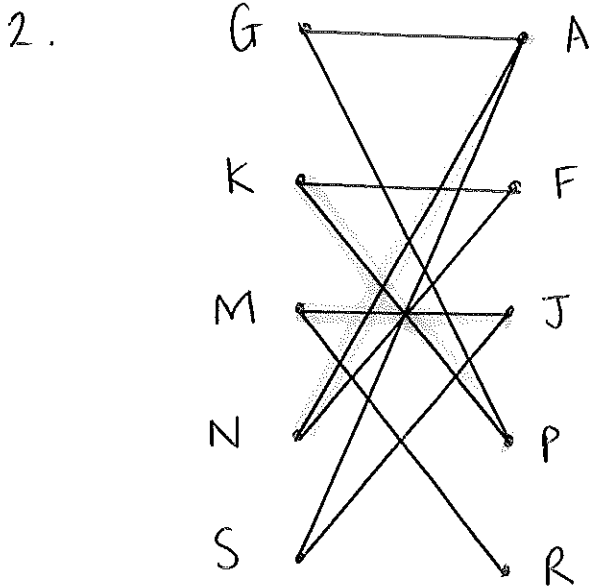


June '05

1.

23	3	17	4	6	19	14	3
3	23	17	4	6	19	14	3
3	17	23	4	6	19	14	3
3	4	17	23	6	19	14	3
3	4	6	17	23	19	14	3
3	4	6	17	19	23	14	3
3	4	6	14	17	19	23	3
3	3	4	6	14	17	19	23



① $(G - A) + (N - F)$

② OR $(G - P) + (K - F)$

AND $(S - J) + (M - R)$

①

GA

KP

MR

NF

SJ

OR

②

GP

KF

MR

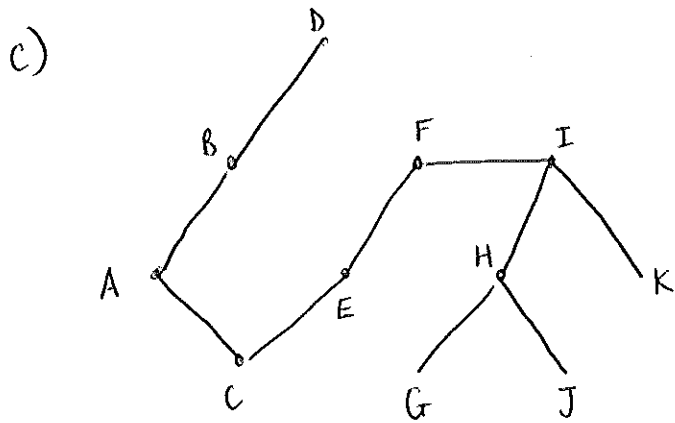
NA

SJ

3a)

AB	20
AC	25
BD	30
CE	35
EF	40
FI	35
IH	30
IK	35
HG	40
HJ	45
	<hr/>
	335

b) 335 metres



d)

AB	20
AC	25
BD	30
CE	35
AE	40
⋮	⋮
⋮	⋮
⋮	⋮

} rest the same

$$-35 + 40 = +5$$

4ai) $\frac{7 \times 6}{2} = 21$

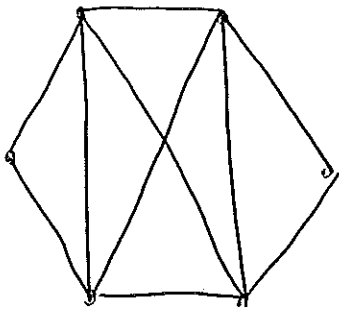
ii) 6

iii) 7

bi) all vertices have even order

ii) n must be odd

c)



5ai)

X	K	Y
2	1	5
5	2	4.1
4.1	3	4.001
4.001	4	

5a ii)

X	K	Y
-6	1	-4.333
-4.333	2	-4.013
-4.013	3	-4.000
-4.000	4	

b) the loop would go on forever (continuous)

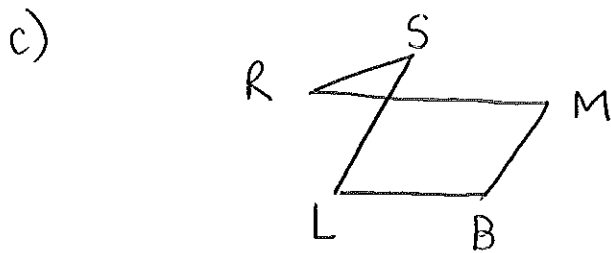
6ai) $S \rightarrow R \rightarrow M \rightarrow B \rightarrow L \rightarrow S$
 $15 \quad 55 \quad 25 \quad 50 \quad 20 = 165$

ii) $S \rightarrow R \rightarrow L \rightarrow B \rightarrow M \rightarrow S$
 $15 \quad 25 \quad 50 \quad 25 \quad 90 = 205$

b)

