InkMaths

QUESTION WORKBOOK

Angular speed and horizontal circular motion

Further Mechanics 2 · Year FM

6 questions · 20 marks

PRINT EDITION

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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]