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| Mathematics Department | |  |
| Course: ATMAA | |
| Topic Title: Skills Test 12 | |
| Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Date: \_\_\_\_\_\_\_\_\_\_\_\_ | | |
| Special Instructions: Calculator allowed | Time Allowed: 20 minutes | | |
|  | Marks: / 14 | | |

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

A 26 B

28 14 10 5

E

C 34 D 16

19 26

F

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

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.  **[ 2, 4, 2 : 8 marks]**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Workstation 1** | **Workstation 2** | **Workstation 3** |
| **Worker A** | 20 | 25 | 12 |
| **Worker B** | 18 | 32 | 9 |
| **Worker C** | 24 | 23 | 10 |

1. Represent the information in the table in the form of a bipartite graph.
2. Use the Hungarian algorithm to assign one worker to one task and calculate the minimum time taken to complete the tasks.
3. Assign the tasks to the workers using a bipartite graph.