Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
TOTAL	

General Certificate of Education
Advanced Level Examination
June 2010

Physics A PHYA5/2B

Unit 5B Medical Physics
Section B

Tuesday 29 June 2010 1.30 pm to 3.15 pm

For this paper you must have:
- a calculator
- a ruler
- a Data and Formulae Booklet.

Time allowed
- The total time for both sections of this paper is 1 hour 45 minutes. You are advised to spend approximately 50 minutes on this section.

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

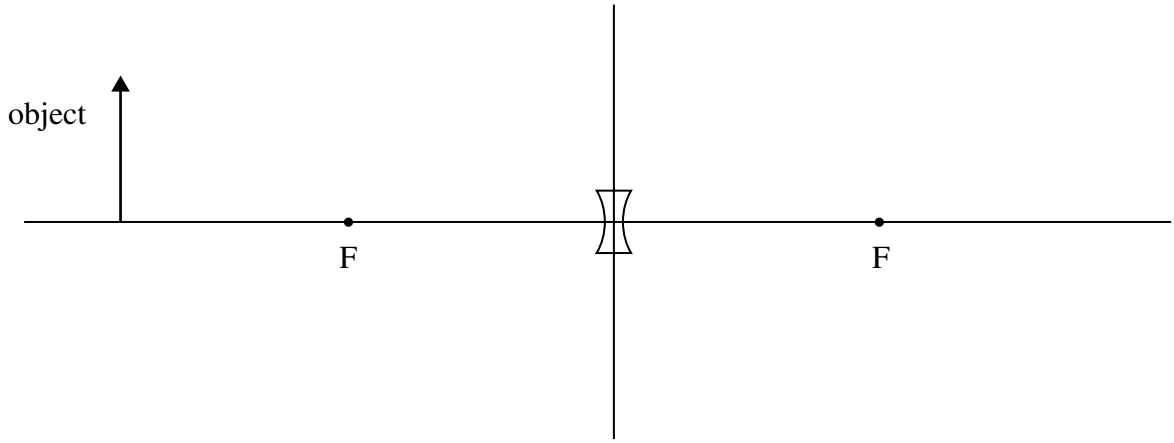
Information
- The marks for questions are shown in brackets.
- The maximum mark for this section is 35.
- You are expected to use a calculator where appropriate.
- A *Data and Formulae Booklet* is provided as a loose insert.
- You will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

Do not write outside the box

Section B

The maximum mark for this section is 35 marks. You are advised to spend approximately 50 minutes on this section.

1 (a) Complete the ray diagram to show the formation of the image of a real object by a diverging lens.



(2 marks)

1 (b) Define the power of a lens.

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(1 mark)

Do not write outside the box

1 (c) A lens of focal length – 0.56 m is used to correct a defect of vision of an eye.

1 (c) (i) Name this defect of vision.

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(1 mark)

1 (c) (ii) The defective eye has an unaided near point at 0.15 m from the eye.
Calculate the aided near point distance, giving your answer to an appropriate number of significant figures.

answer = ... m

(3 marks)

1 (d) Another person was found to suffer from astigmatism. State the format of the prescription to correct this defect.

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(1 mark)

8

Turn over for the next question

Do not write outside the box

2 (a) (i) Describe how the vibrations of a sound wave are received by the outer ear and transmitted to the inner ear.

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(3 marks)

2 (a) (ii) Explain how the pressure changes due to the sound wave are amplified by the ear.

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(2 marks)

2 (b) An intensity meter, set to the dB scale, measures the intensity level of a sound as 46 dB. Calculate the intensity of the sound at the meter, giving an appropriate unit.

answer = ...

(3 marks)

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2 (c) The scale on the intensity meter is changed to the dBA scale and the new reading, for the same sound, is found to be 50 dBA. Explain this change.

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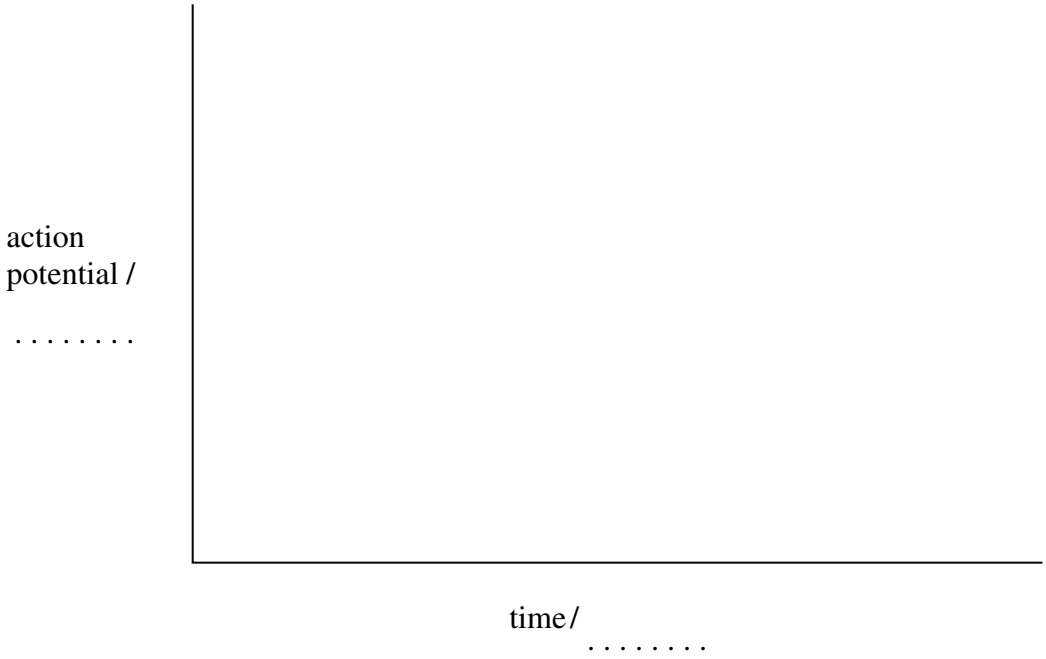
(2 marks)

10

Turn over for the next question

Do not write outside the box

3 (a) On the axes below, sketch the action potential of a nerve cell. Indicate units and scales on both axes.



(3 marks)

3 (b) Explain in terms of ion movement, starting at resting potential, how bioelectrical signals are produced in muscle fibres.
The quality of your written answer will be assessed in this question.

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(7 marks)

10

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4 (a) Outline the basic principles of a magnetic resonance (MR) scanner used to scan a patient's brain.

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(3 marks)

4 (b) State and explain **two** advantages of using an MR scanner to scan a patient's brain compared with a CT scanner.

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(4 marks)

7

END OF QUESTIONS

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There are no questions printed on this page

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