

1

DI January 2009 - Solutions

1 a) M, L, J, H, K, T, R, I
J, H, I, K, M, L, I, R
H, J, I, K, M, L, R, T
H, I, J, K, L, M, R, T
H, I, J, K, L, M, R, T

Remaining sublists of size 1 so stop.

b) 1. ~~Hugo~~ Hannah $\frac{1+8}{2} = 4.5$ 5 = Lauren
2. Imogen
3. John
4. Kieran
5. Lauren
6. Max
7. Richard
8. Tara

$\frac{1+4}{2} = 2.5$ 3 = John
discard 3-4

$\frac{1+2}{2} = 1.5$ 2 = Imogen
discard 2

1 = ~~Hugo~~ : ~~Found~~ Hugo not
Hannah in list.

2

2a)

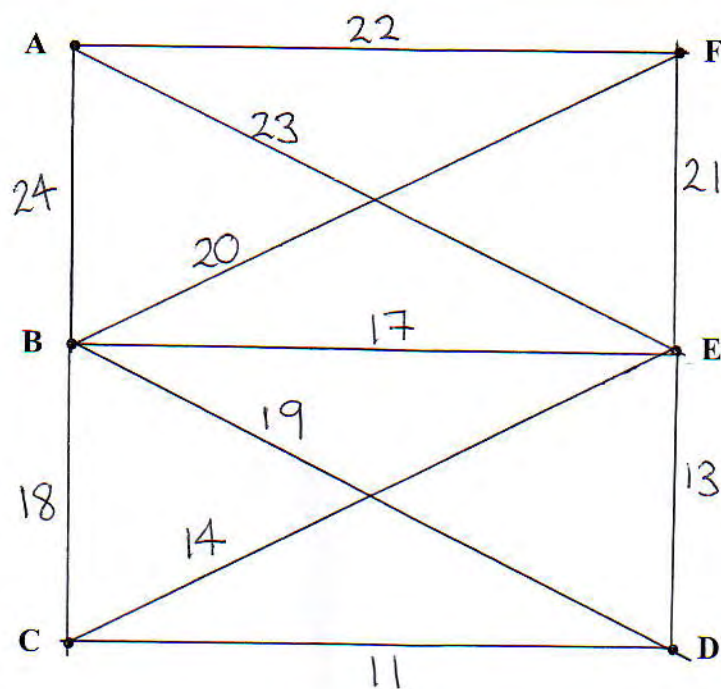


Diagram 1

b)

CD
DE
CE (rej)
BE
BC (rej)
BD (rej)
BF
FE (rej)
FA

c)

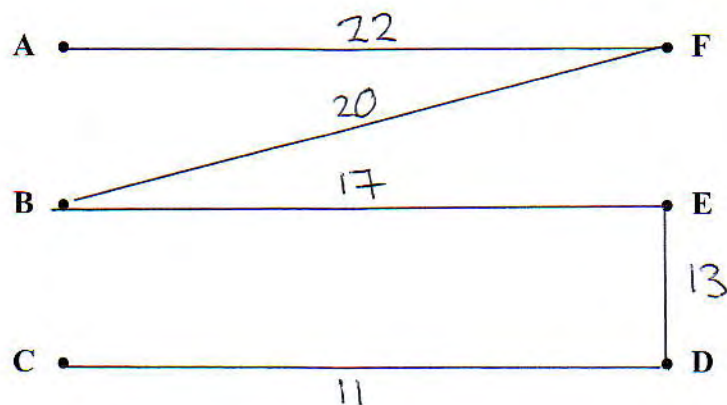
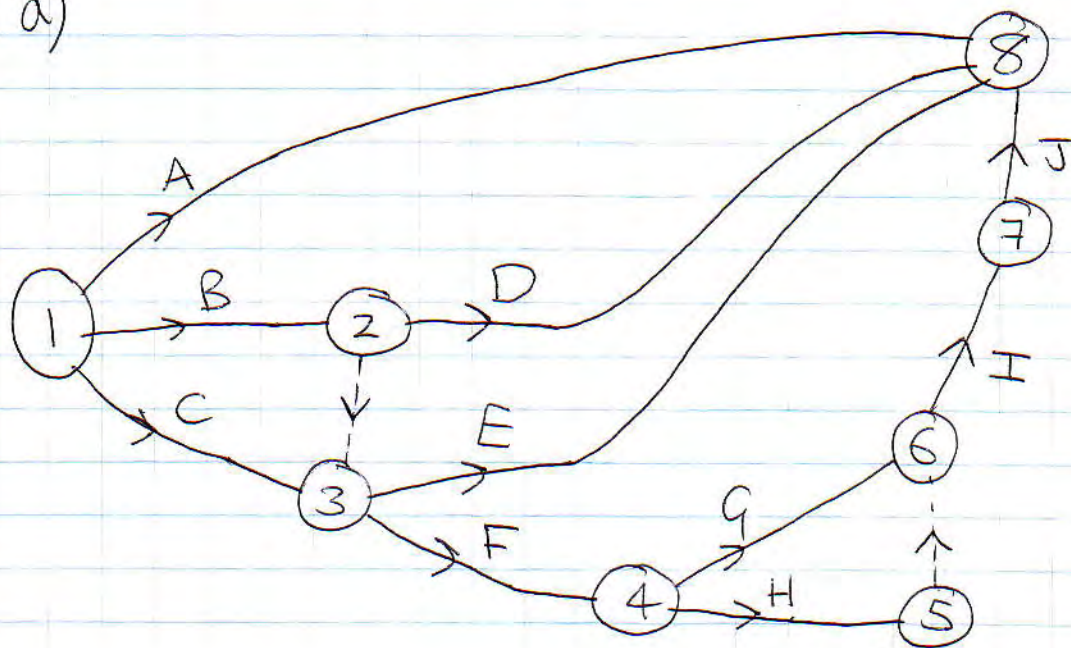


Diagram 2

Total weight of tree 83m

3

3 a)



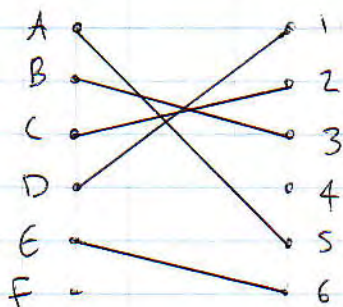
- b) The dummy from (2) to (3) is needed because E depends on C and B but D depends on B only.
The dummy from (5) to (6) is so that G and H can be expressed uniquely as two events.

4 a) $B-3=A-5$ cs $B=3-A=5$

improved match: $A=5, B=3, C=2, D=1, E=6$

- b) E can only do 1 or 6 but F must do 6 and D must do 1.

c) Initial match:



$$F-6=E-1=D-2=C-4$$

c.s

$$F=6-E=1-D=2-C=4$$

complete match: $A=5, B=3, C=4, D=2$
 $E=1, F=6$

④

5. a) Odd vertices C, D, E, G

$$CD = 17$$

$$EQ = \underline{19}$$

$$36$$

$$CE = 12$$

$$DQ = \underline{25}$$

$$37$$

$$CG = 28$$

$$DE = \underline{13}$$

$$41$$

∴ CD and EQ must be traversed twice

$$\text{length of route} = 543 + 36 = \underline{\underline{579 \text{ km}}}$$

b) ~~Start and finish at D and G~~

Start at D, finish at G (or visa versa) as this will leave CE to be traversed twice and this is the shortest pairing.

6. a) SEE PAGE (5)

b) ~~ABEA or ABDA length 166 km~~

ABEGH length 165 km
