



QUESTION WORKBOOK

Modelling, quantities and units

Mechanics · Year 12–13

7 questions · 21 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** A car is modelled as a particle. State what the model assumes, and one consequence for the mathematics. [2]

- A2** A car travels at 90 km h^{-1} and a metal has density 2.5 g cm^{-3} . Convert each to SI units. [2]

SECTION B · Standard

- B1** A load hangs from a crane by a cable modelled as a light inextensible string. State what each modelling word contributes. [2]

- B2** Explain the modelling words smooth, rough and uniform. [3]

- B3** Write the SI units of velocity, acceleration and force, and show that the equation $s = ut + \frac{1}{2}at^2$ is consistent in units. [4]

- B4** Sort into scalars and vectors: mass, weight, speed, velocity, distance, displacement. [2]

SECTION C · Stretch

- C1** A stone and a feather are released together from the same height and a student's model predicts they land together. Identify the modelling assumption responsible, discuss for which object it is reasonable, and describe what a modeller does when a prediction disagrees with experiment. [6]