OCR
Oxford Cambridge and RSA

GCSE Physics A (Gateway)

J249/01 Physics A P1-P4 and P9 (Foundation Tier)

Question Set 5

1 (a) Objects can interact in many ways. Pairs of forces arise when objects interact.

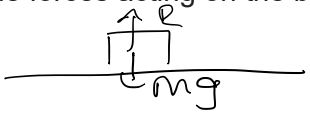
Write down **one** type of force involved when objects interact. **[1]**

Friction

(b) A book rests on a table.

Draw a free body force diagram to show the forces acting on the book. **[4]**

Use arrows to represent the forces.



reaction ↓ the force R and mg ↖ weight are equal to each other

(c) A teacher uses an air-track for motion experiments. Using the air-track means that there is no friction between the glider and the air-track.

The teacher places the glider on the horizontal air-track and gives it a small push to start it moving.

Explain the motion of the glider. **[2]**

The resultant force on the trolley is in the direction of the teacher's push, therefore it will accelerate during the push. It then has a constant speed due to no friction from the track.

(d) A presenter on a car TV programme says:

"The car maker has reduced the mass of this car and it now has better acceleration."

(i) Explain why the presenter is correct. **[2]**

If the force remains the same and mass decreases according to Newton's 2nd law, F=ma acceleration must increase.

(ii) A car accelerates from 5 m / s to 25 m / s in 4 seconds.

Calculate the acceleration of the car.

Use the equation: Acceleration = Change in speed ÷ Time taken

Answer = 5.0 m / s^2 **[3]**

$a = \frac{25-5}{4} = \frac{20}{4} = 5$

Total Marks for Question Set 5: 12