# GCSE and IGCSE Physics: Forces Worksheet

Year 10-11 · GCSE (AQA 4.5.1-4.5.5) and Cambridge IGCSE 0625 topic 1 · Exam-style questions

**Name:** ..... **Class:** ..... **Date:** ..... **Score: / 45**

## Section A: Types of force and resultant force [13 marks]

**weight = mass × gravitational field strength | F = ma | work done = force × distance | moment = force × perpendicular distance | spring: F = k × e**

**1** State the difference between mass and weight, including the unit of each. **[3]**

**2** Calculate the weight of a 65 kg student on Earth (g = 10 N/kg) and on the Moon (g = 1.6 N/kg). **[4]**

**3** Calculate the resultant force in each situation and state its direction. **[6]**

| Forces acting | Resultant force | Direction |
|---|---|---|
| 12 N right and 5 N left | | |
| 30 N up and 30 N down | | |
| 8 N forwards and 20 N backwards | | |

## Section B: Newton's laws [14 marks]

**4** State Newton's first law of motion. **[2]**

**5** A car of mass 1200 kg accelerates at 2.5 m/s$^2$. Calculate the resultant force. **[2]**

**6** A force of 450 N is applied to a trolley and the acceleration is 1.5 m/s$^2$. Calculate the mass of the trolley. **[3]**

**7** A car travels at constant speed along a flat road. The engine force is 800 N. State the size of the resistive forces and explain your answer. **[2]**

**8** State Newton's third law and give an example. **[3]**

**9** Explain why a loaded lorry takes longer to speed up than an empty one, using F = ma. **[2]**

## Section C: Work, springs and moments [11 marks]

**10** A person pushes a box with a force of 40 N through a distance of 6.0 m. Calculate the work done. **[2]**

**11** A spring has a spring constant of 25 N/m. Calculate the extension when a force of 4.0 N is applied. **[3]**

**12** State what happens to the extension of a spring when the limit of proportionality is exceeded. **[1]**

**13** A force of 50 N acts at a perpendicular distance of 0.40 m from a pivot. Calculate the moment. **[2]**

**14** A uniform plank is balanced on a pivot. A 300 N child sits 1.5 m from the pivot. How far from the pivot must a 450 N child sit on the other side to balance it? **[3]**

## Section D: Circular motion and stopping distance (Higher tier / Extended) [7 marks]

**15** Explain why a car travelling around a roundabout at constant speed is accelerating. **[2]**

**16** State what provides the centripetal force for (a) a satellite orbiting Earth and (b) a car turning a bend. **[2]**

**17** A driver has a thinking distance of 12 m and a braking distance of 24 m. Calculate the stopping distance and give one factor that increases the thinking distance. **[3]**