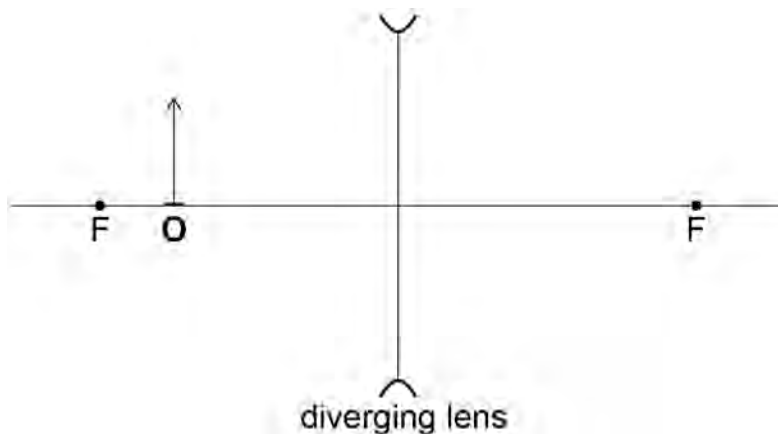


Section B

Answer **all** questions in this section.

- 0 1** . **1** State what is meant by the principal focus and the power of a converging lens. **[2 marks]**

- 0 1** . **2** Complete the ray diagram below to show the formation of an image of a real object O by a diverging lens. Label the image clearly. **[2 marks]**



- 0 1** . **3** State the defect of vision that would be corrected using a diverging lens. **[1 mark]**

0 1 . **4** A diverging lens of focal length -0.33 m is used to view a real object placed 0.25 m from the lens.

Calculate the distance from the lens to the image.

[2 marks]

distance from lens to image = _____ m

0 1 . **5** Two point sources of light are viewed by a normal eye and their images are formed at the fovea.

State, in terms of the active receptors, the conditions necessary for two separate images to be seen.

[2 marks]

0 2 . **1** Sound waves are incident on a human ear.

Describe how the frequency and amplitude of the vibrations change as the wave is transmitted through the ear to the fluid in the inner ear.

[2 marks]

0 2 . **2** Explain how the components of the ear act to amplify the pressure changes due to the sound wave.

[3 marks]

0 2 . **3** A sound intensity meter, set to the dB scale, is placed near to a source of sound. The intensity level reading on the sound meter is 82 dB.

Calculate in, W m^{-2} , the intensity of the sound at the meter.

[3 marks]

intensity = _____ W m^{-2}

0 2 . 4 The sound intensity meter is 2.0 m from the source which is emitting sound equally in all directions.

Calculate the power emitted by the source.

[2 marks]

power = _____ W

Turn over for the next question

Turn over ▶

0 4

. 1

Explain why the effective half-life of a radionuclide in a biological system is always less than the physical half-life.

[2 marks]

0 4

. 2

The physical half-life of a radionuclide is 20 days. The nuclide was administered to a patient. Initially the corrected count rate at the patient's body was $2700 \text{ counts s}^{-1}$. Five days later, the corrected count rate at the same place on the patient was $1200 \text{ counts s}^{-1}$.

Calculate the biological half-life of the nuclide.

[4 marks]

biological half-life = _____ days

0 4 . **3** **Table 1** gives the properties of two radionuclides.

Table 1

	Technetium 99 m	Iodine 131
emitted radiation	gamma	beta ⁻ and gamma
half-life / hours	6.0	190
energy of gamma ray / keV	140	610

By considering information in **Table 1** suggest which of these nuclides is more suitable for use as a tracer in medical diagnosis.

[4 marks]

END OF QUESTIONS