Name of the Student:_____
Max. Marks : 27 Marks **Time : 27 Minutes**

Mark Schemes

Q1.

(a) 47250

*answers of 1350/ 33750/ 48600 gain **1** mark*
*allow **1** mark for correct substitution using both 18 and 3*

2

(b) (i) 47250 or their (a)

accept statement 'same as the KE (lost)'
ignore any units

1

(ii) transformed into heat/ thermal energy

sound on its own is insufficient
accept transferred/ lost/ for transformed
*do **not** accept any other form of energy included as a list*

1

[4]

Q2.

(a) (i) velocity includes direction

accept velocity is a vector

1

(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

(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

(iv) momentum before does not equal momentum after

ignore reference to energy

or total momentum changes

or an external force was applied

1

(b) to reduce the momentum of the driver

1

a smaller (constant) force would be needed

*do **not** accept reduces the impact / impulse on the driver*

1

[8]

Q3.

(a) 4

*allow **1** mark for extracting correct information 12*

2

m/s^2

ignore negative sign

1

(b) 9 (s)

1

[4]

Q4.

(a) concentration / tiredness / drugs / alcohol

accept any reasonable factor that could affect a driver's reactions

*do **not** accept speed or any physical condition unrelated to the driver*

1

(b) 31.25

*credit for **1** mark correct attempt to calculate the area under the slope **or** for using the equation*
distance = average velocity (speed) × time

*credit for **1** mark use of correct velocity change (12.5) and correct time (5) **or** answer of 62.5*

3

(c) 2.5

*credit for **1** mark triangle drawn on slope **or** correct equation **or** two correct pairs of coordinates*

credit for 1 mark use of correct velocity change (12.5) and correct time (5)
accept time = between 4.8 and 5.2 if used in (b)

do not accept an attempt using one pair of coordinates taken from the slope

3

metres / second / second **or** metres / second / squared **or** m/s^2 **or** ms^{-2}

1

(d) (i) force = mass × acceleration

accept correct transformation

accept F = m × a

accept 

provided subsequent use of Δ is correct

*do **not** accept an equation in units*

1

(ii) 2250

credit their (c) × 900 for 2 marks

*credit **1** mark for correct substitution*

2

[11]