Quiz-1 EE5327

February 25, 2019
Duration:Upto 7 pm
Max. Marks 10

Optimization

- **Only programming questions. Solve below question using cvxpy only**
- **You are allowed to use internet. But codes sharing/copying from your peers will give negative marks.**

1) The following table shows the information on the availability of supply to each warehouse, the requirement of each market and unit of transportation cost (in rupees) from each warehouse to each market. The present transporta-

		Market				
		M_1	M_2	M_3	M_4	Supply
	W_1	6	3	5	4	22
Warehouse	W_2	5	9	2	7	15
	W_3	5	7	8	6	8
Requirement		7	12	17	9	

tion schedule is as follows:
W_1 to M_2: 12 units; W_1 to M_3: 1 unit; W_1 to M_4: 9 units; W_2 to M_3: 15 units; W_3 to M_1: 7 units and W_3 to M_3: 1 unit. Then the minimum total transportation cost (in rupees) is

(A) 150   (B) 149   (C) 148   (D) 147

2) We have to assign four jobs I,II,III,IV to four workers A,B,C and D. The time taken by different workers (in hours) in completing different jobs is given below:
The optimal assignment is as follows:

		I	II	III	IV
	A	5	3	2	8
Workers	B	7	9	2	6
	C	6	4	5	7
	D	5	7	7	8

Job III to worker A; Job IV to worker B; Job II to worker C and Job I to worker D and hence the time taken by different workers in completing different jobs is now changed as:
Then the minimum time (in hours) taken by

		I	II	III	IV
	A	5	3	2	5
Workers	B	7	9	2	3
	C	4	2	3	2
	D	5	7	7	5

the workers to complete all the jobs is ?

3) A transportation problem for which the costs, origin and availabilities, destination and requirements are given as follows:

	D_1	D_2	D_3	
Q_1	2	1	2	40
Q_2	9	4	7	60
Q_3	1	2	9	10
	40	50	20	

Check whether the following basic feasible solution

$$x_{11} = 20, x_{13} = 20, x_{21} = 10, x_{22} = 50$$
$$x_{33} = 10 \text{ and } x_{12} = x_{23} = x_{32} = x_{33} = 0$$

is optimal. If not, find an optimal solution.

4) Maximise

$$6x_1 + 5x_2$$

with the constraints

$$x_1 + x_2 \leq 5$$
$$3x_1 + 2x_2 \leq 12$$
$$\text{where } x_1, x_2 \geq 0$$

Find the corresponding values of x_1 & x_2.