

Revision Sheet

Pearson Edexcel · International A-Level · Physics · Unit 5 Thermodynamics, Radiation, Oscillations and Cosmology

16 vocabulary items · 24 marks of exam questions (4 questions)

Part 1 · Vocabulary review (16 items). The terms this unit is examined on most. Mark it yourself from the answer key.

Section A · English dictation

Listen to each word and write it in English. The teacher reads the numbered answer key aloud.

1.

Dictation item 1.

[1]
2.

Dictation item 2.

[1]
3.

Dictation item 3.

[1]
4.

Dictation item 4.

[1]
5.

Dictation item 5.

[1]
6.

Dictation item 6.

[1]
7.

Dictation item 7.

[1]
8.

Dictation item 8.

[1]
9.

Dictation item 9.

[1]
10.

Dictation item 10.

[1]
11.

Dictation item 11.

[1]
12.

Dictation item 12.

[1]
13.

Dictation item 13.

[1]
14.

Dictation item 14.

[1]
15.

Dictation item 15.

[1]
16.

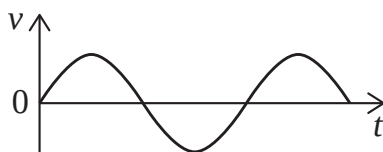
Dictation item 16.

[1]

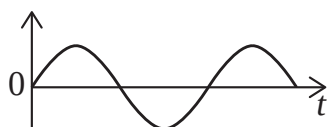
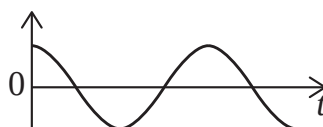
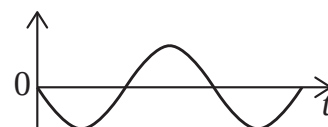
Part 2 · Exam questions (24 marks, 4 questions) begins on the next page. They are ordered easy to difficult and none of them has been set before.

Shared information for this question.

The graph shows how the velocity v varies with time t for an object performing simple harmonic motion.



Four graphs for the same period of time are shown below.

**A****B****C****D**

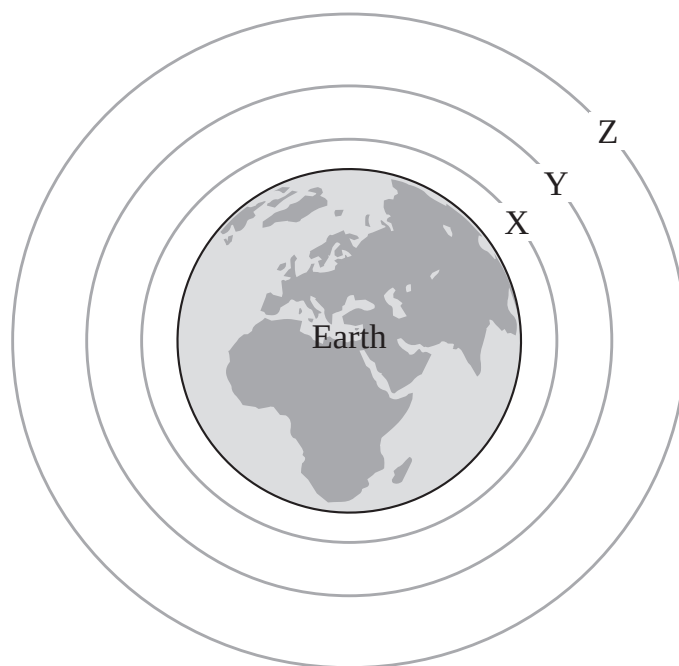
17 Which graph shows how the acceleration of the object varies with t ?

☐ **A**☐ **B**☐ **C**☐ **D**

(Total for Question 17 = 1 mark)

18 The diagram shows the Earth and some gravitational equipotential surfaces X, Y and Z.

The difference in gravitational potential between X and Y is the same as the difference in gravitational potential between Y and Z.



Explain why the equipotential surfaces are not equally spaced.

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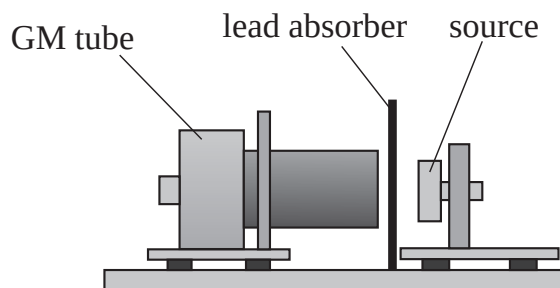
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(Total for Question 18 = 2 marks)

- 19** A student investigated the absorption of gamma radiation by lead, as shown. She used an americium source.



