

M.B.A. SEM-III / M.B.A.(HR) SEM-III (2016 Course) CBCS :

WINTER - 2017

SUBJECT : OPERATIONS RESEARCH

Day : Wednesday
Date : 22/11/2017

W-2017-1722

Time 10.00 AM TO 01.00 PM
Max. Marks : 60

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** In a transportation problem, how do you identify and solve:
- a) An Unbalanced problem?
 - b) A Maximization problem?

- Q.2** The owner of a small machine shop has four mechanics available to assign jobs for the day. Five jobs are offered with expected profit for each mechanic on each job, which are as follows:

Mechanics	Jobs				
	A	B	C	D	E
Virat	71	84	61	73	59
Raj	48	64	87	77	80
Jay	62	78	50	111	82
Adi	87	92	111	71	81

- a) Find the optimal assignment of mechanics to the jobs.
 - b) Which job should be declined?
- Q.3** An automobile production line turns out about 100 cars a day but deviations occur owing to many causes. The production is more accurately described by the probability distribution given as

Production/day	95	96	97	98	99	100	101	102	103	104	105
Probability	0.03	0.05	0.07	0.10	0.15	0.20	0.15	0.10	0.07	0.05	0.03

Finished cars are transported across the bay at the end of each day by a ferry. Simulate the daily production for the next 15 days. Use the random numbers 02, 97, 80, 66, 55, 96, 50, 29, 58, 51, 04, 86, 24, 39, 47.

If the ferry has space for only 101 cars, what will be the average number of cars waiting to be shipped and what will be the average number of empty spaces on the ferry?

Q.4 Given the following project details:

Task	(1-2)	(1-3)	(1-4)	(2-3)	(2-6)	(3-5)	(3-6)	(4-5)	(5-6)
Time (days)	23	8	20	16	24	18	4	19	10

- Construct a network diagram.
- Find the critical path.

Q.5 Write short notes on any **TWO**:

- Graphical solution of LPP
- Types of Floats
- Applications of simulation

SECTION – II

Q.6 A farmer plans to mix two types of food, type A and type B, to make a mix of low cost feed for the animals on his farm. A bag of food A costs Rs. 100 and contains 40 units of proteins, 20 units of minerals and 10 units of vitamins. A bag of food B costs Rs 120 and contains 30 units of proteins, 20 units of minerals and 30 units of vitamins. How many bags of food A and B should be consumed by the animals each day in order to meet the minimum daily requirements of 150 units of proteins, 90 units of minerals and 60 units of vitamins at a minimum cost?

Q.7 A company has four factories supplying to four warehouses and its management wants to determine the shipping schedule for its weekly output of trolleys. The supply, demand and shipping cost per trolley are shown in the following table:

To Factories	Warehouses				Supply
	E	F	G	H	
A	10	30	25	15	14
B	20	15	20	10	10
C	10	30	20	20	15
D	30	40	35	45	12
Demand	10	15	12	15	

- Find the optimal shipping schedule.
- Is your solution unique? State alternate solution if any.

Q.8 The following table shown the time estimates of jobs of a project.

Activity →	(1-2)	(1-6)	(2-3)	(2-4)	(3-5)	(4-5)	(5-8)	(6-7)	(7-8)
Optimistic (a)	3	2	6	2	5	3	1	3	4
most likely (m)	6	5	12	5	11	6	4	9	19
pessimistic (b)	15	14	30	8	17	15	7	27	28

- Draw the project network.
- Compute estimated time for each activity.
- Find critical path and expected project duration.

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