A-Level Edexcel

PHYSICS

UNIT 2(IAL)

2015 — 2019

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1 - (PHY-S 2016-Unit 2(IAL)-Q1) - *Units and Estimation*

Which of the following are two SI base units?

☒ **A** ampere and hertz

☒ **B** ampere and second

☒ **C** coulomb and hertz

☒ **D** coulomb and second

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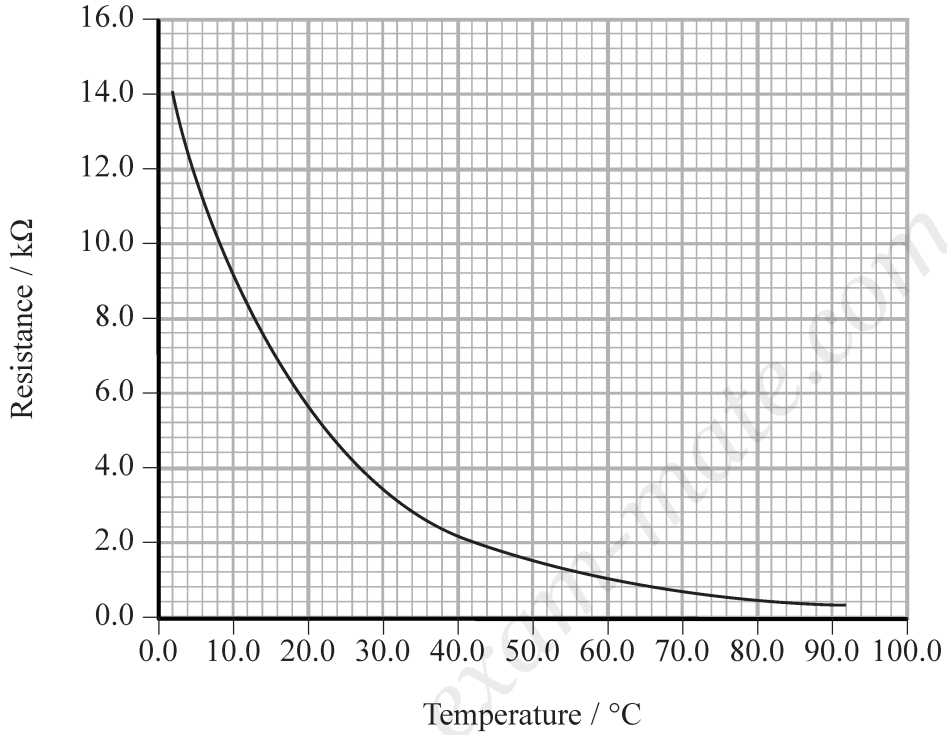
2 - (PHY-S 2016-Unit 2(IAL)-Q16) - *Units and Estimation, Electrical Quantities*

A student carries out an investigation to determine how the resistance of a thermistor varies with temperature.

The thermistor is placed in a beaker of water and an ohmmeter is used to measure resistance for different known temperatures of the water.

(a) The results are shown in the graph.



(i) The student states, "This graph is sufficient to show that resistance is inversely proportional to temperature".

Explain why this statement is **not** correct.

(3)

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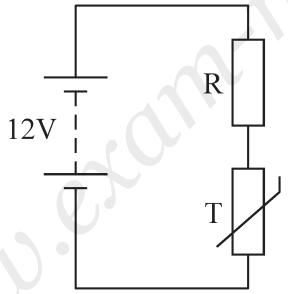
(ii) Explain the graph in terms of the structure of the thermistor.

(4)

(b) The thermistor T is placed in series with a fixed resistor R in the following circuit.



Determine the temperature for which the potential difference across the resistor R will be 8.5 V.

resistance of R = 5.2 kΩ

(3)

Temperature = ...

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(c) Explain why it is more accurate to use an ohmmeter in this investigation than a separate ammeter and voltmeter.

(2)

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3 - (PHY-W 2017-Unit 2(IAL)-Q6) - *Units and Estimation*

Which of the following equations does **not** include any SI base quantities?

