**Name of the Student**:_____
**Max. Marks : 22 Marks** **Time : 22 Minutes**

Mark Schemes

## Q1.

(a) (i) 100 (m)

**1**

(ii) stationary

**1**

(iii) accelerating

**1**

(iv) tangent drawn at $t$ = 45 s

**1**

*attempt to determine slope*

**1**

speed in the range 3.2 – 4.2 (m / s)
*dependent on 1st marking point*

**1**

(b) (i) 500 000 (J)
*ignore negative sign*

**1**

(ii) 20 000 (N)
*ignore negative sign*
*allow **1** mark for correct substitution, ie*
*500 000 = F × 25*
***or** their part (b)(i) = F × 25*
*provided no subsequent step*

**2**

(iii) *(kinetic) energy* transferred by heating

**1**

to the brakes
*ignore references to sound energy*
*if no other marks scored allow k.e. decreases for **1** mark*

**1**

**[11]**

## Q2.

(a) Zero / 0

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*Accept none*

*Nothing is insufficent*

**1**

velocity / speed = 0

*accept it is not moving*

*paintball has not been fired is insufficient*

**1**

(b) 0.27

*allow **1** mark for correct substitution, ie p = 0.003(0) × 90 provided no subsequent step*

**2**

(c) equal to

**1**

**[5]**

## Q3.

(a) momentum before (jumping) = momentum after (jumping)

*accept momentum (of the skateboard and skateboarder) is conserved*

**1**

before (jumping) momentum of skateboard and skateboarder is zero

*accept before (jumping) momentum of skateboard is zero*

*accept before (jumping) total momentum is zero*

**1**

after (jumping) skateboarder has momentum (forwards) so skateboard must have (equal) momentum (backwards)

*answers only in terms of equal and opposite forces are insufficient*

**1**

(b) 7

*accept –7 for **3** marks*

*allow **2** marks for momentum of skateboarder equals 12.6*

***or***

*0 = 42 × 0.3 + (1.8 × –v)*

***or***

*allow **1** mark for stating use of conservation of momentum*

**3**

**[6]**

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