VELOCITY DISPLACEMENT AND ACCELERATION

MARK SCHEMES 1

Question 1

Question	answers	extra information	mark
a)i)	velocity includes direction	accept velocity is a vector	1
a)ii)	64	allow 1 mark for obtaining values of 16 and 4 from the graph or marking correct area or correct attempt to calculate an area	2
a)iii)	any two from: □ velocity zero from 0 to 4 seconds □ increasing in 0.2 s (or very rapidly) to 8 m/s □ decreasing to zero over the next 8 seconds		2
a)iv)	momentum before does not equal momentum after or total momentum changes or an external force was applied	ignore reference to energy	1

b)	to reduce the momentum of the driver a smaller (constant) force would be needed	do not accept reduces the impact / impulse on the driver	1 1

Question 2

Question	answers	extra information	mark
a)	4 m/s2	allow 1 mark for extracting correct information 12 ignore negative sign	2 1
b)	9 (s)		1

Question 3

Question	answers	extra information	mark
a)i)	4.5	allow 1 mark for correct substitution i.e. 9 ÷ 2	2
a)ii)	m/s^2	accept answer given in (a)(i) if not contradicted here	1
a)iii)	 speed		1

a)iv)	straight line from the origin passing through (2s, 9 m/s)	allow 1 mark for straight line from the origin passing through to t = 2 seconds allow 1 mark for an attempt to draw a straight line from the origin passing through (2,9) allow 1 mark for a minimum of 3 points plotted with no line provided if joined up would give correct answer. Points must include(0,0) and (2,9)	2
b)i)	B smallest (impact) force on all/ every/ any surfaces	if A or C given scores 0 marks in total these marks are awarded for comparative answers	1 1 1
b)ii)	(conditions) can be repeated or difficult to measure forces with human athletes	accept answers in terms of variations in human athletes e.g. athletes may have different weights area / size of feet may be different difficult to measure forces athletes run at different speeds	1

		accept any answer that states or implies that with humans the conditions needed to repeat tests may not be constant e.g. athletes unable to maintain constant speed during tests (or during repeat tests) do not accept the robots are more accurate human error is insufficient fair test is insufficient	