Physics 16+

Guidance for ordinary and scholarship entrance examinations:

The questions in the entrance examinations are of a level typically found in an IGCSE examination. They will be based on the topics of Mechanics and Motion, Electricity (static and current), Magnetism and Waves. Scholarship questions may include Electromagnetic Induction and Circular motion.

Equations will not be provided. It is expected that the basic equations in these topics would be known. These would include:

- $V = I \times R$
- $P = I \times V$
- $I = Q/t$
- $V = E/Q$

- $v = f \times \lambda$

- Moment = Force x Perpendicular Distance
- $F = m \times a$
- Work done = $F \times d$

It would be expected that applicants would have at least a basic knowledge of interpreting graphs with ideas of gradient and area. Units for all common quantities should also be known.

The examination is 1 hour long and has 12 questions. Scholarship candidates would be expected to answer all 12 questions – for those not applying for a scholarship only the first 10 questions are expected to be answered.

The following are sample questions of a similar difficulty:

A student connects a light dependent resistor (LDR) to a battery.

(a) The current in the LDR is 0.050 A and its resistance is 90 Ω in the dark.

(i) State the equation which relates current, resistance and voltage.

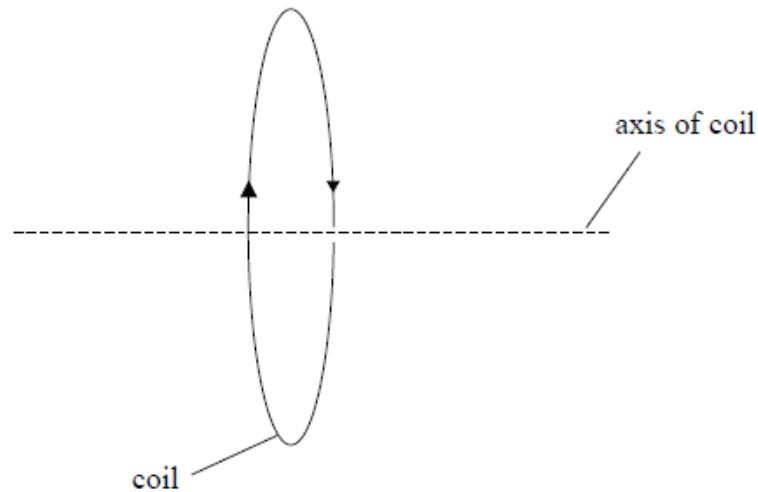..

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(1)

(ii) Calculate the voltage across the LDR. Show your working and give the unit.

....

....

Voltage = ...

(2)

6. **(a)** The diagram shows a flat circular coil carrying a current. On the diagram, sketch the magnetic field pattern of the coil. Use arrows to show the direction of the magnetic field lines.

axis of coil

coil

(3)

12. **(a)** The diagram shows a lorry. It is travelling in a straight line and it is accelerating. The total forward force on the lorry is F and the total backward force is B.

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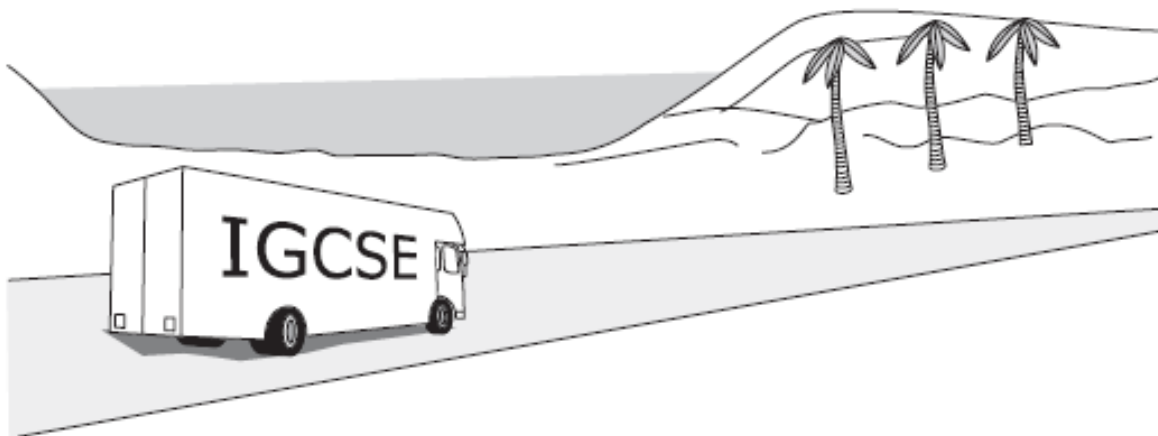
(i) Explain which is larger, force F or force B.

....

....

(1)

(ii) State an equation which relates acceleration, mass and unbalanced force.

....

(1)

(iii) An unbalanced force of 15 000 N acts on the lorry. The mass of the lorry is 12 500 kg. Calculate the lorry's acceleration and give the unit.

....

....

A fishing boat is floating on the still water of a deep lake.

The fisherman drops a heavy anchor into the lake. The anchor falls through the water and does not hit anything until it reaches the bottom.

(a) Three forces act on the anchor as it falls through the water.

   (i) One of these forces is upthrust. State the name and direction of the other two forces.

   1 ....

   2 ....

   (2)

   (ii) Which of the three forces changes significantly as the anchor falls?

   ....

   State how and why it changes.

   ....

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