Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

PHYSICS **0972/12**

Paper 1 Multiple Choice (Core) **May/June 2023**

45 minutes

You must answer on the multiple choice answer sheet.

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You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- Take the weight of 1.0 kg to be 9.8 N (acceleration of free fall = 9.8 m / s^2).

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

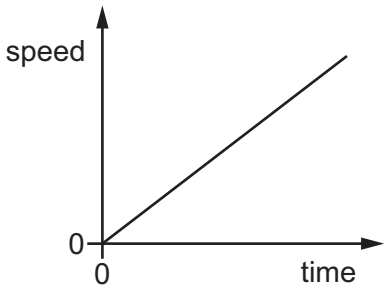
This document has **16** pages. Any blank pages are indicated.

[Turn over

1 Which single apparatus is used to find the volume of a solid cube and which single apparatus is used to find the volume of a quantity of liquid?

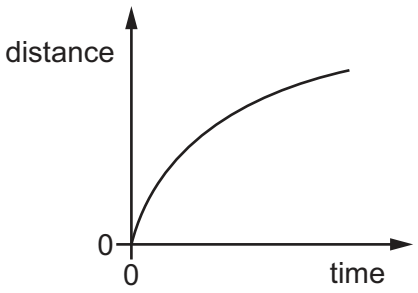
	volume of solid cube	volume of liquid
A	balance	balance
B	balance	measuring cylinder
C	ruler	balance
D	ruler	measuring cylinder

2 The speed–time graph represents a short journey.

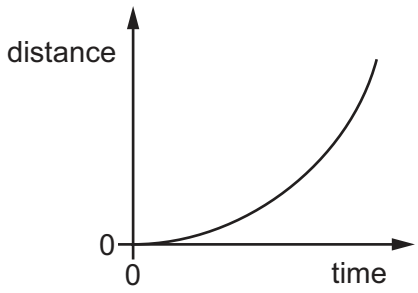


Which distance–time graph represents the same journey?

A



B



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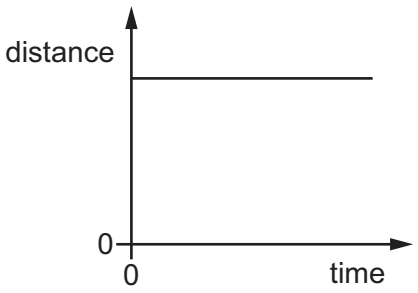
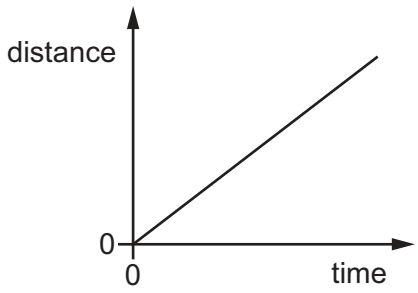
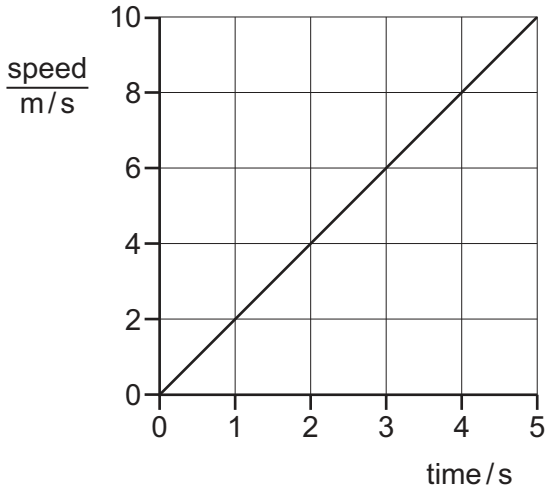


D



3 The graph represents the motion of a car.



How far has the car moved between 0 and 5 s?

A 2 m **B** 10 m **C** 25 m **D** 50 m

4 Which statement about mass or weight is **not** correct?

A Masses can be compared using a balance.

B Mass is a force.

C Weights can be compared using a balance.

D Weight is a force.

