

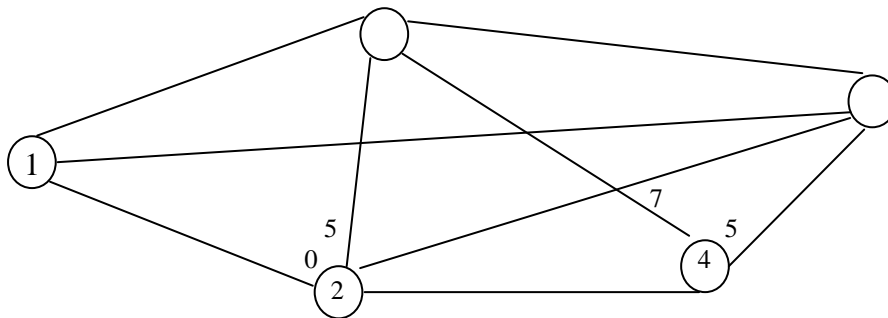
KENYA METHODIST UNIVERSITY
END OF SECOND TRIMESTER 2006/2007 EXAMINATIONS

FACULTY : **SCIENCES**
DEPARTMENT : **MATHEMATICS AND COMPUTER SCIENCE**
COURSE CODE : **MATH 430**
COURSE TITLE : **OPERATIONS RESEARCH II**
TIME : **3 HRS**

Instructions: Attempt Question 1 (compulsory) and any other three questions.

Question 1 (25 marks)

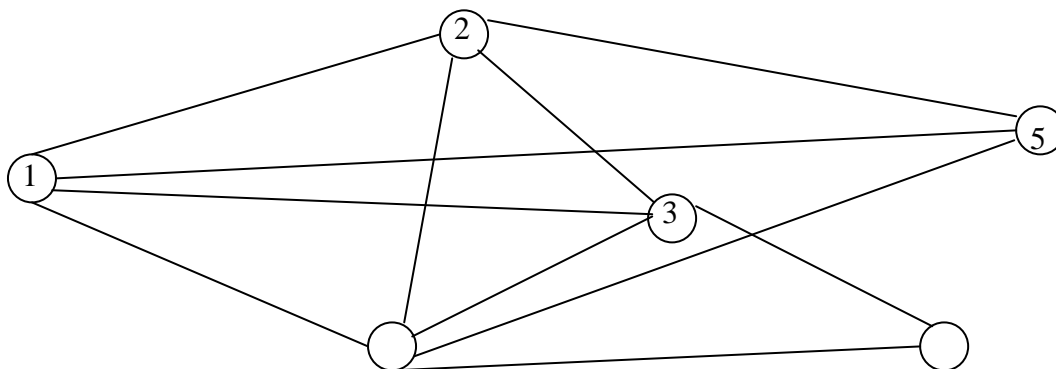
- a) Define a cut. (2 mks)
 b) Determine two cuts and their capacities in the network below. (4 mks)



- c) Determine the maximum flow and the optimal flow for the above network. (19 mks)

Question 2 (15 marks)

The Telkom cable company is in the process of providing cable services to five new housing projects. The figure below depicts the potential cable linkages to the 5 projects. The cable distances (in Km) are shown on each branch. Determine the most economical cable network using the minimal spanning tree Algorithm.



Question 3 (15 marks)

Three steel works I, II and III produce 50, 50 and 100 tonnes of steel per week. The steel has to be transported to consumers A, B, C and D whose demands are 30, 40, 60 and 70 tonnes respectively. The cost of transportation is thousands of Kenya shillings from the producers to the consumers are listed below:

	A	B	C	D
I	15	7	20	10
II	12	8	11	20
III	9	16	12	15

Starting with the basic solution obtained by the North West corner method, determine the optimal solution.

Question 4 (15 marks)

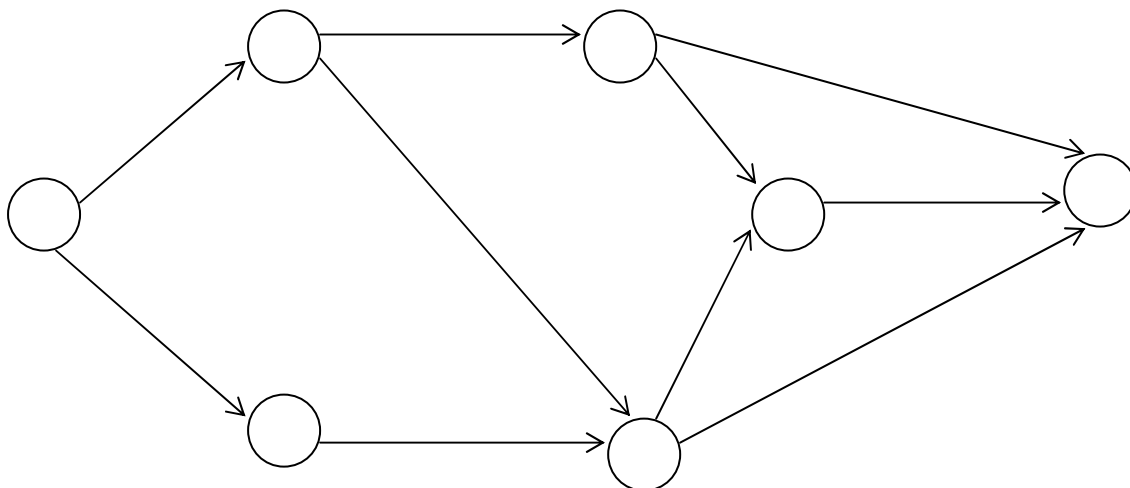
There are five pumps available for developing wells. The efficiency of each pump in producing maximum yield at each well is given in the table below:

	1	2	3	4	5
1	45	40	65	30	55
2	50	30	25	60	30
3	25	20	15	20	40
4	35	25	30	25	20
5	80	60	60	70	50

Determine in what way should the pumps be assigned to maximize the overall efficiency using the Hungarian method.

Question 5 (15 marks)

- a) What is the major difference between CPM and PERT. (2 mks)
- b) Distinguish between a critical and a non-critical activity. (4 mks)
- c) Consider the project network below:



- i) Determine the critical path and the associated critical path and the associated critical activities of this project.
- ii) How long will it take to complete the project?
- iii) Construct a time schedule for the project. (9 mks)