Practice Question Set For A-Level
Subject : Physics
Paper-3 Topic: Section B (Section 10_ Medical Physics)

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Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

(a) A person views a flashing white light source in a darkened room. Each flash lasts for 0.01 s and initially the light is flashing at a frequency of 1 Hz.
State how the person's perception of what is seen changes as the frequency at which the light flashes is slowly increased from 1 Hz to 40 Hz. Name the physiological process involved.

_____

_____

_____

_____

_____

physiological process involved _____

(3)

(b) A person with a defective eye wears spectacles to see clearly a small real object. The object is placed at the aided near point of the eye, 25.0 cm from the correcting lens.
The power of the correcting lens is + 1.75 D.

(i) Find the image distance of the image formed by the correcting lens.

Give your answer to an appropriate number of significant figures.

image distance _____ cm

(3)

(ii) State what this image distance represents.

_____

_____

(1)

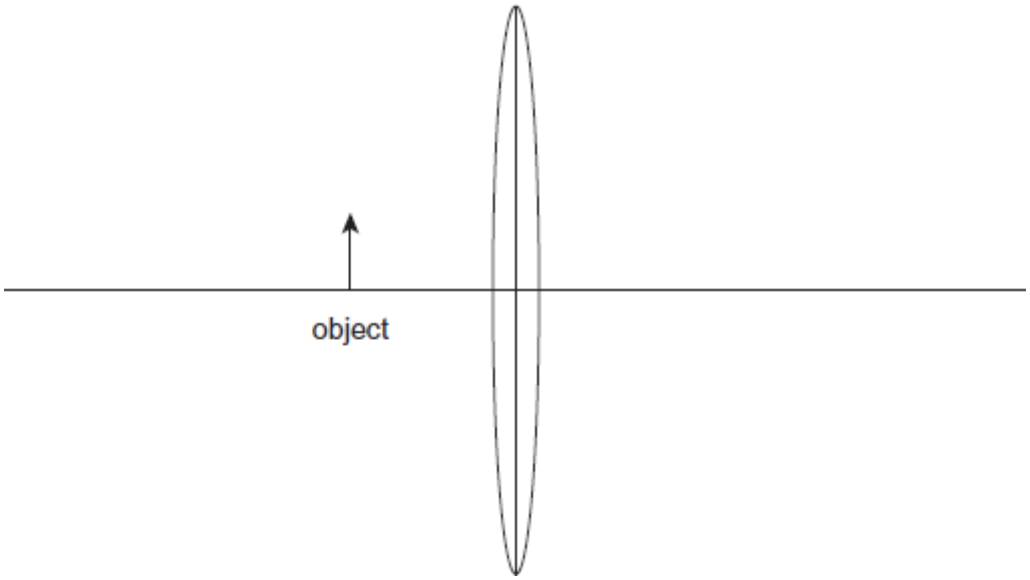
(c) State the defect of vision which is corrected using a converging lens.

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_____

(1)

(d) Draw a labelled ray diagram below to show how the lens in part (b) forms the image of the small real object. Clearly label the image and principal foci of the lens. Your diagram does not have to be to scale.



(2)

(Total 10 marks)

Q2.

A diagnostic X-ray tube produces a beam of X-rays. The beam passes through a diaphragm consisting of two pairs of lead sheets which can be moved at right angles to each other, and then through an aluminium filter.

(a) (i) State the use of the lead sheets.

_____

_____

(1)

(ii) State the use of the aluminium filter.

_____

_____

(1)

(b) When a monochromatic beam of X-ray photons is passed through an aluminium sheet of thickness 2.7 mm, its intensity is reduced by 8.3%.

Calculate the mass attenuation coefficient of aluminium for these X-rays.

State an appropriate unit for your answer.

density of aluminium = 2700 kg m^{-3}

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mass attenuation coefficient _____ unit _____

(5)
(Total 7 marks)

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