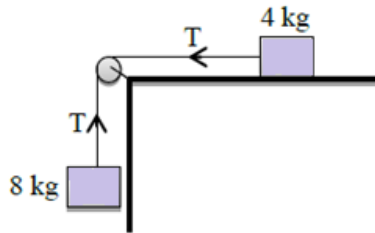


Year 13 Physics 2021 Worksheet 2- Mechanics

Write the answers in your Exercise Book.

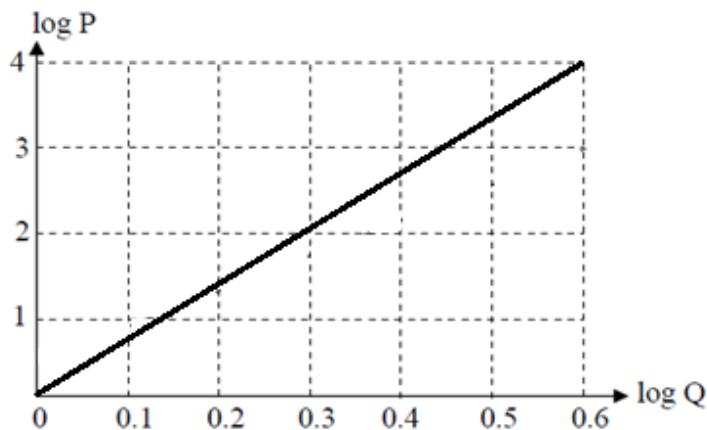
1. A 100 kg satellite orbits at a distance of 42000 km from the centre the earth. The mass of the earth is 6×10^{24} kg and Universal Gravitational constant $G = 6.67 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$.
 - (a) Find the **force of gravity** on the satellite. (1 mark)
 - (b) Determine the orbital **speed** of the satellite. (2 marks)
 - (c) Calculate the **acceleration** of the satellite. (2 marks)
 - (d) Find the **period** of the orbit. (2 marks)

2. A 8 kg hanging mass is connected by a string over a pulley to a 4 kg mass that is sliding on a flat table.



If the coefficient of kinetic friction is 0.2, calculate

- (a) the **acceleration** of the masses. (2 marks)
 - (b) the **tension** in the string. (2 marks)
3. The relationship between two physical quantities P and Q are shown by the graph of log P versus log Q given below.



- (a) How does log P vary with log Q? (1 mark)
- (b) How does P vary with Q? (1 mark)
- (c) Work out the **mathematical relationship** between P and Q. (3 marks)