**EASTERN MEDITERRANEAN UNIVERSITY**



**Department of Industrial Engineering**

**IENG212/MANE212 Modelling and Optimization**

**HOMEWORK 4 Fall 2021-22**

|  |  |
| --- | --- |
| 1. Find the minimal spanning tree for the following network. | 2500  2  7  1100  2300  2200  800  5  1000  4  1  2600  7  1400  780  900  6  3  1200 |

1. Find the shortest path from node 3 to all the nodes in the following network. Identify the shortest path tree obtained.

4

7

3

4

6

56

6

3

1

4

2

4

2

5

4

2

*dij*

2

7

1

8

1. Find the maximal flow from node 1 to node 8 in the following network. Identify the associated minimal cut.



1. Find the maximal flow from node 1 to node 7 in the following network. Identify the associated minimal cut. Also write the associated linear programming problem.



1. Find the shortest path from node 1 to every other node in the following network. Identify the shortest path tree obtained.



*dij*

1. Assume that we want to construct a tin can with maximum volume using a 30 by 40 Aluminum sheet, Formulate the problem as a nonlinear programming.
2. We want to cover the surface of a ball with radius 9 cm with an aluminum foil which its standard width is C={20, 30, 40} cm. Write a mathematical programming problem in a manner that the above goal done by minimum length of aluminum foil.
3. How can we make a rectangle and a circle with maximum total area by a thread with length *70cm?*
4. Consider the following figure write a non-linear programming problem to find the coordinate of a point say *(x,y)* which is near as much as possible to the origin and its distance with the other given points is not more than 20cm.

(-35,80)

(45,60)

*(x,y)*

(40,-15)

(-40,10)

1. Contemporary Issues Report must be 8-10 pages containing (3 bonus points)
   1. Cover Page
   2. Table of Content
   3. Introduction (definition of contemporary issues and selected subjects)
   4. Contemporary Issues List (at least 5 new subjects)
   5. Selected Subject Explain with a Conclusion (at least four **hand writing** pages).
   6. References