5 Which two quantities must be known to determine the density of a material?

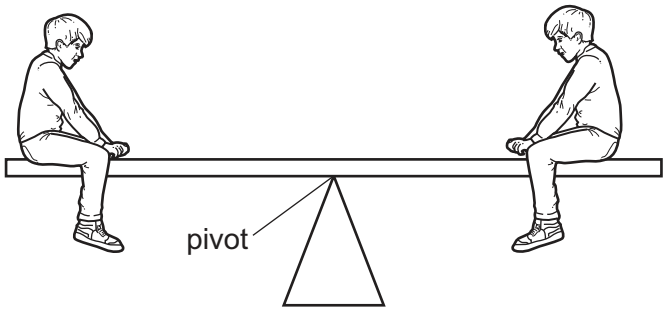
A mass and area

B mass and volume

C weight and area

D weight and volume

6 Two boys are sitting on a see-saw. The see-saw is in equilibrium and remains horizontal.



What affects the moment of each boy about the pivot?

A his distance from the pivot only

B his height above the ground and his weight

C his weight only

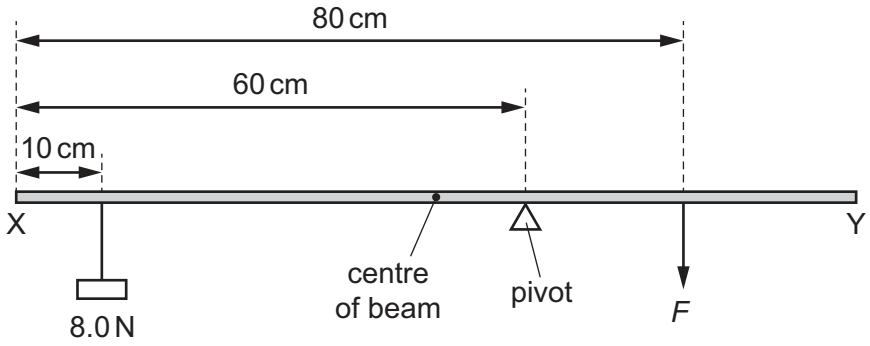
D his weight and distance from the pivot

7 A uniform metre rule is pivoted in equilibrium at the 50 cm mark. A mass of 25 g is placed at the 30 cm mark on the rule.

What is the smallest mass that can be placed on the rule to restore equilibrium?

A 5 g **B** 10 g **C** 15 g **D** 25 g

8 A uniform beam XY is 100 cm long and weighs 4.0 N.



The beam rests on a pivot 60 cm from end X.

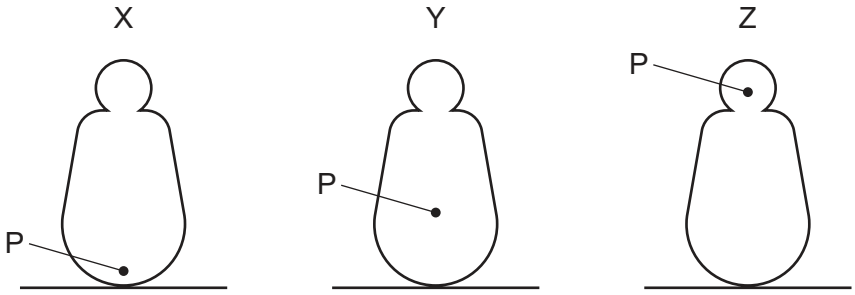
A load of 8.0 N hangs from the beam 10 cm from end X.

The beam is kept balanced by a force *F* acting on the beam 80 cm from end X.

What is the magnitude of force *F*?

A 8.0 N **B** 18 N **C** 22 N **D** 44 N

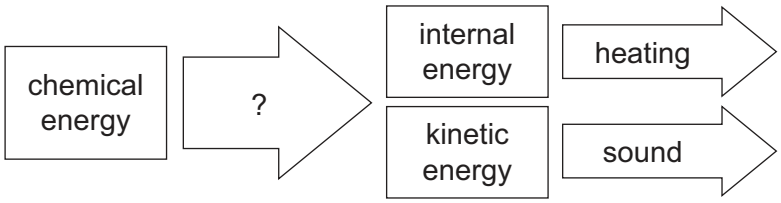
9 Three children's toys, X, Y and Z, are the same size and shape. They have weights at different positions inside so that the position of the centre of gravity of each toy is different. Each toy's centre of gravity is marked P.



Which toy is the most stable and which toy is the least stable when balanced in the positions shown?

	most stable	least stable
A	X	Y
B	X	Z
C	Y	X
D	Y	Z

10 The diagram shows the energy stores for a mobile (cell) phone and how the energy is transferred between stores.



What describes how the chemical energy is transferred?