RS	15	BM	25
SL	20	BL	<u>50</u>
MR	<u>55</u>		<u>75</u>
	90		

$90 + 75 = 165$



This is optimal tour

7ai) see sheet 400 mins

ii) R S G W M C L

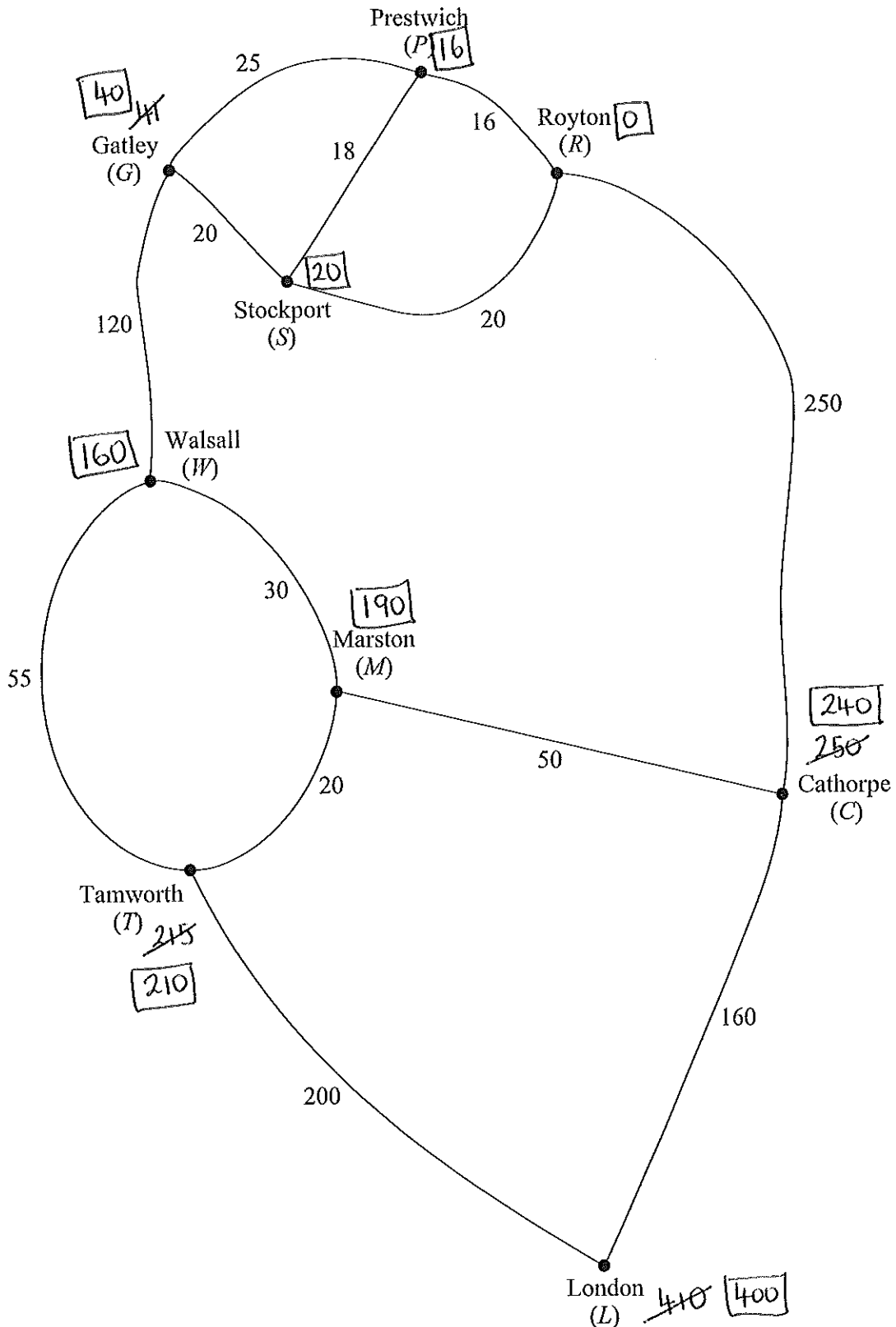
b) RCT: ~~410~~ 250 + 160 = 410
 RSGWTL: 160 + 55 + 200 = 415 ignore

Extra time = 10 mins

Route: Royton - Cathorpe - London

7 [Figure 1, printed on the insert, is provided for use in this question.]

