

Name of the Student: _____

Max. Marks : 24 Marks

Time : 24 Minutes

Mark Schemes

Q1.

- (a) point at which its mass (seems to) act **or** point at which gravity (seems to) act
accept ... its weight acts
accept correct statements if the intent is clear e.g. ... if suspended, the centre of gravity will be directly under the point of suspension
*e.g.... (if the object is symmetrical), the centre of gravity is on the **or** an axis (of symmetry)*
*do **not** credit just 'it is a point'*
- (b) *The answer to this question requires good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme*

1

maximum of 4 marks if ideas not well expressed

any **five** from:

clamp (steel) rod (horizontally)

***no** marks if method quite unworkable*

hang plastic / sheet by rod through (one) hole

hang plumb line from rod

mark ends of plumb line on the sheet and
use the ruler to draw a straight line

repeat with other hole

centre of mass is where the lines cross

check by balancing at this point

maximum of 3 marks if no 'repeat with other hole'

5

- (c) (i) (turning) effect **or** moment
force
distance

all three correct

accept weight

accept length

1

- (ii) 17.6

allow 44 x 0.4 **or** 0.4 x 44 for **1** mark

2

Nm **or** newton metre(s)

do **not** accept N/m **or** N/cm

1760 Ncm gains all **3** marks

1

[10]

Q2.

- (a) (i) accelerating
accept getting faster
accept speed / velocity increasing

1

- (ii) acceleration increases
accept velocity / speed increases more rapidly
do **not** accept velocity / speed increases

1

- (b) (i) acceleration = $\frac{\text{change in velocity}}{\text{time (taken)}}$

accept $a = \frac{v - u}{t}$ **or** $a = \frac{v_1 - v_2}{t}$

do **not** accept velocity for change in velocity

do **not** accept change in speed

do **not** accept $a = \frac{v}{t}$

1

- (ii) 15

allow **1** mark for an answer of 900 **or** for correct use of 540 seconds

2

- (iii) velocity includes direction
accept velocity is a vector (quantity)
accept converse answer

1

[6]

Q3.

- (a) (i) work (done) = force (applied) × distance (moved)
accept $W = F \times s$ or $W = F \times d$

accept  provided subsequent method is correct

1

- (ii) 240 000

allow **1** mark for correct substitution **or** correct use of 1200 (N)

2

joules

accept J

do **not** accept j / Nm

1

(b) 800 (watts)

accept 0.8 kW

accept their (a)(ii) $\div 300$ correctly evaluated for **2** marks

allow **1** mark for correct substitution

(a)(ii) $\div 5$ correctly evaluated for **1** mark

2

(c) (i) any **one** from:

- needs to raise the chair / lift
- lifting more than one chair
allow lifting more than 2 people
implication of a heavier weight
- energy transfer to the surroundings
correctly qualified
accept loss for transfer
do **not** accept motor inefficient
do **not** accept motor gets hot
do **not** accept friction unless the location is specified as external to the motor

1

(ii) electrical

accept electric

potential

both answers required for the mark

1

[8]