A electrical work done

B mechanical work done

C electromagnetic waves

D sound waves

11 A moving object is brought to rest by a resistive force of 50 N over a distance of 5.0 m.

What is the work done by the force?

A 0.10 J **B** 10 J **C** 55 J **D** 250 J

12 Which two physical quantities must be used to calculate the power developed by a student running up a flight of steps?

A force exerted and the vertical height of the steps only

B force exerted and the time taken only

C work done and the vertical height of the steps only

D work done and the time taken only

13 A rectangular marble block has dimensions 1 m by 1 m by 5 m and weighs 125 000 N.

The marble block is stored with the long side resting on the ground, as in diagram 1.

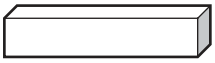


diagram 1

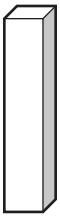


diagram 2

What is the change in the pressure on the ground due to the block when the block is stored as in diagram 2 rather than diagram 1?

A a decrease of 25 000 N / m^2

B an increase of 100 000 N / m^2

C an increase of 125 000 N / m^2

D no change

14 Four students describe the phrase ‘absolute zero’ during a lesson on the particle model.

Which student is correct?

A This is the lowest possible temperature.

B Particles in a solid start vibrating.

C Particles do not have any weight.

D Particles have the least gravitational potential energy.

15 At the surface of a liquid, the more energetic molecules can escape from the liquid into the atmosphere.

Which name is given to this process?

A boiling

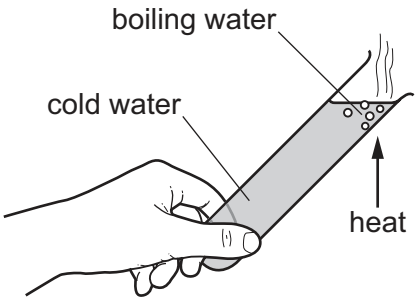
B condensation

C evaporation

D melting

16 A teacher puts some cold water in a test-tube.

She holds the bottom of the test-tube while heating the top.



The water at the top boils but she continues to hold the test-tube as the bottom remains cold.

Which conclusion about water is made from this experiment?

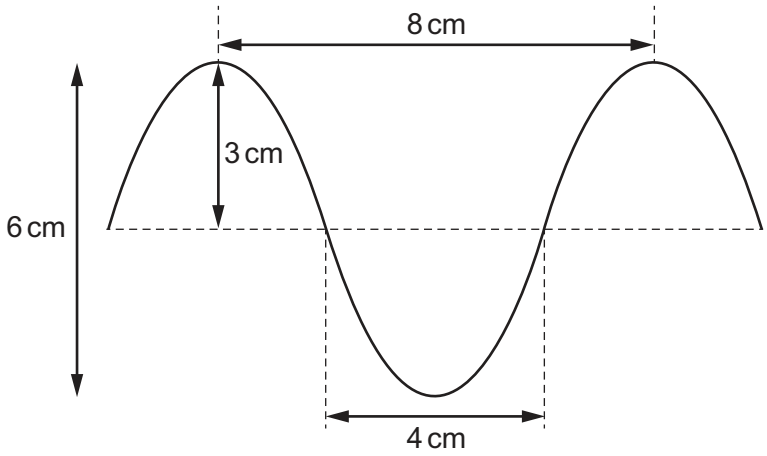
A Water is a bad conductor.

B Water is a bad convector.

C Water is a good conductor.

D Water is a good convector.

17 The diagram shows a wave.



What are the amplitude and the wavelength of this wave?

	amplitude / cm	wavelength / cm
A	3	4
B	3	8
C	6	4
D	6	8

18 A light ray strikes a plane mirror and is reflected.

Which angle is always equal in size to the angle of reflection?

