

Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

5 Newton's laws of motion

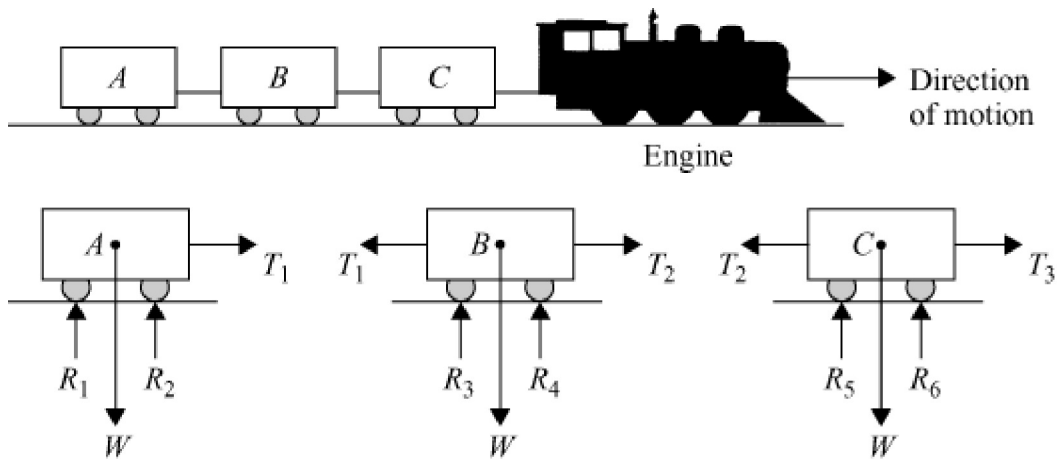
Exercise C, Question 5

Question:

Three carriages are coupled to an engine on a set of railway lines. The carriages and engine move forward on horizontal tracks. Draw diagrams to show the forces acting on each of the carriages. Clearly show any forces that have the same magnitude.

Solution:

For the situation on a straight track shown



The weights are the same provided the carriages are identical, then also $R_1 = R_3 = R_5$ and $R_2 = R_4 = R_6$. These will all be equal if the centre of mass is symmetrical between the wheels. All the tensions in the couplings are the same when the train travels at constant velocity.

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