Practice Question Set For A-Level
Subject : Physics
Paper-2 Topic : 5_Waves

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

Q1.

When electromagnetic radiation is incident on a metal plate, electrons may be emitted.

(a) State what is meant by threshold frequency.

(1)

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(b) Calculate the threshold frequency for a metal with a work function of 2.28 eV.

(3)

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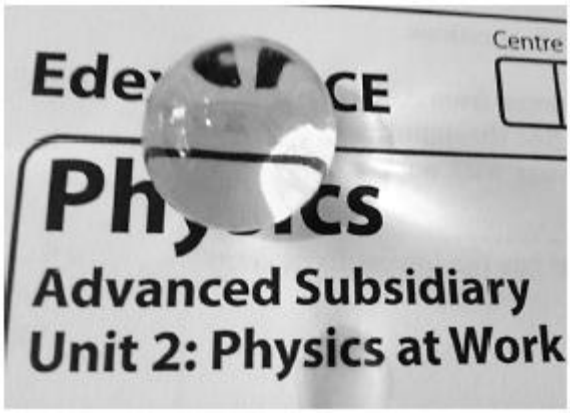
Threshold frequency = ...

(Total for question = 4 marks)

Q2.

Flower arrangers sometimes use gel balls instead of water to fill vases.

The photograph below shows some writing seen through one of these gel balls. The writing is distorted because the gel ball refracts light.



(a) Explain what is meant by refraction.

(2)

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(b) The photographs below show a beaker containing gel balls. When water is added to the beaker, the gel balls below the water surface are no longer visible.

Explain how this shows that the gel has the same refractive index as water.

(2)

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Q3.

The photoelectric effect was discovered by Hertz who investigated the effect of ultraviolet radiation incident upon the surface of zinc. The effect was found to depend on the frequency of the radiation.

(a) State what is meant by threshold frequency.

(1)

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(b) Light of frequency 8.9×10^{14} Hz is incident upon the surface of a different metal. The photoelectrons have a maximum speed of 6.7×10^{5} m s^{-1}.

Calculate the work function of the metal in eV.

(4)

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Work function = ... eV

(Total for question = 5 marks)

Q4.

(a) State what is meant by the principle of superposition of waves.

(2)

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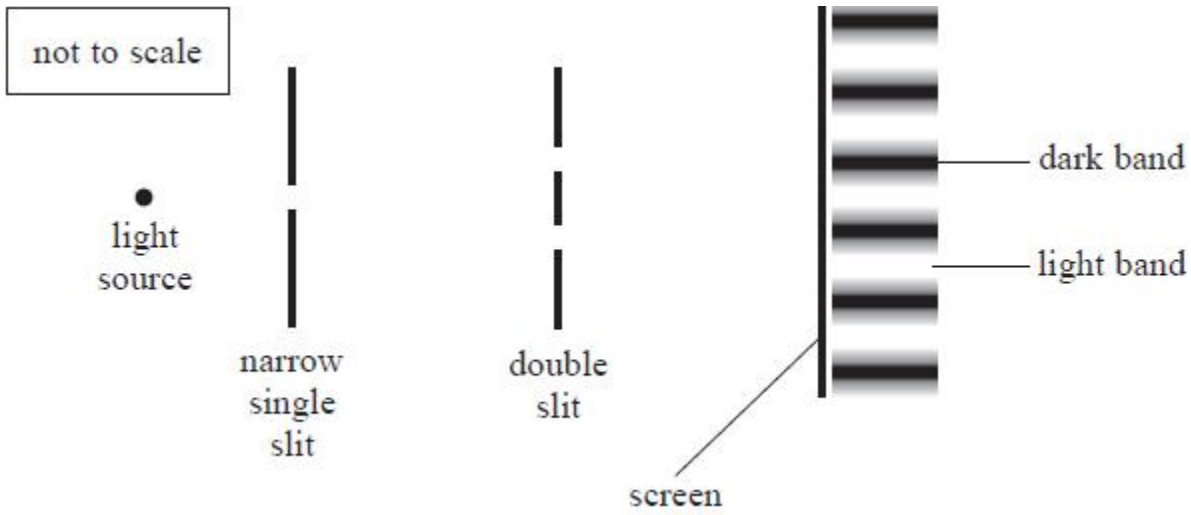
(b) The arrangement in the diagram demonstrates the effect of superposition. When a monochromatic light source is used, a series of dark and light bands is formed on the screen.



*(i) Explain how the dark and light bands are formed by light reaching the screen from the two slits of the double slit.

(3)

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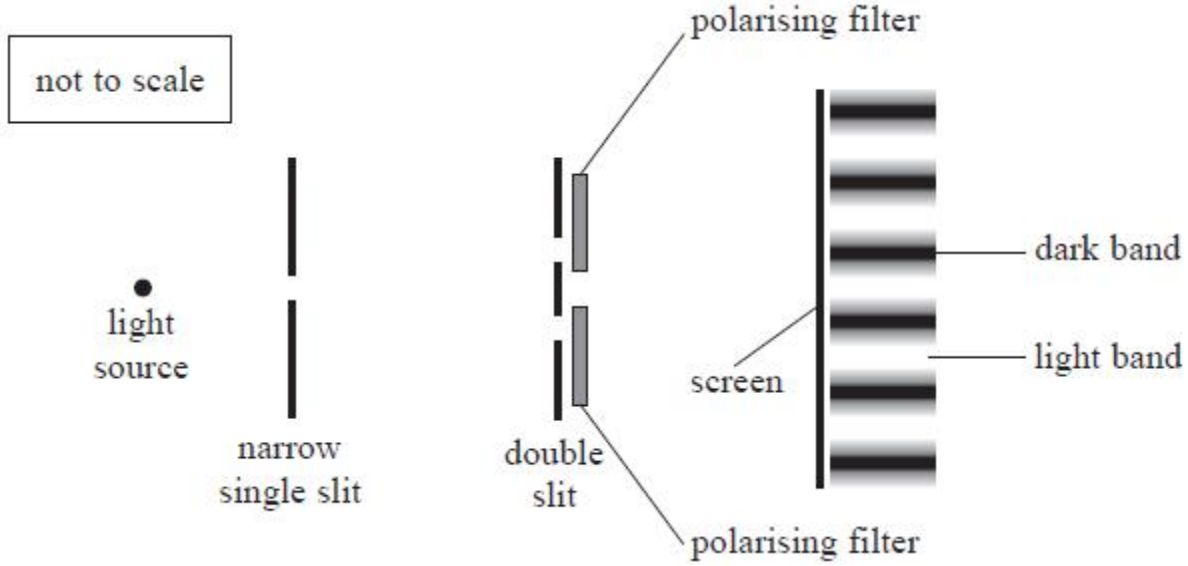
(ii) Polarising filters are placed behind the slits as shown. When the planes of polarisation are parallel, the pattern of light and dark bands is still seen.



If one polarising filter is rotated through 90° there are no dark bands and the screen is illuminated evenly. Explain why there are no dark bands when one filter has a plane of polarisation at 90° to that of the other filter.

(3)

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