A the angle between the incident ray and the mirror

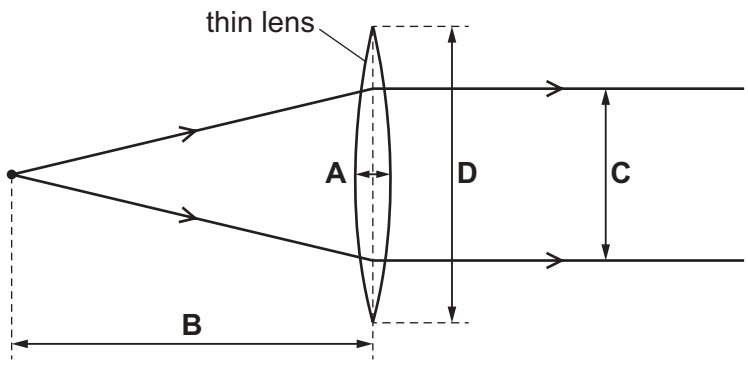
B the angle between the incident ray and the normal to the mirror

C the angle between the reflected ray and the mirror

D the angle between the reflected ray and the incident ray

19 The diagram shows two diverging rays of light passing through a lens and emerging parallel to each other.

Which labelled distance is the focal length of the lens?

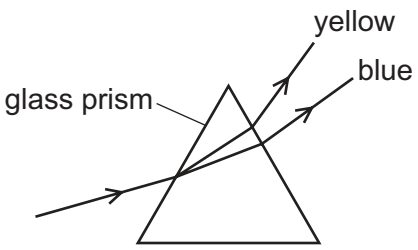


20 A beam of light consists of yellow and blue light.

The beam of light is incident on a glass prism.

Which diagram is correct?

A



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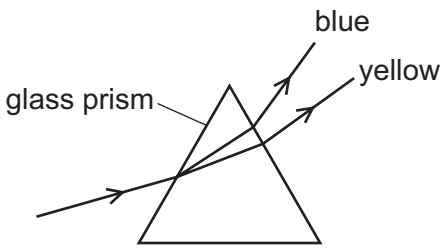

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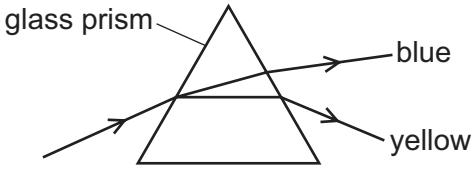

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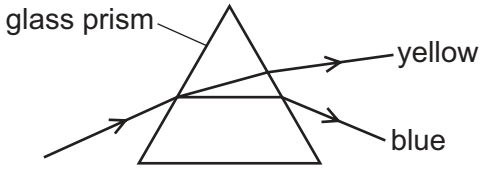
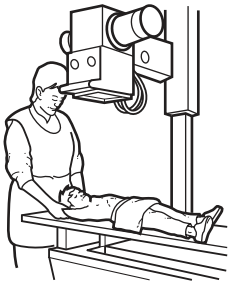


21 The two devices shown use different types of electromagnetic waves.

medical scanning



remote controller

Which types of waves are used in these devices?

	medical scanning	remote controller
A	ultraviolet	infrared
B	ultraviolet	microwaves
C	X-rays	infrared
D	X-rays	microwaves

22 A boy shouts and hears the echo from a tall building 2.2 s later.

The speed of sound in air is 330 m / s.

How far away from the boy is the building?

A 150 m **B** 300 m **C** 360 m **D** 730 m

23 The magnetic field of a bar magnet can be represented by magnetic field lines.

Which diagram shows two magnetic field lines correctly?

A

B

C

D

24 A plastic rod is rubbed with a dry cloth. The rod becomes positively charged.

Why has the rod become positively charged?

A It has gained electrons.

B It has gained neutrons.

C It has lost electrons.

D It has lost neutrons.

25 Which statement about electric current in a conductor is correct?

A In a d.c. circuit, the electric current gradually decreases along the conductor.

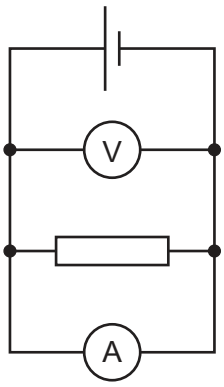
B In a d.c. circuit, the free electrons flow back and forth.

C In an a.c. circuit, the electric current remains exactly the same all the time.

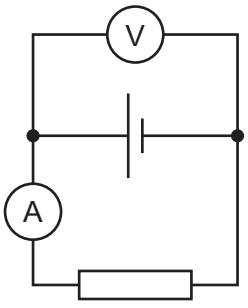
D In an a.c. circuit, the flow of charge changes direction continually.

