

Categories of questions



- Multiple choice
 - Simple factual
 - Deduction
 - Elimination
- Short answer
- Long calculation
- Anecdotal i.e. is it interesting to read about?

Know Your Audience - what and who are your writing for?

- Do you want them to get the answer?
- Age range
- Level of difficulty
 - Participation
 - Challenge
 - Didactic
 - Discriminating
- Time allocation

Question types and styles

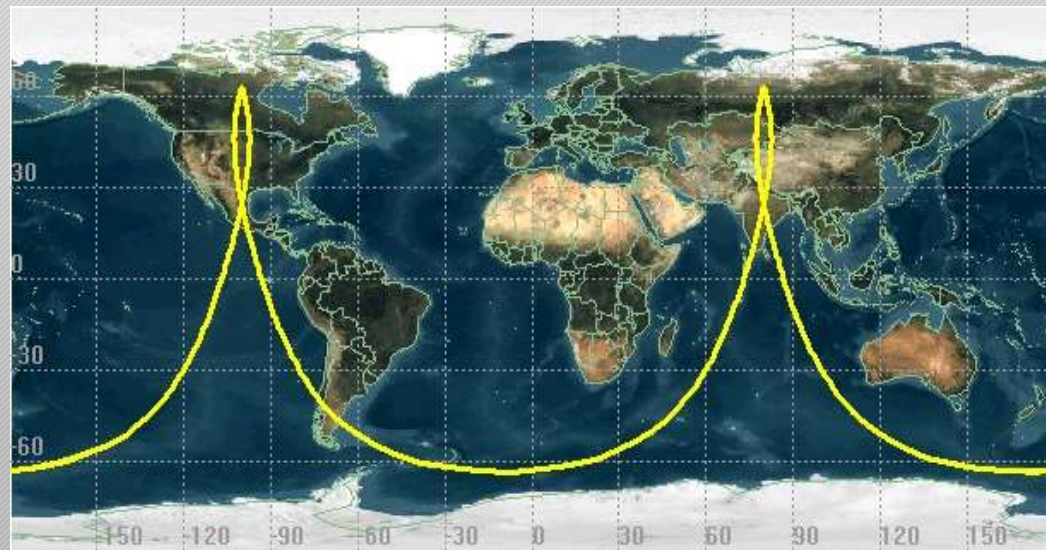


- Explanations
- Diagram
- Computations & calculations
- Estimates
- Technique spotting
- Proofs
- Bookwork
- Data analysis
- Conceptual

Explanations



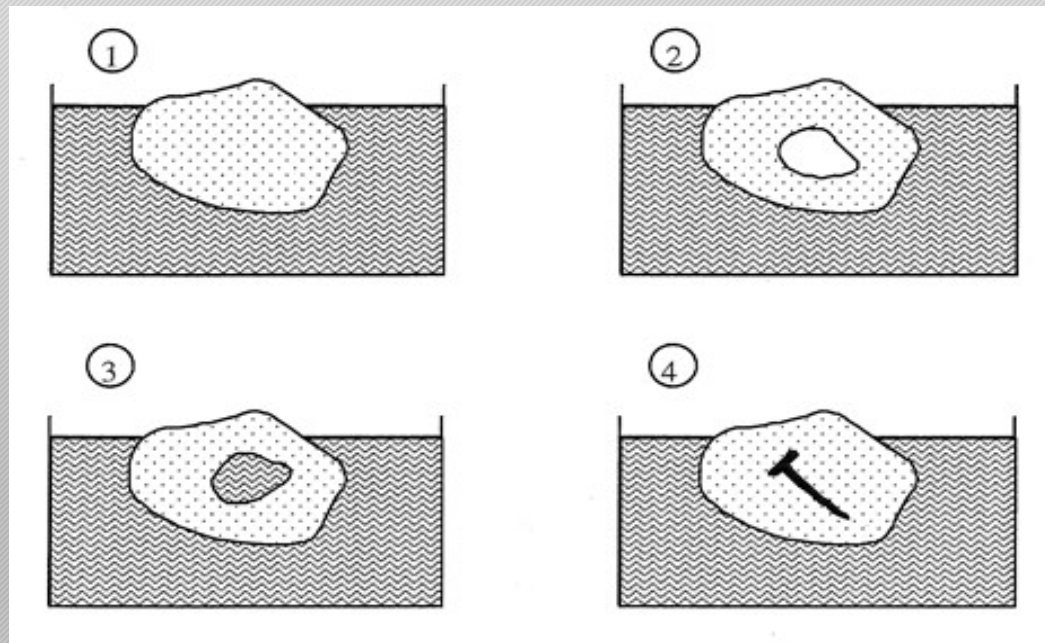
Ground path of a satellite



Diagram



What happens to the water level when the ice melts?



Computations & calculations



Q: Energy in a Wire

A wire that obeys Hooke's Law is of length l_1 when it is in equilibrium under a tension T_1 , and its length becomes l_2 when the tension is increased to T_2 .

