

1

DI January 2009 - Solutions

- 1 a) M, L, J, H, K, T, R, I  
 J, H, I, K, M, L, T, 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 discard 5-8  
 4. Kieran  
 5. Lauren  $\frac{1+4}{2} = 2.5$  3 = John  
 6. Max  
 7. Richard discard 3-4  
 8. Tara  
 $\frac{1+2}{2} = 1.5$  2 = Imogen  
 discard 2

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

2  
2a)

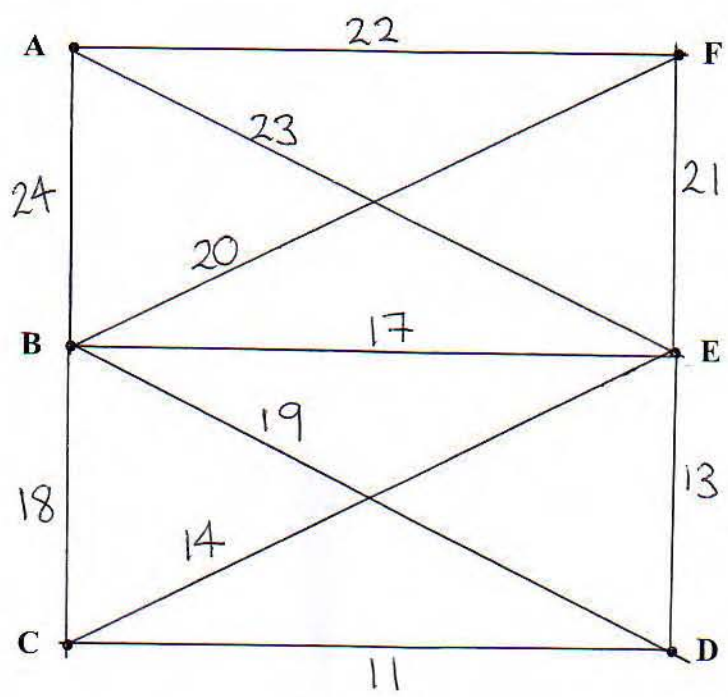


Diagram 1

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

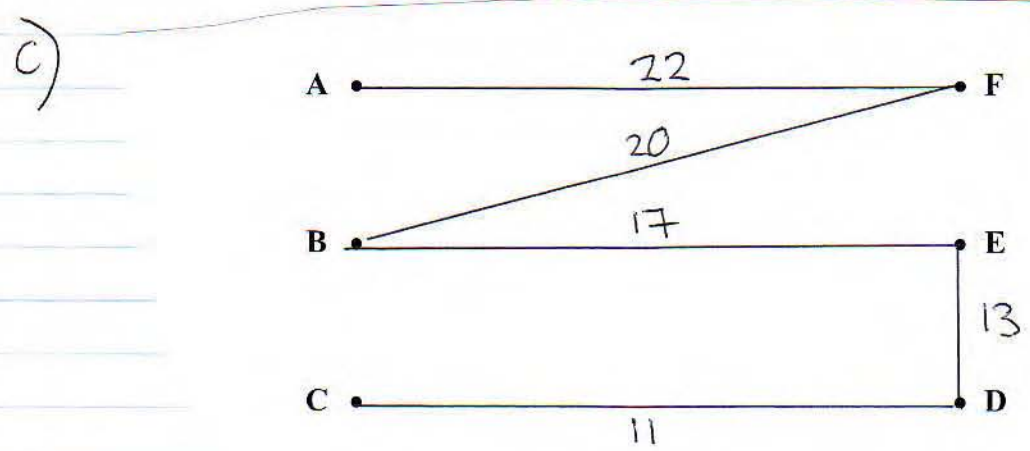


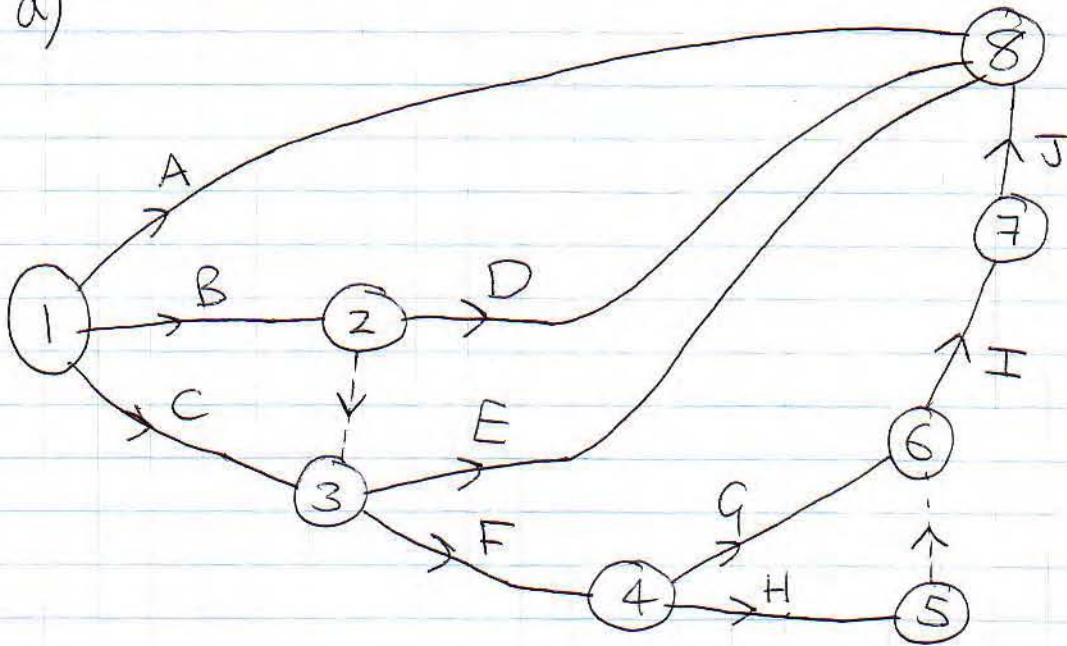
Diagram 2

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.

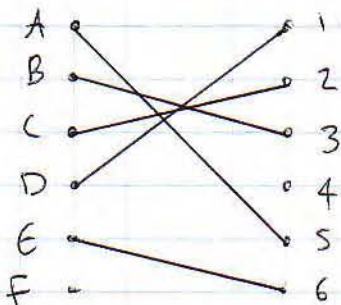
