Name of the Student:_____
Max. Marks : 25 Marks **Time : 25 Minutes**

Mark Schemes

Q1.

(a) **Level 3:** The plan would lead to the production of a valid outcome. All key steps are identified and logically sequenced.

5-6

Level 2: The plan would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.

3-4

Level 1: The plan would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1-2

No relevant content

0

Indicative content

method of varying force

- clamp a pulley onto the edge of the desk
- attach a string to the trolley and place the string over the pulley
- attach a mass holder to the string

or

- vary the height of the runway
- use wooden blocks

measurements

- place a slotted mass on the mass holder
- use $W = mg$ to calculate the force
- mark the starting and finishing points of the trolley on the runway
- measure the distance between the two marks with a metre rule
- time how long it takes to travel between the two marks with a stopclock / timer
- use $v = \frac{s}{t}$ and $a = \frac{\Delta v}{t}$

or

- use light gate(s) to determine time and / or speed
- computer calculates acceleration

- repeat for different numbers of slotted masses

allow a description of a method using a ticker timer

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(b) second law

1

(c) $\frac{3.6}{1.2} = 3$

1

$1.6 \times 3 = 4.8$ (m/s^2)

OR

(use of $F = ma$)

$m = \frac{1.2}{1.6} = 0.75$ (1)

$a = \frac{3.6}{0.75} = 4.8$ (m/s^2) (1)

1

(d) resultant force = mass × acceleration

or

$F = ma$

1

(e) $0.42 = m \times 1.2$

1

$m = \frac{0.42}{1.2}$

1

$m = 0.35$ kg

1

[13]

Q2.

(a) work done = force × distance (along the line of action of the force)

or

$W = Fs$

1

(b) $3\,360\,000 = F \times 42\,000$

1

$F = \frac{3360000}{42000}$

1

$F = 80$ (N)

1

(c) distance travelled = speed × time

1

(d) $42\,000 = v \times 5600$

1

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$v = \frac{42\,000}{}$

1

v = 7.5 (m/s)

1

(e) **Level 2:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.

3–4

Level 1: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

1–2

No relevant content

0

Indicative content

the effect on speed must be consistent with the cause of the change

- competitors accelerate at the start
- so speed increases

- the road is not flat
- so speed increases going downhill and / or speed decreases going uphill

- the competitor goes round a bend
- so speed decreases

- competitors may tire towards the end (so the force they exert decreases)
- so they slow down

- competitors may sprint during the race
- causing speed to increase

- may get a puncture
- so speed would decrease or they would stop

- resistive forces on competitors may increase/decrease
- so speed would decrease/increase

[12]

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