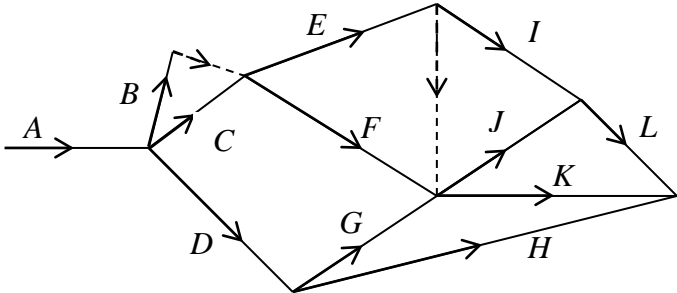


Decision Mathematics D1 (6689)

Mock paper mark scheme

Question number	Scheme	Marks
1.	<p>(a) For example: 28 31 14 18 24 11 7 31 28 18 24 14 11 7 31 28 24 18 14 11 7</p> <p>(b) $\frac{133}{40} = 3.325$, so 4 lorries</p> <p>(c) Bin 1: 31 + 7 Bin 2: 28 + 11 Bin 3: 24 + 14 Bin 18</p>	<p>M1, A1 A1 A1 (4)</p> <p>M1, A1 (2)</p> <p>M1 A1 A1 (3)</p> <p>(9 marks)</p>
2.	<p>$\left\lceil \frac{1+9}{2} \right\rceil = 5$ Freya reject top</p> <p>$\left\lfloor \frac{6+9}{2} \right\rfloor = 8$ Richard reject bottom</p> <p>$\left\lfloor \frac{6+7}{2} \right\rfloor = 7$ Jenny reject bottom</p> <p>6 is Greg so Hannah is not on list</p>	<p>M1 A1 A1 A1</p> <p>(4 marks)</p>
3.	<p>(a)(i) DF GH EG $\left[\begin{array}{c} CD \\ EH \times \end{array} \right]$ EF AD $\left[\begin{array}{c} FH \times \\ AC \times \end{array} \right]$ CF \times BD</p> <p>(ii) AD DF DC FE EG GH BD</p> <p>(b) 188 m</p> <p>(c)</p>	<p>M1 A1 A1</p> <p>M1 A1 A1 (6)</p> <p>B1 (1)</p> <p>B1 (1)</p> <p>(8 marks)</p>

Question number	Scheme	Marks
<p>4. (a)</p> <p>(b)</p>	<p>$A - 1 = D - 2$ c.s. $A = 1 - D = 2$</p> <p>$A = 1$ $M = 4$ $S -$</p> <p>$D = 2$ $P = 6$ $T -$</p> <p>E.g. $S - 6 = P - 3$ c.s. $S = 6 - P = 3$</p> <p>$T - 4 = M - 5$ c.s. $T = 4 - M = 5$</p> <p>$A = 1$ $M = 5$ $S = 6$</p> <p>$D = 2$ $P = 3$ $T = 4$</p>	<p>M1 A1</p> <p>A1 (3)</p> <p>M1 A1</p> <p>M1 A1</p> <p>A1 (5)</p> <p>(8 marks)</p>
<p>5. (a)</p> <p>(b)</p>	 <p>One dummy needed so that B and C can be <i>uniquely</i> expressed in terms of end events</p> <p>Other due to <i>precedence</i> (I depends only on E, J and K depends upon E, F and G)</p>	<p>M1 A1</p> <p>A1</p> <p>A1</p> <p>(4)</p> <p>B3, 2, 1, 0 (3)</p> <p>(7 marks)</p>
<p>6. (a)</p> <p>(b)</p>	<p>$AB + FG = 16 + 23 = 39 \leftarrow$</p> <p>$AF + BG = 21 + 21 = 42$</p> <p>$AG + BF = 29 + 15 = 44$</p> <p>Shortest route length = $185 + 39 = 224\text{km}$</p> <p>Repeat BF, since it is the smallest.</p> <p>So start/finish at A and G.</p>	<p>M1 A1</p> <p>A1</p> <p>A1</p> <p>A1 (5)</p> <p>B1</p> <p>B1 (2)</p> <p>(7 marks)</p>

Question number	Scheme	Marks
7. (a)	<p>S-B-D-F-T Length £8.70</p> <p>(b) E.g. $8.7 - 2.1 = 6.6$ FT $6.6 - 3.3 = 3.3$ DF $3.3 - 1.2 = 2.1$ BD $2.1 - 2.1 = 0$ SB</p> <p>(c) S - C - E - G - T cost £8.90</p> <p><i>Or trace back from T including arc XY if Y lies on the path and the length of XY = difference in arc weights of X and Y.</i></p>	<p>A1 A1 (2)</p> <p>B2, 1, 0 (2)</p> <p>B1 B1 (2)</p> <p>(10 marks)</p>

Question number	Scheme	Marks
<p>8. (a)</p> <p>(b)</p> <p>(c)</p> <p>(d)</p>	<p>$x \geq 20$ Line + shading</p> <p>$3x + 2y \leq 360$ Line + shading</p> <p>R correctly labelled – see graph paper</p> <p>$P = 0.7x + 0.2y$</p> <p>Profit line or point testing</p> <p>A and B correctly labelled</p>	<p>B2, 1, 0</p> <p>B2, 1, 0 (4)</p> <p>B1 (1)</p> <p>B1 (1)</p> <p>M1, A1</p> <p>B1, B1</p>

Question number	Scheme	Marks
9. (a)		<p>M1 A1 (top boxes)</p> <p>M1 A1 (bottom boxes)</p> <p>(4)</p> <p>(b) B E I K N</p> <p>(c) $\frac{94}{31} = 3.032$ so 4 workers</p> <p>(d) As below</p>
		B2, 1, 0 (2)
		M1, A1 (2)

