Practice Question Set For A-Level
Subject : Physics
Paper-3 Topic: Section A(Practical Skills Set-3)

Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Q1.

(a) (i) Draw and label suitable apparatus required for measuring the Young modulus of a material in the form of a long wire.

(ii) List the measurements you would make when using the apparatus described in part (i).

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(iii) Describe briefly how the measurements listed in part (ii) would be carried out.

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(iv) Explain how you would calculate the Young modulus from your measurements.

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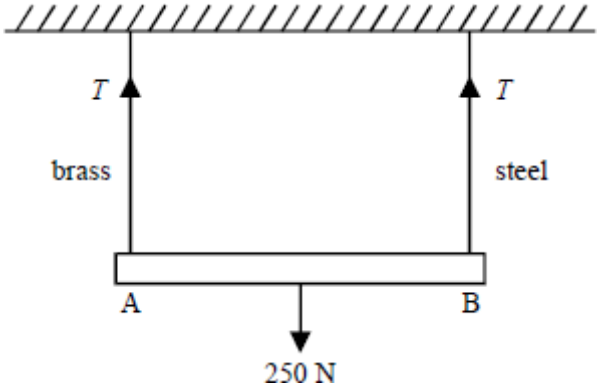
(13)

(b) A uniform heavy metal bar of weight 250 N is suspended by two vertical wires, supported at their upper ends from a horizontal surface, as shown.



One wire is made of brass and the other of steel. The cross-sectional area of each wire is 2.5×10^{-7} m^2 and the unstretched length of each wire is 2.0 m.

the Young modulus for brass = 1.0×10^{11} Pa
the Young modulus for steel = 2.0×10^{11} Pa

(i) If the tension, T, in each wire is 125 N, calculate the extension of the steel wire.

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(ii) Estimate how much lower the end A will be than the end B.

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(3)

(Total 16 marks)

Q2.

(a) (i) Draw the diffraction pattern produced when light from a star passes through a circular aperture.

(1)

(ii) Explain what is meant by the "Rayleigh criterion" for the resolution of **two** stars. Draw a diagram to help if you wish.

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(2)

(b) The star Arich in the constellation Virgo is two stars separated by an angle of 1.1×10^{-5} radians when viewed from Earth. Calculate the minimum diameter of a telescope objective which would just allow the two stars to be resolved. Assume the light from the star has a wavelength of 5.7×10^{-7} m.

(2)

(Total 5 marks)