The dummy from (5) to (6) is so that G and H can be expressed uniquely as two events.

4 a)  $B - 3 = A - 5$  c.s  $B = 3 - A = 5$

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

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

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	CE = 12	CG = 28
EQ = <u>19</u>	DG = <u>25</u>	DE = <u>13</u>
36	37	41

∴ CD and EQ must be traversed twice  
length of route =  $543 + 36 = \underline{\underline{579 \text{ km}}}$

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

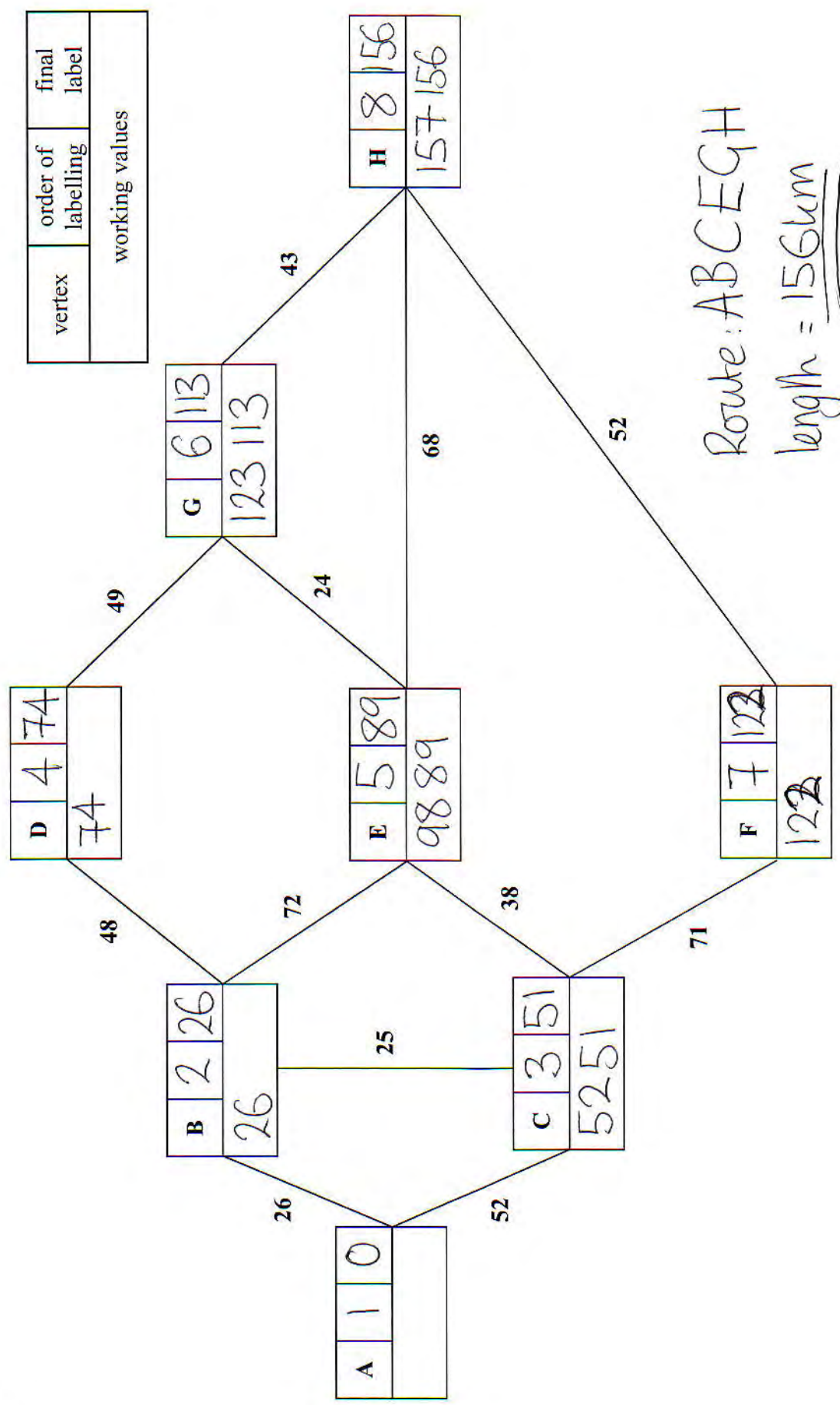
Start at D, finish at G (or visa versa) as this will leave CE to be traversed twice and this is the shortest pairing.

