Mathematics Department

Course: ATMAA

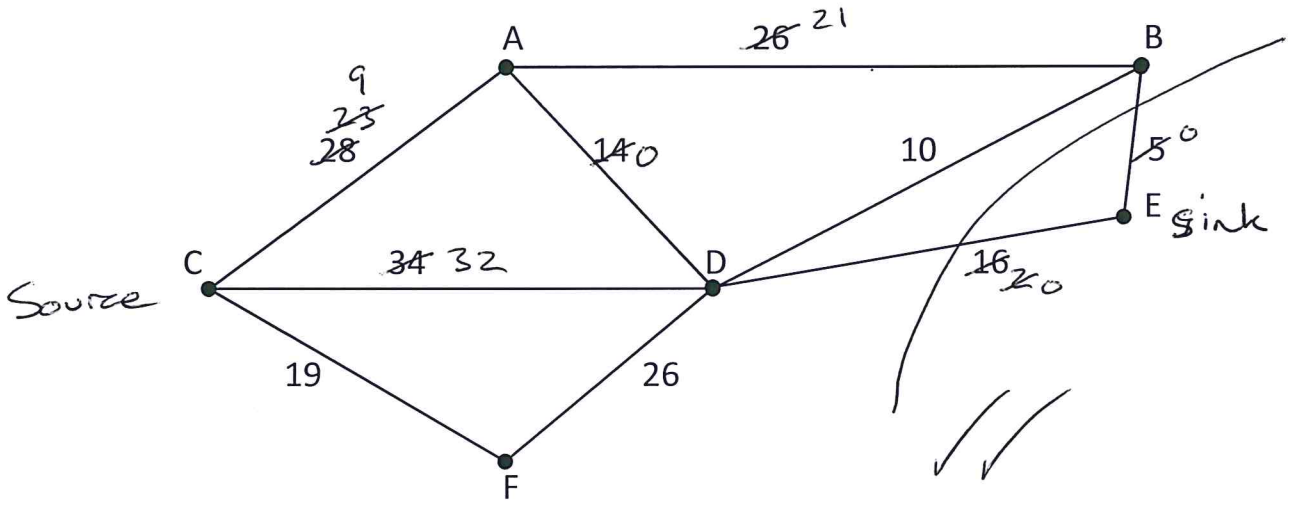
Topic Title: Skills Test 12

Student Name:_____ Date: _____

Special Instructions: Calculator allowed Time Allowed: 20 minutes

Marks: ~~/12~~ ~~15~~ 14

1. Consider the following network where the numbers represent flow rates in litres/hr: **[4, 2 : 6 marks]**



a) What is the maximum flow from C to E (show working)?

CABE – 5
CADE – 14
CDE – 2 ✓

Maximum flow = 5+14+2 = 21 Litres/hr ✓

b) Check your work by showing the minimum cut on your network.

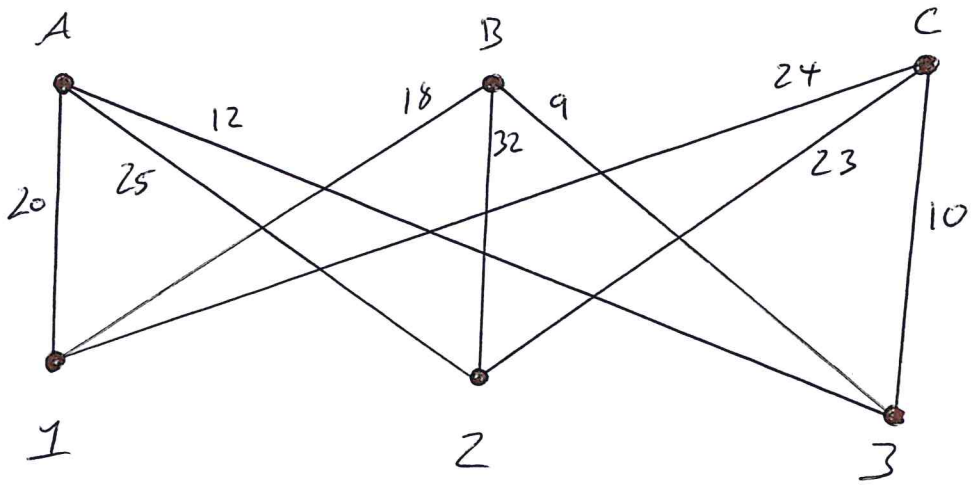
✓✓

2. The table below shows the time taken by workers A,B and C to complete a task at workstations 1,2 and 3.

[~~3~~ 2, 4, 2 : ~~9~~ 8 marks]

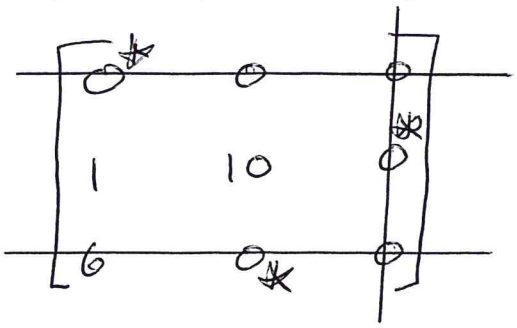
	1	2	3
A	20	25	12
B	18	32	9
C	24	23	10

a) Represent the information in the table in the form of a bipartite graph.



b) Calculate the minimum time taken by workers A,B and C to complete tasks 1,2 and 3.

$$\begin{bmatrix} 8 & 13 & 0 \\ 9 & 23 & 0 \\ 14 & 13 & 0 \end{bmatrix}$$



$$\begin{bmatrix} 0 & 0 & 0 \\ 1 & 10 & 0 \\ 6 & 0 & 0 \end{bmatrix}$$

$20 + 9 + 23 = 52$ minutes

c) Assign the tasks to the workers using a bipartite graph.