

Forces speed dist time 2 Answers

- 1)
- (a) (i) 15 (m/s) B1
- (ii) 0 (m/s) B1
- (b) (i) increasing OR accelerating B1
- (ii) constant OR nothing B1
- (iii) decreasing OR decelerating (however expressed) B1
- (c) area of triangle OR area under graph OR appropriate equation of motion C1
 $\frac{1}{2} \times 30 \times 5$ C1
 75 (m) A1
- (d) speed = distance/time in any form, letters, words, numbers C1
 $750/30$ C1
 25 (m/s) A1 [11]
- 2)
- (a) speed = distance \div time in any form OR (distance =) speed \times time C1
 $80 \times \frac{1}{2}$ OR 80×0.5 C1
 40 (km) A1
- (b) (i) First section of line:
 horizontal line starting at zero time, any speed M1
 at 80 km/hour A1
 from 0 to 0.5 hour, no further A1
- (ii) Second section of line:
straight line sloping down B1
 line starting at end of previous section and ending at 1 hour
 (condone not straight) B1
 line ending at 30 km/hour B1
- Third section of line:
 vertical/near vertical line down to 0 at 1 hour B1
 ignore further sections of graph **[Total: 10]**

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3)	(a) (i) BC OR 40 – 70 OR 2nd section	B1
	(ii) AB OR 0 – 40 OR 1st section	B1
	(b) (i) area under graph OR speed × time seen or used 70–40 OR 30 8 × 30 e.c.f. 240 (m)	C1 C1 C1 A1
	(ii) 7 × 10 OR average speed × time OR area of triangle + area of rectangle 70 (m)	C1 A1
	(c) line down from D to axis at 110s (need not be straight)	B1 [Total: 9]
4)	(a) 4 (hours) OR 5 ½ / 5.5 (hours) / 5 hours 30 mins	B1
	(b) (i) 300 (km)	B1
	(ii) 30 (km)	B1
	(iii) 270 (km) e.c.f. (i) & (ii)	B1
	(c) 2 horizontal sections clearly indicated	B1
	(d) last section, however expressed e.g. after 6 hours smallest slope OR smallest distance in ½ hour	B1 B1
	(e) distance ÷ time 300 ÷ 6.5 answer in range 46–46.2 correct unit e.g. km/h	C1 C1 A1 B1 [Total: 11]
5)	1(a) cyclist accelerating OR moving faster OR cyclist has higher speed both (cyclist and runner) accelerating cyclists gradient steeper OR acceleration values calculated	B1 B1 B1
	1(b) Constant OR steady OR uniform (speed or motion)	B1
	1(c) indication of an area calculated 6 × 9 = 54(m) ½ (6 × 9) = 27(m) <u>81(m)</u>	C1 C1 C1 A1
	1(d) horizontal line finishes at 10 seconds straight line to time zero in two seconds	B1 B1
		Total: 10

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6)	(a) (i) acceleration OR increasing speed constant acceleration OR constant rate of increase in speed	C1 A1
	(ii) decreasing acceleration OR decreasing rate of increase in speed NOT deceleration	B1
7)	(a) A increasing speed B constant speed C stationary Note: one mark lost for e.e.o.o.	B2
	(b) D increasing acceleration E constant acceleration F constant speed Note: one mark lost for e.e.o.o.	B2
8)	(a) (i) Increasing speed / acceleration	B1
	(ii) Constant / steady / uniform speed or motion	B1
	(iii) Decreasing speed / deceleration / braking / slowing / stopping / negative acceleration	B1
	(b) (i) (Total) distance / (total) time OR d / t OR 400 / 60 6.67 m/s at least 2 s.f.	C1 A1
	(ii) Mention of maximum gradient OR clear that whole or part of B to C is used Use of correct data from graph to $\pm \frac{1}{2}$ square Answer rounds to 9.2 to 9.4 m/s, at least 2 s.f.	C1 C1 A1
[Total: 8]		
9)	(a) (i) <u>tape measure</u> OR <u>laser measure</u> OR <u>trundle wheel</u>	B1
	(ii) stopwatch / stopclock	B1
	(b) reaction time owtte OR delay in hearing sound	B1
	(c) (i) (speed =) distance \div time 100 \div 12.5 8.0(m/s)	C1 C1 A1

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10)	(a) area under graph OR $\frac{1}{2}(u + v) t$		C1
	$\frac{1}{2} \times 40 \times 8$		C1
	160 (m)		A1
	(b) 315 + candidate's (a)		C1
	distance = speed \times time OR distance/time in words, symbols or numbers		C1
	(315 + 160)/80 OR (315 + candidate's (a))/80		C1
	(5.9) 38(m/s)		A1
	(c) (i) steady/same/constant/uniform speed		B1
	(ii) slowing down/decelerating/negative acceleration		B1
			[Total: 9]
11)	(a) speed \times time OR area under graph		C1
	8×50		C1
	400 (m)		A1
	(b) half candidate's (a) OR $\frac{1}{2} \times \text{base} \times \text{height}$		C1
	200 (m) e.c.f. from (a)		A1
	(c) 600 (m) e.c.f. from (a)(b)		B1
	(d) (i) equation using candidate's (c)/60		C1
	10 e.c.f. (c)		C1
	m/s		B1
	(ii) horizontal straight line at 10 m/s e.c.f. (i)		M1
	from 0 s – 60 s, not beyond		A1 [11]

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- 12) (a) 40(km) B1
- (b) speed = distance ÷ time in any form C1
0.5 ÷ 0.04 C1
12.5 m/s A1
- (c) (i) distance travelled = area under slope **OR** $0.5 \times 15 \times 6$ C1
45(m) A1
- (ii) (straight) line from 15 m/s to 0 in 2.0 seconds A1

[Total: 7]