

OCR

A Level

A Level Mathematics

SI Units

Name:

M M E

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Total Marks:

P1- SI Units- Questions

OCR

1) Convert the following into the units stated.

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|--|---|-----|
| i) 340 km/h to m/s | ii) 12 m/s to km/h | [7] |
| iii) 19.3 g/cm ³ to kg/m ³ | iv) 929 kg/m ³ to gm ⁻³ | |
| v) 0.9gcm ⁻³ to kgm ⁻³ | vi) 5.24 g/cm ³ to kg/L | |

2) A robotic vacuum cleaner is moving in a straight line from its cleaning area (A) to battery (B) constant acceleration 2 ms⁻². Its speed at A is 3 ms⁻¹ and it takes 8 seconds to move from A to B.



Find:

- | | |
|---|-----|
| i) The speed of the vacuum cleaner at B | [1] |
| ii) The distance from cleaning area (A) to battery(b) | [2] |

3) John, *J*, is moving in a car along a straight road with constant speed 18 ms⁻¹. At time $t = 0$, *J* passes a car-park. Also at time $t = 0$, a second person in a car, *K*, leaves the car-park. Car *K* accelerates from rest to a speed of 25ms⁻¹ in 10 seconds and then maintains this speed. *K* passes *J* at the point *Z*.

- | | |
|---|-----|
| i) Sketch a speed-time graph to show the motion of driver in their cars | [3] |
| ii) Calculate the distance between the car-park and point <i>Z</i> | [5] |

4) Wilf and Pippa are sitting on a non-uniform see-saw *AB*, with a mass of 30 kg and length of 3 m. The see-saw is pivoted, the midpoint of *AB*, called *M*. The centre of mass, *C* is 1.2 m from *A*. Pippa has mass 30kg and sits at *A*. Wilf has mass 40 kg. How far should Wilf sit from *A* to balance the plank?

[5]

5) A particle, mass of 4kg is held by two fixed-length inextensible strings. One of the strings is horizontal and the other is inclined at 45° to the horizontal. The tension in the strings are *J* and *K* for the horizontal string and 45° string, respectively.

Find the values of *J* and *K*.