6. a) SEE PAGE (5)

b) ~~ADEA or ABDA length 165 km~~

ABEGH length 165 km





vertex	order of labelling	final label
working values		

6. (a)

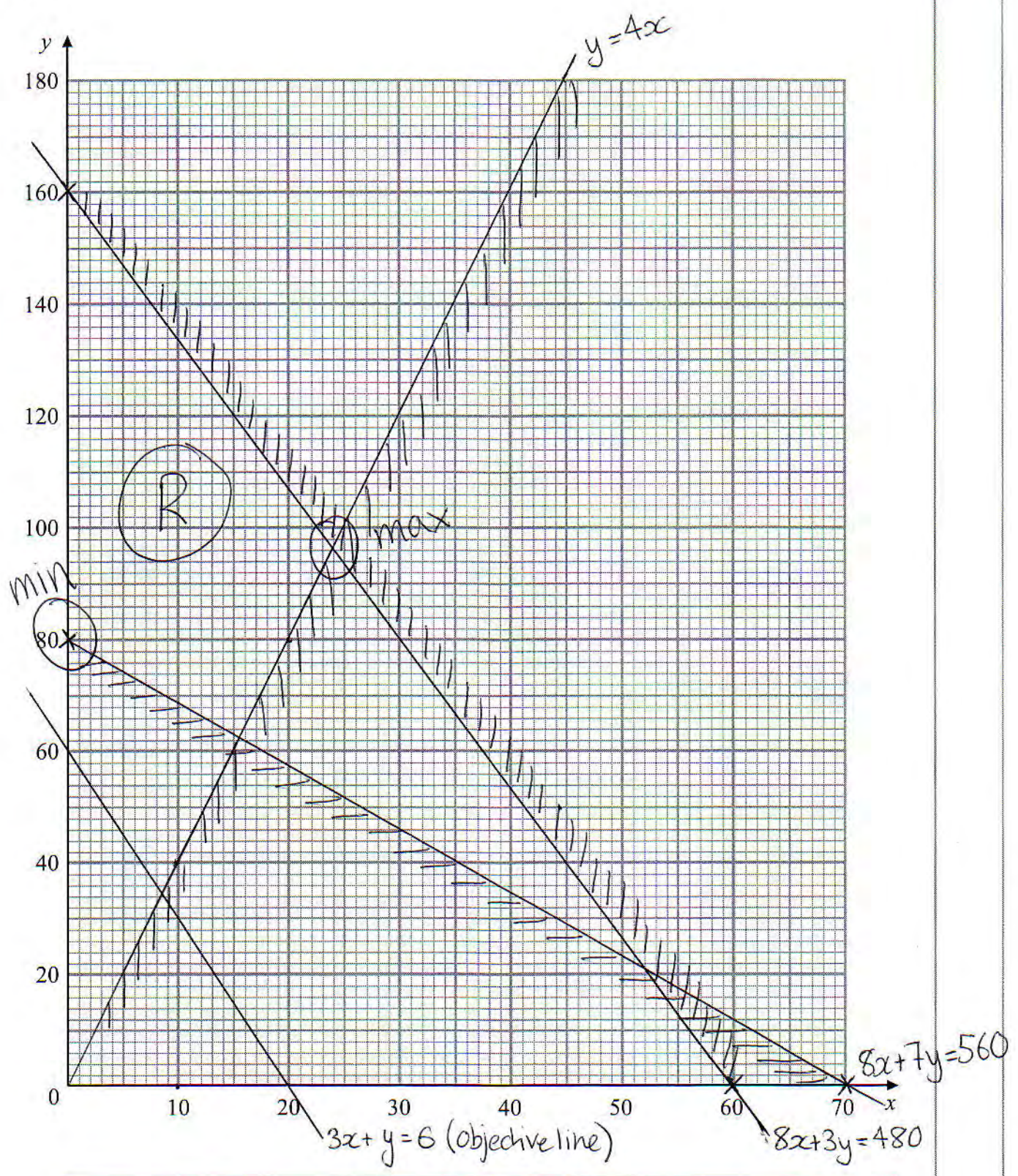




6

