

PRELIM REVIEW: PAPER 1

01 OCTOBER 2013

Lesson Description

In this lesson, we:

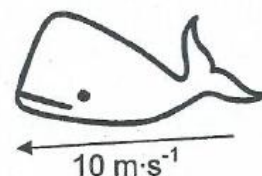
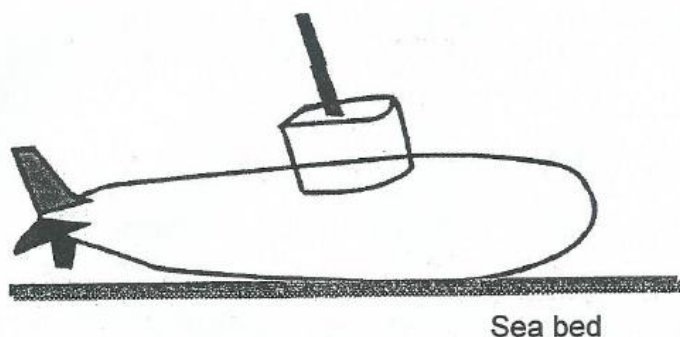
- Review some questions from the 2013 GDE Physics Preparatory exam.

Questions

Question 1

(Adapted from GDE, Question 6)

A submarine is stationary on the sea bed as shown in the diagram. The sonar system of the submarine detects a whale moving straight towards the submarine at a velocity of $10 \text{ m}\cdot\text{s}^{-1}$.



The sonar system operates at a frequency of $2,3 \times 10^4 \text{ Hz}$. Take the speed of the sonar wave in water as $1\,435 \text{ m}\cdot\text{s}^{-1}$.

- 1.1. Describe the Doppler effect in words (2)
- 1.2. Calculate the **frequency** of the signal received by the submarine after being reflected from the whale (6)
- 1.3. Name ONE other use of the Doppler effect (1)

Question 2

(Adapted from GDE, Question 7)

Diffraction of light has a significant effect on the sharpness of photographic images.

During the study on the effect of the width of the slit on the degree of diffraction in the laboratory, a single slit with a variable width is used. Monochromatic light with a wavelength of $7,3 \times 10^{-9} \text{ m}$ is used to illuminate the slit. The resulting diffraction pattern is observed on a screen $2,5 \text{ m}$ from the slit.

- 2.1. Write an investigative question for this investigation. (2)
- 2.2. Sketch a labelled diagram showing the positions of the bright and dark bands as observed on the screen. (3)
- 2.3. Calculate the width of the central bright band with the slit width is $0,05 \mu\text{m}$ (5)

A photographer found that the width of the opening (aperture) of the camera, will either increase or decrease sharpness (clearly identifiable edges) of the images.

- 2.4. How should the photographer adjust the aperture setting for the camera to **increase the sharpness** of the images in photographs he takes? Write down INCREASES, DECREASES or DO NOT ADJUST. Explain your answer (3)

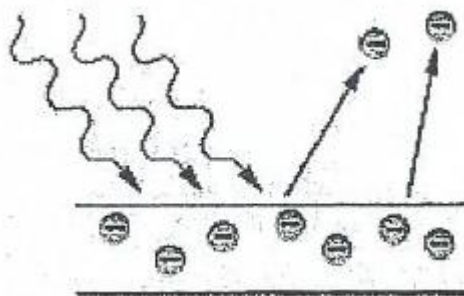
Question 3

(Adapted from GDE, Question 12)

Electromagnetic (EM) radiation has both wave properties and particles properties

- 3.1. Name the phenomenon commonly used to prove the particle nature of EM-radiation (1)
 3.2. Write down the term used for the particles in EM-radiation (1)

The diagram below shows how electrons are emitted from the surface of a metal, using EM-radiation.



The EM-radiation has a wavelength of $410 \times 10^{-9} \text{ m}$. The emitted electrons move away from the metal surface at a velocity of $7,5 \times 10^4 \text{ m.s}^{-1}$

- 3.3. Calculate the kinetic energy of the emitted electrons (3)
 3.4. Calculate the work function of the metal (4)



Learn Xtra
Exam Revision
marathon 2013
competition

*GOING THE
DISTANCE
together...*



mindset

Terms and Conditions on website

A3012

Prizes sponsored by:

SAMSUNG

www.learnxtra.co.za
[www.facebook.com \ LearnXtra](https://www.facebook.com/LearnXtra)

Helpdesk contact: www.learnxtra.co.za/helpdesk