☒ **A** $P = W \div t$

☒ **B** $Q = I \times t$

☒ **C** $R = V \div I$

☒ **D** $W = Q \times V$

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4 - (PHY-S 2015-Unit 2(IAL)-Q4) - *Basic Waves*

The level of detail in an ultrasound scan can be increased by using a

☒ **A** higher frequency.

☒ **B** higher wave speed.

☒ **C** longer pulse duration.

☒ **D** longer wavelength.

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5 - (PHY-S 2015-Unit 2(IAL)-Q10) - *Basic Waves*

An ambulance is moving towards an observer with its siren sounding.

Which row of the table correctly describes the apparent changes in wave properties of the sound from the siren caused by the Doppler effect?

	Wave speed	Frequency	Wavelength
☒ **A**	no change	increases	decreases
☒ **B**	decreases	decreases	increases
☒ **C**	no change	decreases	increases
☒ **D**	increases	increases	decreases

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6 - (PHY-S 2015-Unit 2(IAL)-Q12) - *Basic Waves*

The diagram represents the position of particles before a progressive wave passes and as the wave passes.

(a) On the axes below, draw a corresponding graph of displacement against original particle position and label the wavelength.

(2)

(b) Suggest what type of progressive wave could be represented by the diagram.

(1)

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7 - (PHY-S 2015-Unit 2(IAL)-Q13) - *Basic Waves, Optics*

Surveyors sometimes use laser rangefinders to measure the distance to objects such as buildings and trees.

A reflector is placed on the object. The rangefinder emits pulses of light and detects them when they return after being reflected.

(a) State why the laser light is emitted in pulses.

(1)

.....

.....

(b) The rangefinder measures distances between 50 cm and 1 km.

Calculate the longest pulse duration that would allow this range of measurements.

(3)

.....

.....

.....

.....

Pulse duration = ...

(c) Distances inside buildings, such as the length of a room, are often measured using ultrasound.

Suggest a reason why a laser rangefinder would be more suitable than one using ultrasound for measuring the distance to a tree 1 km away.

(1)

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8 - (PHY-S 2015-Unit 2(IAL)-Q19) - *Basic Waves*

The photograph shows a satellite television dish.

Electromagnetic radiation from a communications satellite is reflected from the reflector to the detector.

(a) The radiation used has a frequency of 12.6 GHz.

(i) Show that the wavelength of the radiation is about 2 cm.

(2)

.....

.....

.....

.....

(ii) State the region of the electromagnetic spectrum to which this radiation belongs.

(1)

.....

(b) The radiation incident on the reflector has a radiation flux of 4.8×10^{-13} W m^{-2}.

Calculate the power of the incident radiation.

area of the reflector = 0.27 m^2

(2)

.....

.....

.....

Power = ...

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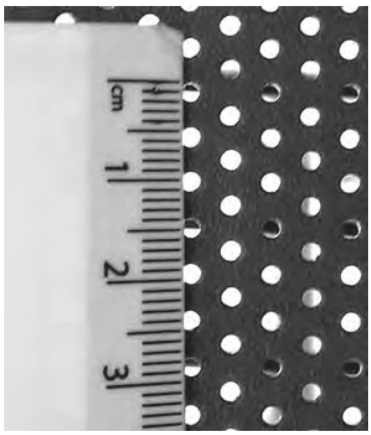
(c) The reflector contains many small holes.

(i) Use the photograph to estimate the diameter of the holes.



(1)

.....

.....

(ii) It is important that the radiation is reflected to the detector with the maximum possible power.

Use the idea of diffraction effects to explain why the radiation is reflected as if from solid metal.

(2)

.....

.....

.....

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(iii) Suggest a reason for having holes in the reflector, rather than using solid metal.

(1)

.....

.....

.....

.....

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9 - (PHY-S 2016-Unit 2(IAL)-Q2) - *Basic Waves*

Which of the following types of wave has the highest frequency?

☒ **A** infrared

☒ **B** microwave

☒ **C** radio

☒ **D** ultraviolet

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10 - (PHY-S 2016-Unit 2(IAL)-Q3) - *Basic Waves*

Sound waves are classified as longitudinal because they

☒ **A** are produced by vibrations.

☒ **B** produce displacement along the direction of travel of the wave.

☒ **C** require a medium through which to travel.

☒ **D** transfer energy along the direction of travel of the wave.

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