

Multiple Choice Answers

Q2: B

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Multiple Choice Answers

Q2: C

Q3: D

1(a)(i)	constant acceleration
1(a)(ii)	area under the graph OR $\frac{1}{2}bh$ OR <u>average</u> speed $\times$ time
	$0.5 \times 5.9 \times 0.6$ OR 1.77 (to ≥ 3 sf)
1(a)(iii)	9.5 J
	$(\Delta E_p =) m g(\Delta)h$ OR $0.54 \times 9.8 \times 1.8$
1(a)(iv)	candidate's 1(a)(iii) value $\times 0.5$ (2sf)
1(b)	any three from: (initially there is acceleration due to) an unbalanced force OR resultant force OR downward force OR weight OR gravitational force acting on the ball - as speed increases the <u>air</u> resistance increases (as air resistance increases) resultant force downwards decreases OR acceleration decreases (eventually) ball falls with constant speed when air resistance = weight OR ball falls with terminal velocity when air resistance = weight
1(c)	(some of the) energy is: transferred to the thermal energy (store) of the ground (when ball hits ground) OR converted / transferred to thermal energy (store) of the air OR used to deform ball / transferred to the elastic energy (store) of the ball (as it contacts the ground)
	gravitational potential energy (in the store at C) will be less (than at A) OR (ball has) less kinetic energy (in its store just after B)

Multiple Choice Answers

Q1: C

Multiple Choice Answers

Q7: B

1(a)	(acceleration is) rate of change in velocity OR change in velocity per unit time OR ($a =$) $\Delta v / \Delta t$
1(b)	0.021 N
	$F = ma$ OR ($F =$) ma OR 0.0075×2.8
1(c)(i)	any four from: (acceleration) decreases (acceleration decreases) to zero (at approximately 0.03 s) - resistive force increases / resistance increases (as speed / velocity increases) - resultant force (downwards) decreases (until) terminal velocity / constant speed (is reached) (when) resistive force = weight OR resultant force is zero OR forces are balanced
1(c)(ii)	tangent drawn at $t = 0.010$ s
	$1.2 \text{ m/s}^2 \leq \text{acceleration} \leq 1.8 \text{ m/s}^2$
	($a =$) gradient of tangent OR ($a =$) $\{\Delta y / \Delta x\}$

Multiple Choice Answers

Q2: D

Multiple Choice Answers

Q3: C

2(a)(i)	(speed =) 38 m / s
	$a = \Delta v / \Delta t$ OR ($\Delta v =$) $a\Delta t$ OR ($\Delta v =$) 7.2×5.3
2(a)(ii)	(resultant force =) 1 700 N
	$F = ma$ OR ($F =$) ma OR ($F =$) 240×7.2
2(b)(i)	(vector) has direction (as well as magnitude) OR scalar does not have direction
2(b)(ii)	(velocity) changes (as direction of motion changes) OR direction (of velocity) changes
2(b)(iii)	any two from: - because there is an acceleration / change in velocity / change in direction / change in momentum (which needs a resultant force) - motorcyclist accelerates / changes momentum (because velocity / direction changes) (resultant) force is perpendicular to the motion (of the motorcycle) OR $a \propto F$