

VPM's
DR VN BRIMS, Thane
Programme: PGDM (2014-16)
Fifth Semester Examination January 2016

Subject	Decision Making & Modelling		
Roll No.		Marks	60 Marks
Total No. of Questions	7	Duration	3 Hours
Total No. of printed pages		Date	14.01.2016

Note: Q1 is compulsory and solve any FOUR from the remaining SIX questions.

Q1) 20 Marks (Compulsory)

A firm produces two products P and Q, which yield a contribution margin of Rs. 200 and Rs. 300 respectively. The firm has a limited capacity in the two departments where these products need processing. The availability and requirements are given below.

Department	Processing Time		Daily Availability (hrs)
	Product P	Product Q	
I	4	2	45
II	4	4	70

The management of the firm has specified the following goals in the order of priority.
 Produce a product mix to make a daily profit of at least Rs. 4,800
 Achieve daily sales of at least 15 units of product Q
 Achieve daily sales of at least 5 units of product P

Formulate and solve this as a goal programming problem.

Attempt Any FOUR from the Remaining SIX Questions

Q2) Given below is a transshipment problem. Any supply can work as a demand as well as a supply point. Similarly any demand point can act as a supply as well as demand point. Find the optimal allocation of stocks such that the total cost of transportation is minimized.

	D	E	F	Supply
A	6	4	1	50
B	3	8	7	40
C	4	4	2	60
Demand	20	95	35	150

The cost of transportation between the supply points is as follows.

	A	B	C
A	0	3	2
B	3	0	4
C	2	4	0

The cost of transportation between the demand points is as follows.

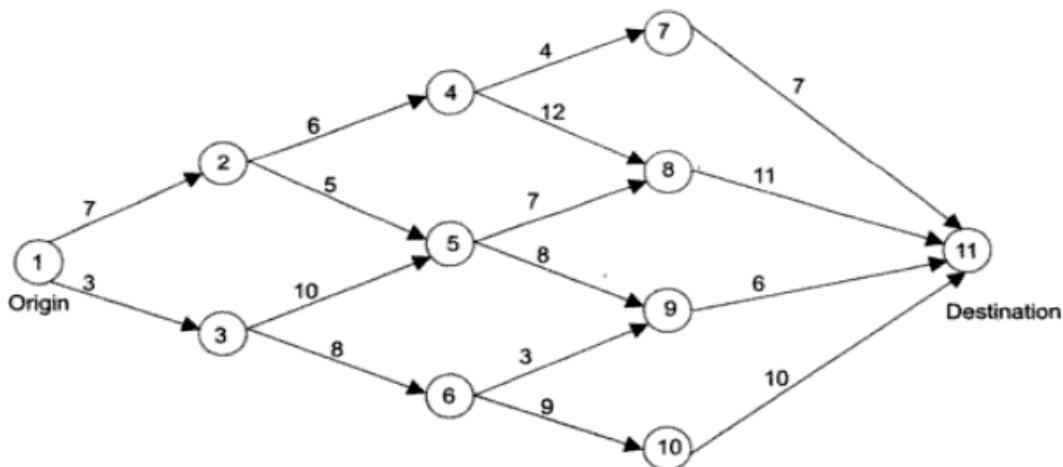
	D	E	F
D	0	2	5
E	2	0	1
F	5	1	0

Q3) The times taken by 8 jobs on 3 machines are as follows. Find the optimal assignment so that the time is minimized and find the idle time on machine 3.

	1	2	3	4	5	6	7	8
Machine A	45	58	24	26	15	48	12	26
Machine B	24	17	9	20	24	4	7	8
Machine C	25	45	46	29	27	56	45	53

Q4) Solve the following network problem for shortest route between the origin and destination. The numbers on the arrows connecting different pairs of nodes represent distance in km. Use dynamic programming.

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Q5) Four items are considered for loading on an airplane, which has the capacity to load up to 13 tones. The weights and values of the items are indicated below. Which items and what quantities should be loaded on the plane so as to maximize the value of the cargo transported?

Q6) A company produces three items A, B and C. All these are processed in a central plant. Production of one unit of A, B, and C needs 2 hours, 3 hours and 1 hour, respectively. The regular plant capacity is 40 hours per week. The marketing department has informed the maximum sales per week of A, B and C is 10, 10 and 12 units, respectively. The chief executive of the company has established the following goals according to their Importance:

- Avoid any underutilisation of production capacity.
- Meet the order for 7 units of B and 5 units of C per week.
- Avoid the overtime operation of the plant beyond 10 hours.
- Achieve the sales goal of 10 units of A, 10 units of B and 12 units of C.
- Minimise the overtime operation as much as possible.

Formulate this as a goal programming problem.

Q7) Answer the following questions.

- a) Write a short note on dynamic programming.
- b) Write a short note on goal programming.