She placed sheets of lead absorber between the source and the GM tube. She recorded the count for 2 minutes for each thickness of absorber.

- (a) Americium emits alpha radiation as well as gamma radiation.

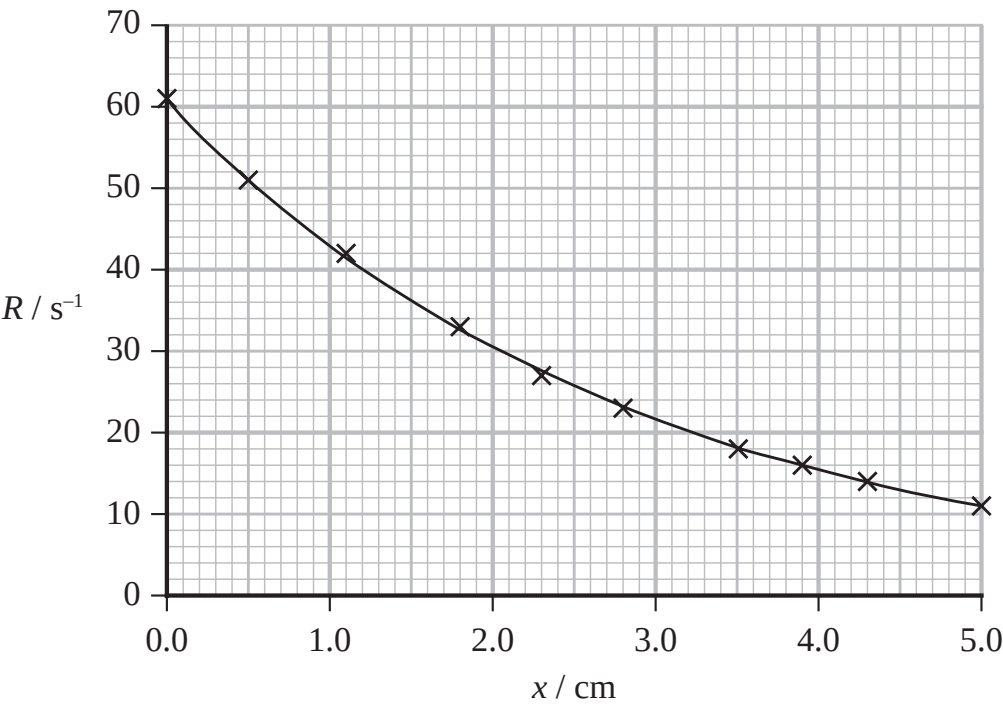
State why alpha radiation will not affect the recorded count rate.

(1)

- (b) Explain **one** modification to her method that would give a more accurate value for the count rate.

(2)

(c) The student plotted a graph of count rate R against thickness x of absorber. Her graph is shown below.



R varies with x according to the equation

$$R = 60\text{e}^{-\mu x}$$

where μ is a constant.

Determine a value for μ .

(3)

$\mu =$

(Total for Question 19 = 6 marks)

20 The source of energy in a main sequence star is the fusion of hydrogen into helium.

The fusion of hydrogen to helium occurs in a number of stages but it can be approximated as 4 protons coming together to form a helium nucleus.

	Mass / u
Proton	1.0078
Helium	4.0026

(a) (i) Show that when 4 protons form a helium nucleus the energy released is about 4.3×10^{-12} J.

(4)

(ii) A scientist claimed that it would take 9×10^9 years for 10% of the mass of hydrogen in the Sun to be fused into helium.

Assess the accuracy of this claim.

You should consider the rate of production of helium in the Sun.

mass of hydrogen in Sun = 1.39×10^{30} kg

luminosity of Sun = 3.83×10^{26} W

1 year = 3.15×10^7 s

(5)

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*(b) Main sequence stars evolve into red giant stars. Red giant stars eventually become white dwarf stars.

Explain this evolutionary sequence.

You should refer to the fusion processes occurring in the star.

(6)

(Total for Question 20 = 15 marks)