Answer Now

Hint 1

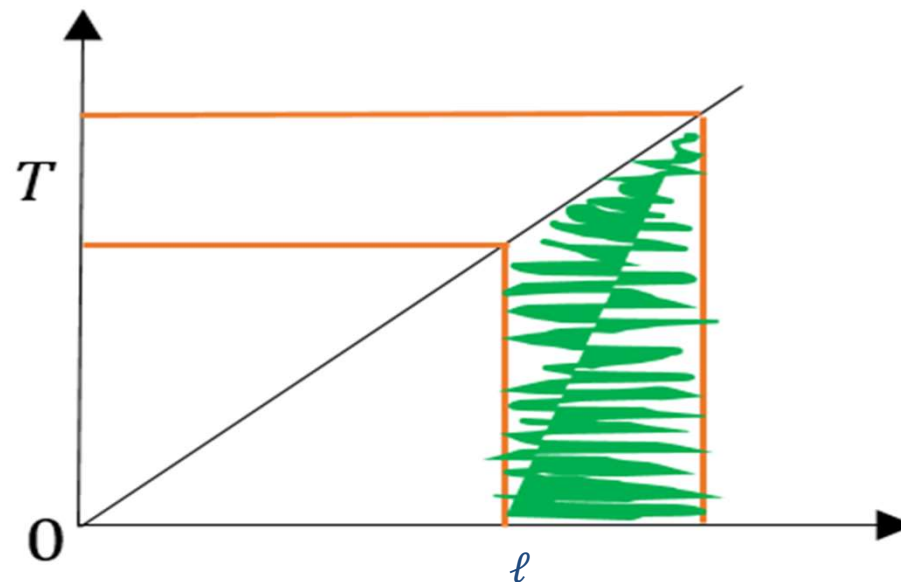
Hint 2

Hint 3

Hint 4

Hint 5

What is the extra energy stored in the wire as a result of this process?



Estimations

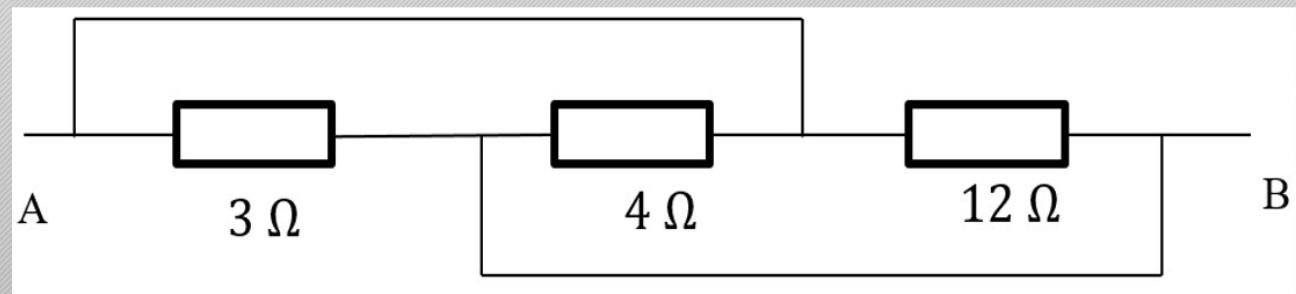


Which is smoother: a squash ball or the Earth?