26 Which circuit can be used to measure the resistance of a resistor?

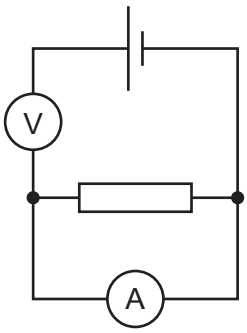
A



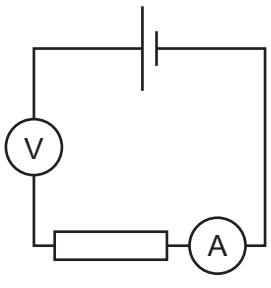
B



C



D



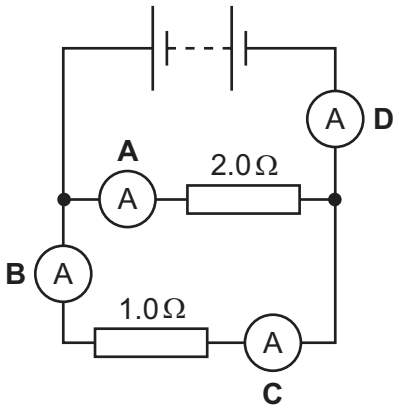
27 A lamp rated 12 V, 2.0 A is switched on for 60 s.

How much energy is transferred?

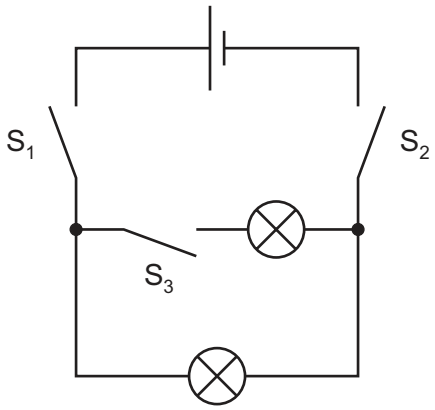
A 0.40 J **B** 10 J **C** 360 J **D** 1400 J

28 The circuit diagram shows a battery connected to two resistors. Four labelled ammeters are connected into the circuit.

Which ammeter shows the largest reading?



29 Two lamps are connected in parallel.



Which switches must be closed so that both lamps light?

A S_1 and S_2 only

B S_1 and S_3 only

C S_2 and S_3 only

D S_1, S_2 and S_3

30 Which statement about electrical safety is correct?

A If a device is double insulated, it does not need a fuse.

B A device that has a normal operating current of 3.0 A must be protected by a 3.0 A fuse.

C Switches must always be connected into the live supply wire.

D The metal casing of an electrical device must be connected to the neutral wire.

31 A student investigates the output voltage induced across a coil of wire by a bar magnet.

When will the induced voltage have the greatest value?

A The student slowly moves the bar magnet into the coil of wire.

B The student leaves the bar magnet stationary in the coil of wire.

C The student quickly removes the bar magnet from the coil of wire.

D The student places the bar magnet at rest outside the coil of wire.

