Sixth Form Entrance Examination: Physics

Summary

The Physics 6th form Entrance and Scholarship exam lasts for 45 minutes in which there are two sections; Section A which consists of 20 multiple choice questions and Section B which has longer answer questions. The content of the paper is based on topics which are common to all GCSE and IGCSE courses. There may be questions with unfamiliar concepts in which problem solving skills are being tested, rather than subject knowledge. A formula booklet will be provided, containing all of the equations necessary to complete the paper.

Sample Questions

Section A:

An unknown value resistor is placed in a circuit. A voltage of 10 V is applied across it and a current of 5.0 mA flows through it. What is its resistance?

A   20 Ω

B   5 Ω

C   2 mΩ

D   2 kΩ   (1)

Section B:

Mira and Susan are rock climbing. They are using a nylon climbing rope. Mira has fastened herself to the rock face and to one end of the rope. The other end of the rope is fastened to Susan. This means that, if Susan falls, the rope will hold her. Susan weighs 540 N.

(a)   (i)   Use the words *distance*, *force* and *work* to write an equation which shows the relationship between them

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(1)

(ii)   What vertical distance up the rock face does Susan climb when she does 2000 J of work against gravity? Show your working and give your answer to the nearest 0.1 m.

....

....

Distance = ... metres

(2)

(iii)   How much gravitational energy will Susan gain when she does 2000 J of work against gravity?

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(1)

(b)   The climbers dislodge a 3 kg stone which falls down the rock face.

What is the speed of the stone when its kinetic energy is 600 J?

Show clearly how you get to your answer and give the unit.

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....

....

Speed = ...

(3)

(c)   The climbing rope is made of nylon. Nylon is very strong. Another advantage is that it stretches. This means that, if Susan falls, it transfers some of her kinetic energy to elastic (or strain) energy at the end of the fall.

Explain, in terms of *force* and *deceleration*, what would happen if Susan fell and the climbing rope did **not** transfer any of her kinetic energy to elastic energy.

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(3)
(Total 10 marks)