

# Motion

## Mark Scheme 7

|            |                         |
|------------|-------------------------|
| Level      | IGCSE                   |
| Subject    | Physics                 |
| ExamBoard  | CIE                     |
| Topic      | General Physics         |
| Sub-Topic  | Motion                  |
| Paper Type | (Extended) Theory Paper |
| Booklet    | Mark Scheme 7           |

**Time Allowed:** 58 minutes

**Score:** /48

**Percentage:** /100

|                    |  |   |
|--------------------|--|---|
| 1                  | <p><b>(a) (i)</b> <math>t = v/g</math> or <math>32/10</math><br/><math>= 3.2 \text{ s}</math></p> <p><b>(ii)</b> straight line starting at zero, inclined<br/>line joining 0,0 and 3.2, 32, accept c.f. from time <b>(i)</b></p> <p><b>(iii)</b> 2.4 kg</p>  | <p>C1<br/>A1</p> <p>C1<br/>A1</p> <p>A1 [5]</p>           |
| 1                  | <p><b>(b) (i)</b> take volume of water before use<br/>(totally) immerse stone and take new volume<br/>(Not clearly measured before and after C1)</p> <p><b>(ii)</b> hang rock from balance and take reading</p> <p><b>(iii)</b> density = mass/volume</p> <p><b>(iv)</b> need to tie "sinker" or cork or press cork down<br/>need volume with sinker then volume with sinker and cork or just completely submerge<br/>cork</p> | <p>B1<br/>B1</p> <p>B1</p> <p>B1</p> <p>B1<br/>B1 [6]</p> |
| <b>[Total: 11]</b> |  |   |

|   |   |  |   |
|---|---|--|---|
| 2 | <p><b>(a)</b> acceleration, speed increases<br/>acceleration getting less<br/>acc. zero/constant speed along RT or terminal velocity</p> <p><b>(b)</b> air resistance or friction (force) up (accept upthrust)<br/>weight/(force of) gravity down</p> <p><b>(c)</b> air resistance (up) = weight (down) or two forces equal<br/>no (net) force, no acceleration</p> <p><b>(d)</b> distance = speed x time or <math>120 \times 40</math><br/>distance = 4800 m</p> <p><b>(ii)</b> distance = average speed x time or <math>25 \times 6</math> or area under graph<br/>distance = 150 m</p> | <p>B1<br/>B1<br/>B1</p> <p>B1<br/>B1</p> <p>B1<br/>B1</p> <p>C1<br/>A1<br/>C1<br/>A1</p> | <p><b>3</b></p> <p><b>2</b></p> <p><b>2</b></p> <p><b>4</b><br/><b>[11]</b></p> |
|---|---|--|---|

|   |     |      |  |          |      |
|---|-----|------|--|----------|------|
| 3 | (a) | (i)  | Acceleration / increase in speed<br>Uniform / constant or in a straight line                               | M1<br>A1 |      |
|   |     | (ii) | Uniform speed<br>Velocity changes / motion in a circle / accelerates                                       | B1<br>B1 | 4    |
|   | (b) |      | Similarity: same value / 6m/s or velocity changing<br>Difference: opposite directions / up at E, down at C | B1<br>B1 | 2    |
|   | (c) | (i)  | Average speed x time / area under graph / $3 \times 20$<br>60 m  | C1<br>A1 |      |
|   |     | (ii) | $6 \times 52$<br>312m  | C1<br>A1 |      |
|   |     |      |  |          | [10] |

|   |     |      |   |             |           |
|---|-----|------|---|-------------|-----------|
| 4 | (a) |      | deceleration/slows down/speed reduces<br>deceleration uniform/comes to rest at 4 s  | 1<br>1      | 2         |
|   | (b) | (i)  | 40 (m/s)  | 1           |           |
|   |     | (ii) | 4 (s)   | 1           | 2         |
|   | (c) |      | speed falls from 0 to 40 m/s in 4 s<br>acceleration = change in speed/time taken or $40(\text{m/s})/4(\text{s})$<br>acceleration = $10 \text{ m/s}^2$ | 1<br>1<br>1 | 3         |
|   | (d) |      | distance = average speed x time or area of triangle under<br>graph<br>= $20 \times 4$ or $2 \times 40$<br>= 80 m                                      | 1<br>1<br>1 | 3<br>(10) |

|   |     |  |  |                |     |
|---|-----|--|--|----------------|-----|
| 5 | (a) |  | change in speed is 1.5 m/s<br>deceleration = decrease in speed/time or $1.5/12$<br>$a = (-/+)$ $0.125 \text{ m/s}^2$ | C1<br>C1<br>A1 | 3   |
|   | (b) |  | average speed = 1.75 m/s<br>distance = 21 m  | C1<br>A1       | 2   |
|   |     |  |  |                | [5] |