32 In which device is the magnetic effect of a current **not** used?

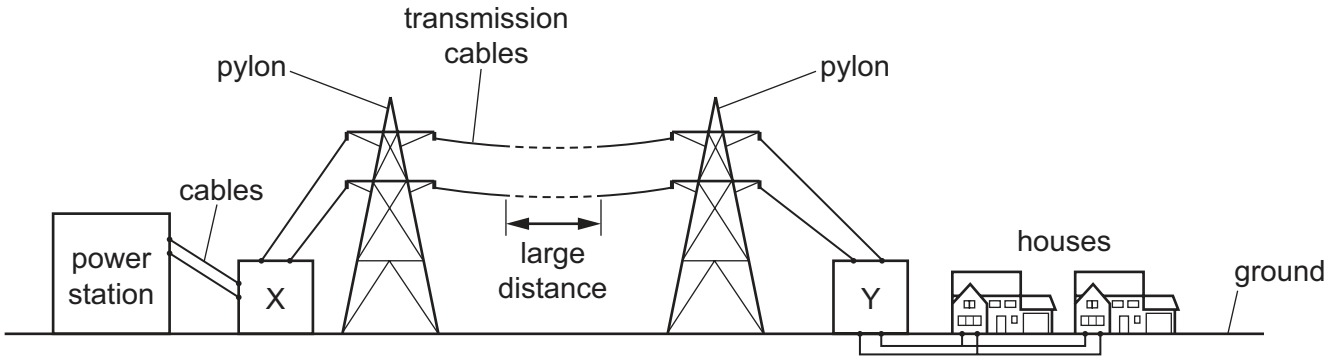
A electromagnet

B loudspeaker

C potential divider

D relay

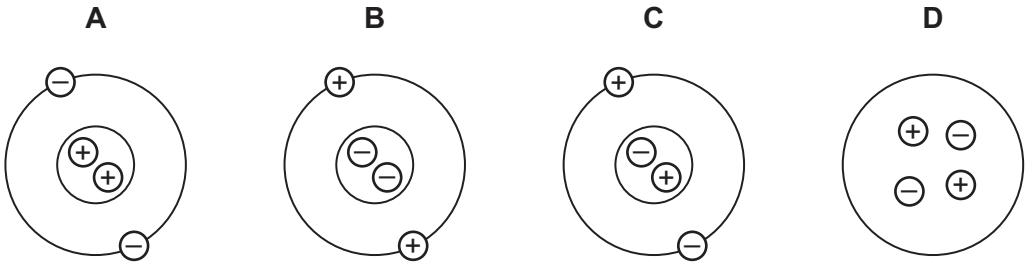
33 The diagram represents the transmission of electricity from a power station to homes that are many kilometres away. Two transformers are labelled X and Y.



What type of transformers are X and Y?

	X	Y
A	step-down transformer	step-down transformer
B	step-down transformer	step-up transformer
C	step-up transformer	step-down transformer
D	step-up transformer	step-up transformer

34 Which diagram represents the positions of the charged particles of an atom?



35 The table shows the composition of three different nuclei.

nucleus	number of protons	number of neutrons
X	3	3
Y	3	4
Z	4	3

Which nuclei are isotopes of the same element?

A X, Y and Z **B** X and Y only **C** X and Z only **D** Y and Z only

36 A sample of a radioactive isotope emits 9600 α-particles per second.

After 40 hours the rate of emission has fallen to 600 α-particles per second.

What is the half-life of this isotope?

A 4.0 hours **B** 8.0 hours **C** 10 hours **D** 20 hours

37 Which row states a harmful effect and a beneficial effect of ionising radiation on living things?

	harmful effect	beneficial effect
A	kills cancer cells	kills cancer cells
B	kills cancer cells	mutates living cells
C	mutates living cells	kills cancer cells
D	mutates living cells	mutates living cells

38 Which statement about the Solar System is correct?

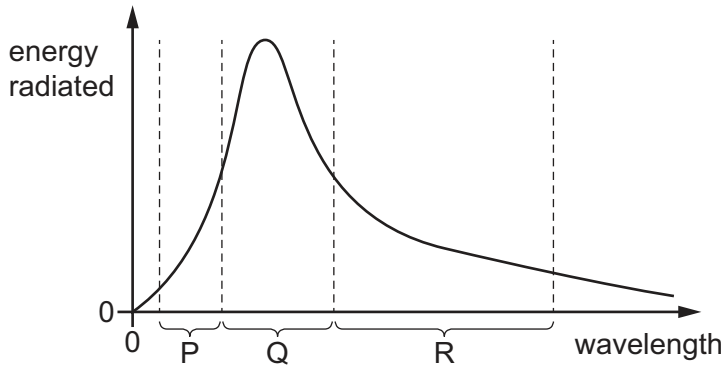
A All the planets are rocky.

B Only the Earth has a moon.

C Pluto is a dwarf planet.

D There are many stars in the Solar System.

39 The graph shows the energy radiated by the Sun at different wavelengths. Most of the energy is radiated in just three parts of the electromagnetic spectrum, labelled P, Q and R.



Which parts of the electromagnetic spectrum are P and R?

	P	R
A	gamma ray	radio
B	infrared	ultraviolet
C	radio	gamma ray
D	ultraviolet	infrared

40 An astronomer observes redshift in the light from a distant galaxy.

Which statement about redshift is correct?

A It is the decrease in the observed wavelength of red light emitted from receding galaxies.

B It is evidence that the Universe is contracting and supports the Big Bang Theory.

C It is evidence that the Universe is expanding and supports the Big Bang Theory.

D Redshift is when light from receding galaxies appears blue.

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