

Name of the Student: _____

Max. Marks : 26 Marks

Time : 26 Minutes

Q1.

An eye condition is corrected using a +4.0D lens.

(a) Which eye condition could be corrected by using this lens?

Tick (✓) **one** box.

astigmatism

hypermetropia

myopia

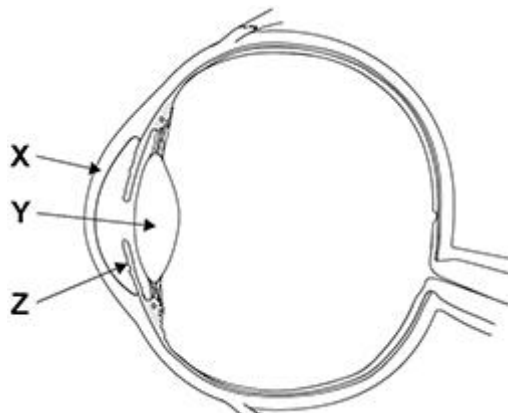
(1)

(b) Calculate the magnification produced by the +4.0D lens when viewing an object 75 cm from this lens.

magnification = _____

(3)

(c) The figure below shows a diagram of an eye.



State the name and primary optical function of **X**, **Y** and **Z**.

Name of **X** _____

Primary optical function of **X** _____

Name of **Y** _____

Primary optical function of **Y** _____

Name of **Z** _____

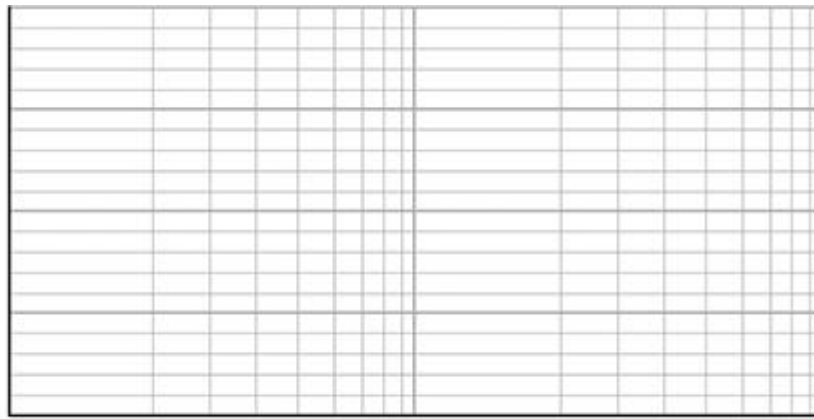
Primary optical function of **Z** _____

(4)
(Total 8 marks)

Q2.

- (a) Sketch an equal loudness curve on the figure below showing the normal response of a healthy ear. Annotate the **frequency** axis with an appropriate scale.

intensity level / dB



(3)

(b) Describe the procedure used to gather the data for an equal loudness curve.

(2)

(c) Calculate the intensity of a sound that produces an intensity level of 30 dB.

intensity = _____ W m^{-2}

(2)

(Total 7 marks)

Q3.

(a) An X-ray image is to be made of a broken bone.
The image can be formed on

- photographic film
- a flat panel (FTP) detector or
- an intensifying screen using fluoroscopic image intensification.

State and explain which one of these detection methods should be used in this situation.
Go on to discuss why the other two methods are less suitable.

energy absorbed = _____ J

(5)

(c) State **two** reasons why the estimate of energy absorption in part (b) may be greater than the actual value.

1. _____

2. _____

(2)

(Total 11 marks)