Technique spotting



- *What is the resistance between A and B?*



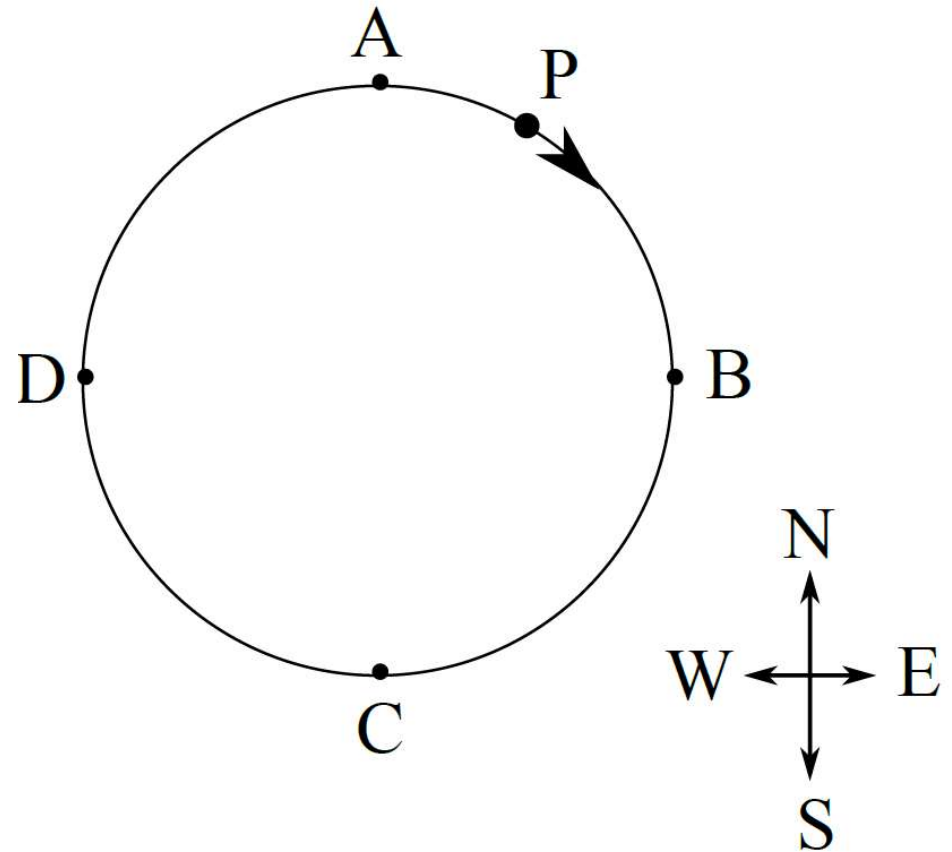
Bookwork



- *A question about velocity as opposed to speed*

Point P moving in a circle of radius 4m at a constant speed.
 $T=2.0$ s.

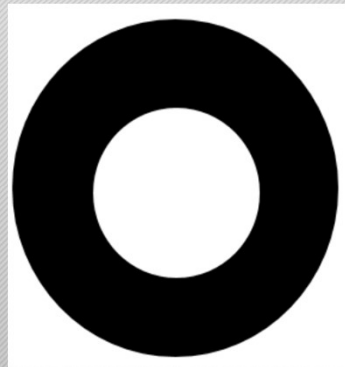
What is its average velocity?



Conceptual



- *A metal disc has a hole cut in the middle. The disc is heated. What happens to the size of the hole?*



Have a go!!!



- Think of an idea first and not a question.
- Form an idea round it.
- Doodling can help.

Year 7 - 10



An unusually long ladder is used to climb to the top of a 10 storey building. Approximately how many rungs would there be on the ladder?

- 10
- 100
- 1000
- 10000

What is the main cause of atmospheric pressure at the Earth's surface?

- The weight of water as clouds in the air
- The weight of the air
- The force on the air produced by meteorites and other objects from space hitting the atmosphere

Which one of these quantities would not be thought of as a speed?

- mm/year
- m^3/s
- miles/ millisecond
- Earth's equatorial circumference/80 days

Lower 6th



A bulldozer runs on a continuous track, sometimes called a caterpillar track, as shown in the image of **Fig. 6**. The driving wheel at the front has a diameter of 1.0 m and rotates once in 0.84 s. A person standing at the side of the bulldozer as it drives past sees a large piece of mud stuck to the top side of the moving track (at about 1 m above the ground).

At what speed relative to the person is the mud moving past them?



Figure 6: The moving caterpillar track on a bulldozer.

Lower 6th



A steady sound of 165 Hz is produced by a loudspeaker at one end of a field and it is received 157 m away. By what fraction of a cycle (measured in degrees from 0 to 360°) is the received signal out of phase?

The speed of sound in air is 330 m s^{-1}

- A. 0° B. 45° C. 90° D. 135° E. 180°

Something different



For many questions, drawing a diagram is the key to unlocking the ideas and unwrapping the question. A diagram should be large, should represent the scales described in the question and should be correct. It may require improving several times to get it right. In the following, you are asked to draw the diagram for this situation and calculate an angle only.

Three uniform beams **AB**, **BC** and **CD**, of the same thickness and of lengths ℓ , 2ℓ and ℓ respectively, are connected by smooth hinges at **B** and **C**, and rest on a perfectly smooth sphere of radius 2ℓ so that the middle point of **BC** and the extremities, **A** and **D** are in contact with the sphere.

Sketch a diagram of the beams and sphere in the space below, and calculate the obtuse angle between beams **AB** and **BC**.

Something interesting?



- (b) A filament lamp has a resistance which we can assume is proportional to its temperature in kelvin. A 50 W bulb operates on 230 V at a temperature of 2250 K. What is the resistance of the bulb at room temperature of 27 °C?

A circuit of two resistors R and R_C in series is connected to a supply as shown in **Fig. 5**. The potentials at three points are marked as 0 V, V_A , V_B . The current I in the circuit depends upon the value of R_C .

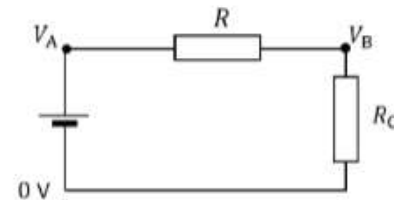


Figure 5

- (c) i. Obtain a relation between V_A , V_B , I and R .