Leave blank

7.



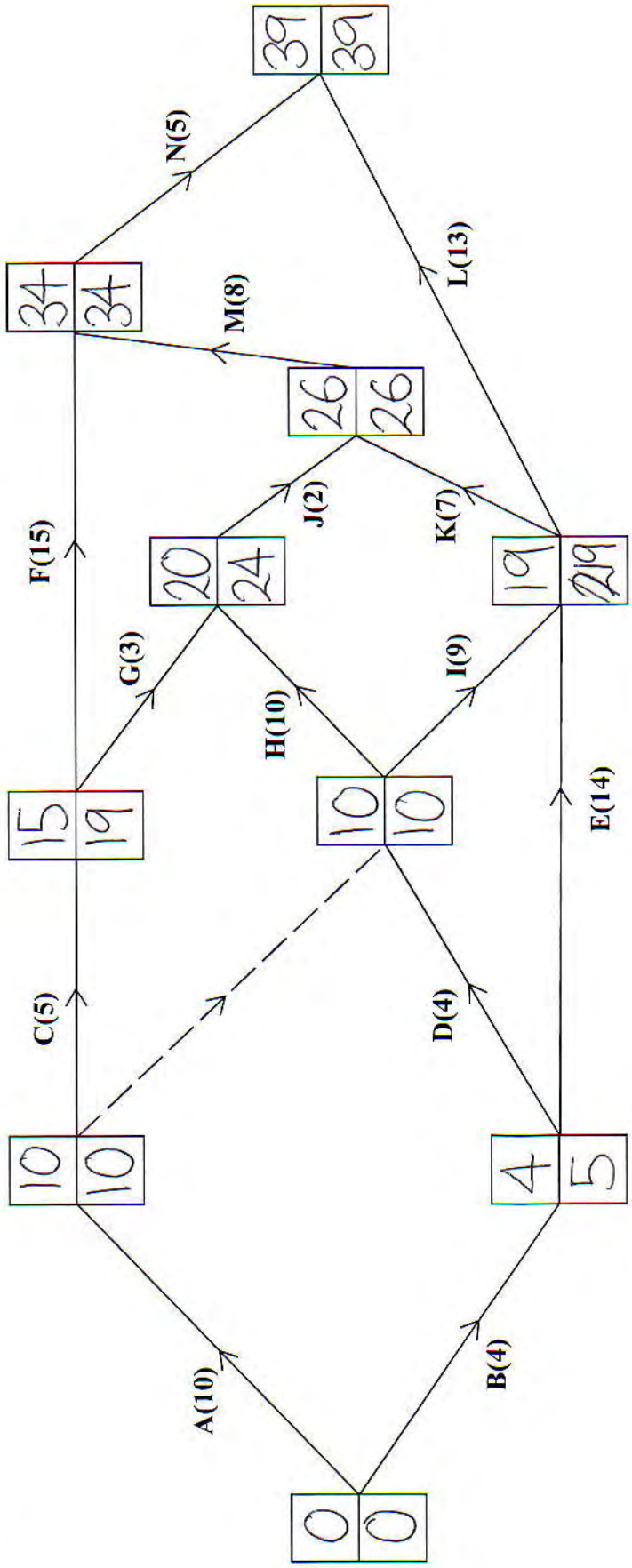
b) I)  $(0, 80) \quad F = 80$

II)  $8x + 3(4x) = 480 \quad (24, 96) \quad F = 168$   
 $20x = 480$   
 $x = 24 \Rightarrow y = 96$





