GENERAL MATHEMATICS 2024

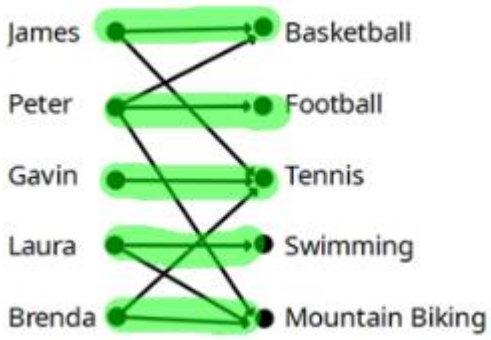
Unit 4
Key Topic Test 8 – Networks and Decision Mathematics: Matching Problems

Recommended writing time*: 45 minutes
Total number of marks available: 25 marks

SOLUTIONS

SECTION A – Multiple Choice (1 mark per question)

Question 1
Answer: B



Question 2
Answer: E

By inspection this is the best allocation (total 18 minutes)

Question 3
Answer: C

Company 1 = $4000

Question 4
Answer: A

Company 1 = $17 000

Question 5
Answer: C

style	company 1	company 2	company 3	company 4
1	4	6	7	6
2	1	4	6	3
3	2	3	3	3
4	10	11	12	9

Row reduction

$$\begin{bmatrix} 0 & 2 & 3 & 2 \\ 0 & 3 & 5 & 2 \\ 0 & 1 & 1 & 1 \\ 1 & 2 & 3 & 0 \end{bmatrix}$$

Column reduction

$$\begin{bmatrix} 0 & 1 & 2 & 2 \\ 0 & 2 & 4 & 2 \\ 0 & 0 & 0 & 1 \\ 1 & 1 & 2 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 0 & 0 & 1 & 2 \\ 0 & 1 & 3 & 2 \\ 1 & 0 & 0 & 2 \\ 1 & 0 & 1 & 0 \end{bmatrix}$$

$6000 + 1000 + 3000 + 9000 = \$19\,000$

SECTION B – Short Answer

Question 1

a.

0	6.4	11	8.9
0	**6.8**	15	5.2
0	8.4	**13**	3.2
0	6.8	11.4	3

2 marks

b. Freestyle was the fastest stroke for each swimmer

1 mark

c. The minimum number of lines to cross out all zeros is less than the number of rows or columns ($3 < 4$)

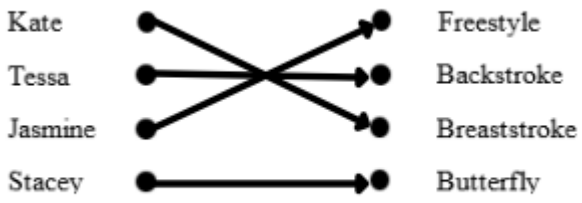
1 mark

d.

0.4	0	0	**6.3**
0	**0**	3.6	2.2
0	1.6	1.6	0.2
0	**0**	**0**	0

2 marks

e.



2 marks

f. 154.4 seconds

1 mark

Question 2

a.

Row reduction

	F	**BV**	**AV**	**S**
TB	172	4	112	0
AG	154	9	119	0
SRU	188	6	140	0
SD	167	0	110	2

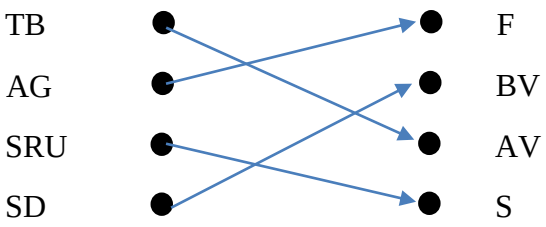
Column Reduction

	F	**BV**	**AV**	**S**
TB	18	4	2	0
AG	0	9	9	0
SRU	34	6	30	0
SD	13	0	0	2

	F	**BV**	**AV**	**S**
TB	18	2	**0**	0
AG	**0**	7	7	0
SRU	34	6	28	**0**
SD	15	**0**	0	4

3 marks

b.



3 marks

= $370 000 000

1 mark

c. Football = A Graded
Beach Volleyball = Structures R Us or Shady Design
Athlete Village = Shady Design
Skateboarding = Structures R Us

Total cost = $368 000 000
Saving = $2 000 000

2 marks

d. Either Shady Designs or Structures R Us would be building 2 different stadiums. This may delay the completion time as they could not be completed at the same time.

1 mark

e. Allocate to A Graded builders as the Football stadium is the highest cost.
This will reduce the total cost by $18 000 000

1 mark

END OF KEY TOPIC TEST SOLUTIONS