Mark scheme

Motion

Physics 0625 · Questions from Paper 3 and Paper 4

Total marks

78

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
6	7	7	9	11	7	8	7	8	8	**78**

Question 1 [6]

1(a)	speed **OR** velocity on y-axis **AND** time x-axis	**B1**
1(b)	A to B	**B1**
1(c)	area under graph	**C1**
	$0.5 \times 5 \times 5$ (+ (3×5))	**C1**
	27.5 (m)	**A1**
1(d)	correctly placed continuous single thin straight line from A to E drawn using a rule	**B1**
	Total:	**6**

Question 2 [7]

2 **(a)** 1100 (m) ± 20 B1

(b) stationary / not moving / at rest B1

(c) **(i)** C **AND** D B1

(ii) D **AND** E B1

(d) (speed=) distance ÷ time, in any form: symbols, words, numbers, ecf from **(a)** C1

use of 300 s **OR** conversion of time to s **OR** ÷ 60 C1

3.7 **OR** 3.67 (m / s) A1

[Total: 7]

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Question 3 [7]

3(a)(i)	9 (min)	**B1**
3(a)(ii)	7.5 (m / s)	**B1**
3(a)(iii)	C	**M1**
	greatest slope / greater change of speed in same time interval owtte	**A1**
3(b)	3.8 (m / s)	**A3**
	5200 ÷ 1380	(C2)
	(average speed =) (total) distance ÷ (total) time in any form	(C1)

Question 4 [9]

4(a)	(section) KL **OR** LK	**B1**
4(b)	(distance travelled =) 150 (m)	**A3**
	(distance travelled =) ½ × 20 × 15	C2
	(distance travelled =) area under graph **OR** ½ × b × h	C1
4(c)(i)	(section LM is) constant / steady speed	**B1**
4(c)(ii)	(section MN is) decelerating	**B1**
4(d)	(average speed =) 25 (m / s)	**A3**
	(average speed =) 500 ÷ 20	C2
	(average speed =) (total) distance travelled ÷ (total) time	C1

Question 5 [11]

5(a)	2 : 33 : 65 – 1 : 22 : 15 **OR** 153.65 – 82.15	**1**
	71.50 (s)	**1**
5(b)	4 × 20 **OR** 4000 × 20	**1**
	(average speed =) distance ÷ time	**1**
	80 000 ÷ 1600	**1**
	50 (m / s)	**1**
5(c)(i)	(section) P or from 0 s to 2.5 s	**1**
	(line has) greatest gradient	**1**
5(c)(ii)	dist travelled = area under graph **OR** ½ × b × h	**1**
	½ × 2.5 × 40	**1**
	50 (m)	**1**

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Question 6 [7]

6(a)	rate of change of velocity OR change in speed per unit time / s	**B1**
6(b)(i)	deceleration	**C1**
	constant deceleration	**A1**
6(b)(ii)	acceleration	**C1**
	increasing acceleration	**A1**
6(b)(iii)	decreasing speed / velocity OR deceleration	**B1**
6(b)(iv)	constant speed	**B1**

Question 7 [8]

7 **(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 C1
6.67 m/s at least 2 s.f. A1

(ii) Mention of maximum gradient OR clear that whole or part of B to C is used C1
Use of correct data from graph to +/– ½ square C1
Answer rounds to 9.2 to 9.4 m/s, at least 2 s.f. A1

[Total: 8]

Question 8 [7]

8 **(a)** **(i)** acceleration OR increasing speed C1

constant acceleration OR constant rate of increase in speed A1

(ii) decreasing acceleration OR decreasing rate of increase in speed
NOT deceleration B1

(b) mention of air resistance AND weight (of object) / force due to gravity B1

acceleration at start (of fall) is acceleration of gravity / 10 m / s^2 / a maximum / g
OR acceleration decreases (as it falls) B1

air resistance increases as speed increases/as it accelerates B1

acceleration zero/terminal velocity/constant speed/maximum speed when air resistance = weight B1

[Total: 7]

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Question 9 [8]

9 **(a)** underline or circle force B1
underline or circle velocity B1

(b) **(i)** 4.07 – 4.1 (s) B1

(ii) $(v - u)/t$ OR $\Delta v/t$ OR in words OR use of 40 ÷ (ans. to **(b)(i)**)
OR other correct values from graph C1
answer between 9.7 and 10 m/s^2 or m/s/s A1

(iii) area under graph OR ½ $(u + v)t$ OR ½ × 40 × (ans. to **(b)(i)**) C1
OR $s = ut + ½at^2$ OR $v^2 = u^2 + 2as$ OR numbers substituted
82 m A1

(c) graph continues in straight line to 6 s B1

[Total 8]

Question 10 [8]

10(a)	0.0069 m / s^2	**A2**
	(acceleration =) gradient of graph or $\Delta v / \Delta t$ in any form OR $\frac{15-7.5}{(60-42)60}$	C1
10(b)	48 000 m or 48 km	**A3**
	area under graph	C1
	$\frac{1}{2}(18\times7.5\times60)+(7.5\times18\times60)+(15\times40\times60)$	C1
10(c)(i)	(force =) 2.0×10^5 N	**A2**
	(F =) ma OR $2.3 \times 10^7 \times 0.0087$ in any form	C1
10(c)(ii)	there is a backward / drag force OR water resistance	**B1**

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