8. (a)



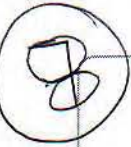
(b) Critical activities: **A I K M N**

Length of critical path: **39**

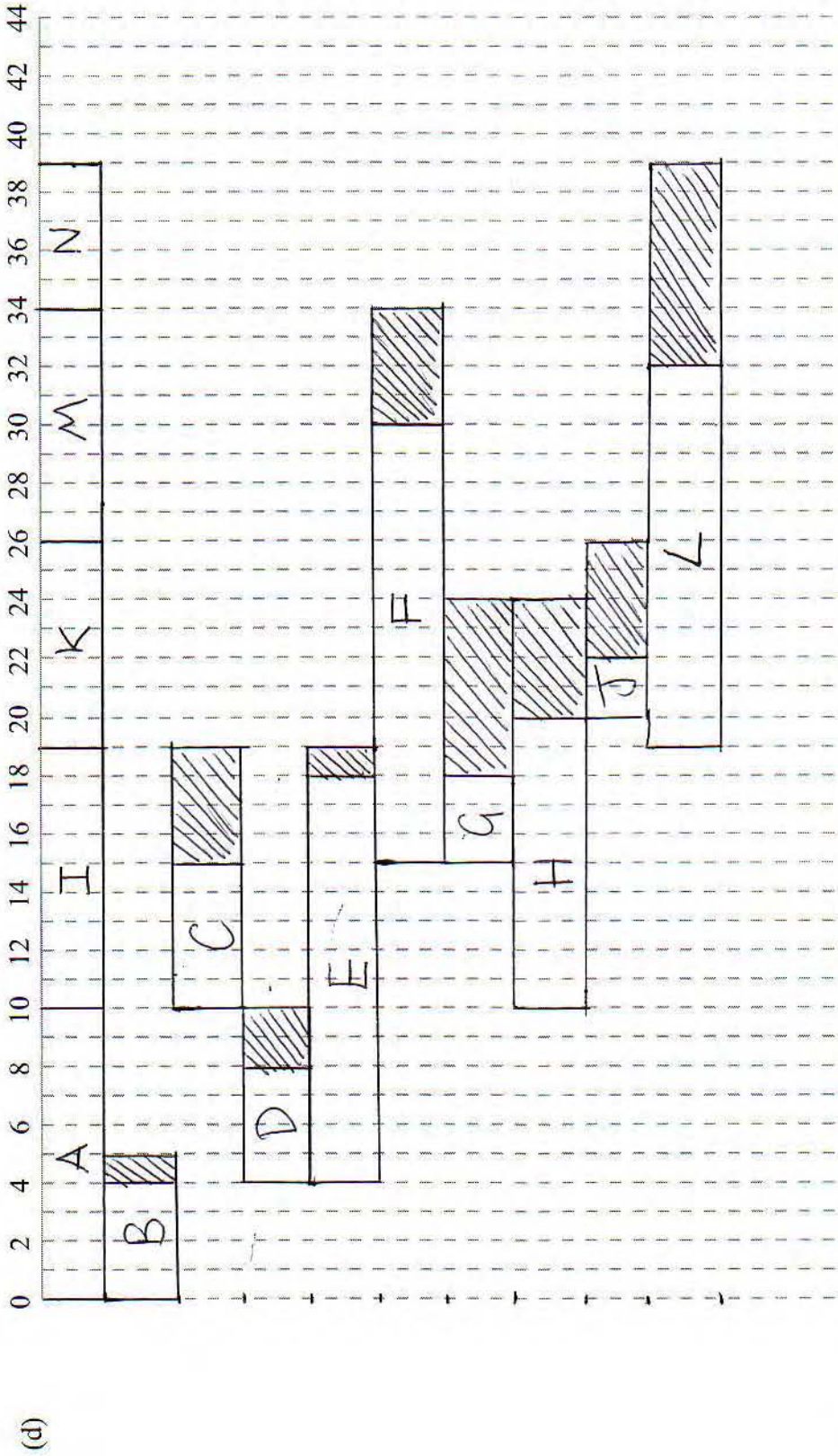
(c) Total float on activity F: **34 - 15 - 15 = 4**

Total float on activity G: **24 - 3 - 15 = 6**





(Question 8 continued)



(e) 4 workers are the minimum as on day 14 four activities must be taking place.

(Total 16 marks)

TOTAL FOR PAPER: 75 MARKS

END

Q8

