GENERAL MATHEMATICS 2024

Unit 4
Key Topic Test 6 – Networks and Decision Mathematics: Weighted Graphs and Trees

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

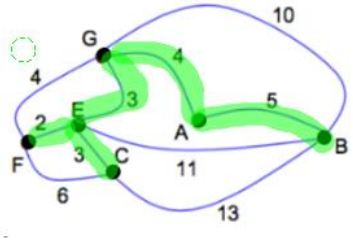
SOLUTIONS

SECTION A – Multiple Choice (1 mark per question)

Question 1
Answer: B

F – E – B = 13

Question 2
Answer: B

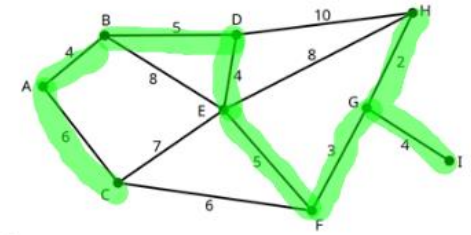


$5 + 4 + 3 + 2 + 3 = 17$

Question 3
Answer: B

9 vertices, 8 edges required for a spanning tree

Question 4
Answer: C



$6 + 4 + 5 + 4 + 5 + 3 + 2 + 4 = 33$

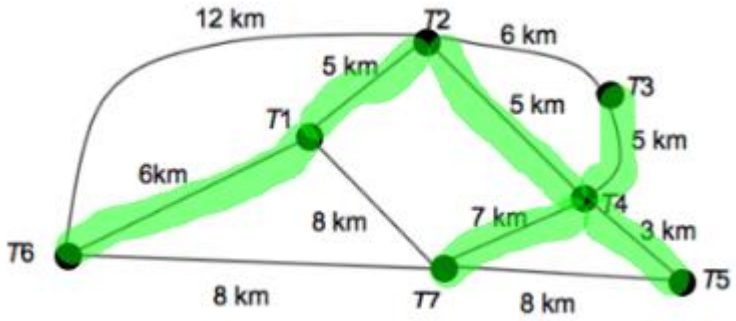
Question 5
Answer: C

A – C – F – G – I = 19

SECTION B – Short Answer

Question 1

a.



2 marks

b. Prim's algorithm

1 mark

c. 31km of cable

1 mark

d. T1, T3, T4, T6

1 mark

e. T6 – T7 – T4, 15km

2 marks

Question 2

a. $\text{Vertices} = 8,\ \text{Edges} = 12, \text{faces} = 6$
$8 + 6 - 12 = 2$

1 mark

b. 42 kms

1 mark

c. 6 even degree vertices

1 mark

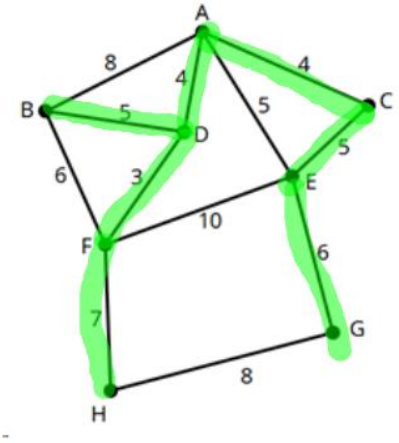
d. D (the other odd degree vertex)

1 mark

e. Euler circuits are only possible if all vertices are even degree.
There are 2 odd degree vertices (B & D)

1 mark

f. Note AE can replace EC



2 marks

g. 34 kms

1 mark

Question 3

a.

From A	B	C	D	E	F
A	3	5	8	∞	∞
B	3	5	8	∞	17
C	3	5	7	11	17
D	3	5	7	10	17
E	3	5	7	10	15

4 marks

b. A – C – D – E – F

1 mark

15 units

1 mark

END OF KEY TOPIC TEST SOLUTIONS