The diagram shows some of the main roads connecting Royton to London. The numbers on the edges represent the travelling times, in minutes, between adjacent towns. David lives in Royton and is planning to travel along some of the roads to a meeting in London.



8a) Milky chocolates: $12x + 18y \leq 600$
 $2x + 3y \leq 100$

b) $2x + 3y \leq 100$

$$x \geq 15$$

$$y \geq 15$$

$$x + y \geq 35$$

$$20x + 10y \leq 600 \rightarrow 2x + y \leq 60$$

$$P = 1.5x + y$$

c) see next sheet

d) maximum at $(20, 20)$

$$P = 1.5(20) + 20$$

$$= 30 + 20 = 50$$

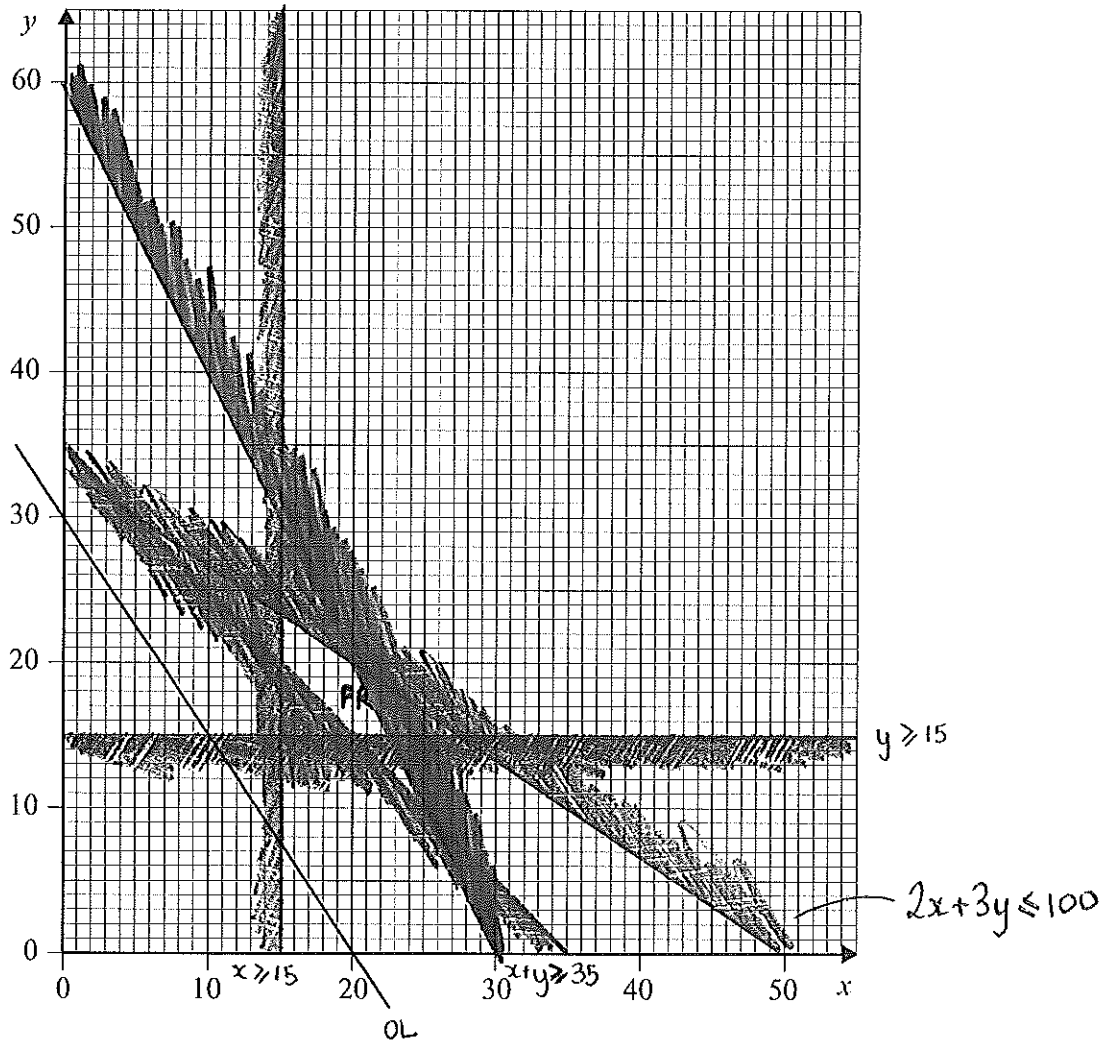


Figure 2 (for Question 8)

$$30 = 1.5x + y \quad \begin{matrix} (0, 30) \\ (20, 0) \end{matrix}$$