B	100	105	130	117
C	111	109	110	120
D	130	125	108	113

Find the optimal solution by using Vogel's Approximation Method for determining the initial basic feasible solution.

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