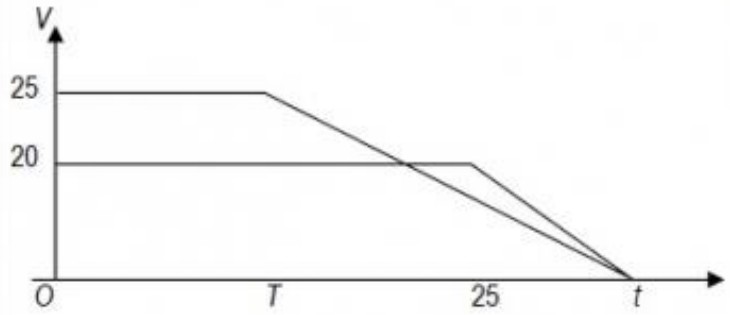
Year 1 Applied Chapter 9: Constant Acceleration – Exam Questions
Velocity Time Graphs - Two Vehicles (Answers)

Q1.

Question Number	Scheme	Marks
(a)	 Shape (both) Cross Meet on t-axis Figures 25,20,T,25	B1 B1 B1 B1 (4)
(b)	For Q: $20\left(\frac{t+25}{2}\right)=800$ $t=55$	M1 A1 DM1 A1
	For P: $25\left(\frac{T+55}{2}\right)=800$ solving for T: $T=9$	M1 A1 DM1 A1 (8) [12]

Q2.

Question Number	Scheme	Marks
(a)	$30^2 = 2a.300$ $a = 1.5$	M1 A1 (2)
(b)	$0^2 = 30^2 - 2 \text{ x } 1.25s$ OR $0 = 30 - 1.25t_2$ $s = 360$ $t_2 = 24$ $300 + 30T + 360 = 1500$ $\frac{(20+T+24+T)}{2} \text{ x } 30 = 1500$ $T = 28$ $T = 28$	M1 A1 M1 A1 A1 (5)
(c)	triangle, *drawn on the diagram*, with base coinciding with base of trapezium, top vertex above line $v = 30$ and meeting trapezium at least once V marked correctly	B1 DB1 (2)
(d)	$30 = 1.5t_1 \Rightarrow t_1 = 20$ $30 = 1.25t_2 \Rightarrow t_2 = 24$ $\frac{1}{2}(20 + 28 + 24)V = 1500$ $V = \frac{750}{18} = 41.67$ $= \frac{125}{3}$ (oe) 0r 42 (or better)	M1 A1 A1 M1 A1 A1 (6)

Q3.

Question Number	Scheme	Marks
(a)	Speed 22 0 30 30+T 120 Time	Shape B1 Figures B1 (2)
(b)	$\frac{(120+T)22}{2} = 2145$	M1 A1
	$T = 75$	A1
		(3)
(c)	$\frac{(t+t-30)22}{2} = 990$	M1 A1
	$t = 60$	A1
	Answer $= 60 - 10 = 50$	A1
		(4)
(d)	$990 = 0.5a50^2$	M1
	$a = 0.79, 0.792, 99/125$ oe	A1
		(2)
		[11]

Q4.

Question Number	Scheme	Marks
(a)	V 15 5 t 16 22 Shape 'V' Shape for last 22s (with $V > 15$) Figures	B1 B1 B1 (3)
(b)	$\frac{1}{2}(15 + 5) \times t = 120$ $\Rightarrow t = 12 \rightarrow T = 12 + 16 + 22 = \underline{50\text{ s}}$	M1 M1 A1 (3)
(c)	$120 + \underline{\frac{1}{2}(V + 5).16} + 22V = 1000$ Solve: $30V = 840 \Rightarrow V = \underline{28}$	M1 B1 A1 DM1 A1 (5) **11**