



QUESTION WORKBOOK

Angular speed and horizontal circular motion

Further Mechanics 2 · Year FM

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** Explain why a particle moving at constant speed in a circle is accelerating, and state the direction of that acceleration. [2]

- A2** A particle moves in a circle of radius 1.5 m with angular speed 4 rad/s. Find its linear speed and its acceleration. [3]

SECTION B · Standard

- B1** A bob of mass 0.4 kg on a string of length 1.2 m moves in a horizontal circle with the string at 40° to the vertical. Find the tension and the period, taking $g = 9.8 \text{ m/s}^2$. [4]

- B2** A bend of radius 120 m is banked at 15° . Find the speed at which no sideways friction is needed. [4]

- B3** Name the force supplying the radial acceleration in each of: a conical pendulum, a car on a flat bend, and a satellite in orbit. [3]

SECTION C · Stretch

- C1** A car travels round a flat bend of radius 50 m on a road where the coefficient of friction is 0.6. Find the greatest speed at which it can do so without slipping. [4]