

Cambridge O Level

PHYSICS

5054/11

Paper 1 Multiple Choice

May/June 2026**1 hour**

You must answer on the multiple choice answer sheet.

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 or tape.
- 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.

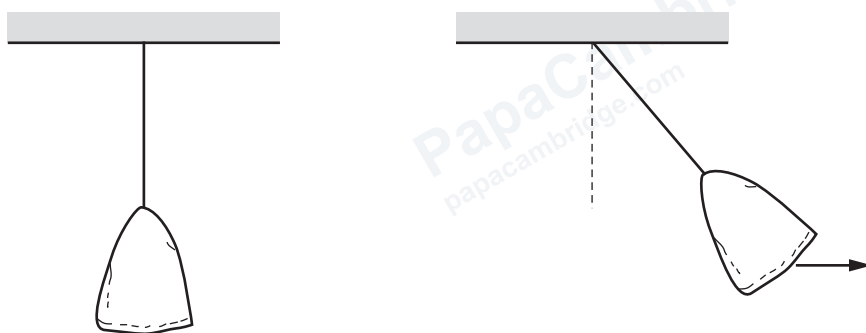
- 1 A car travels along a road at x , where x is 15 m/s due north.

Which term describes x ?

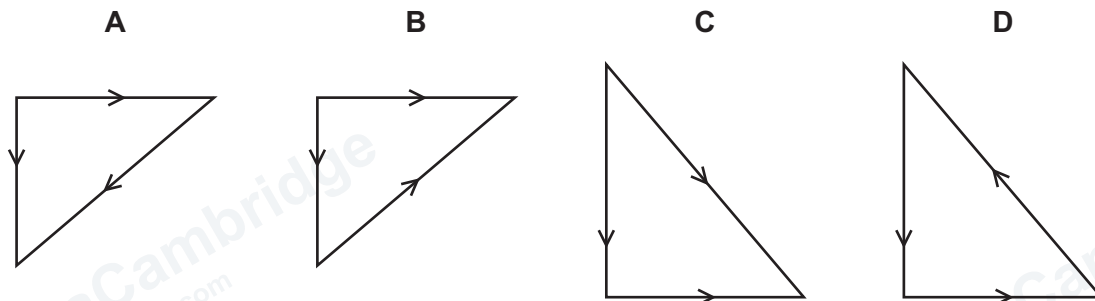
- A acceleration
- B scalar
- C speed
- D vector

- 2 A heavy sack is suspended from a ceiling by a rope.

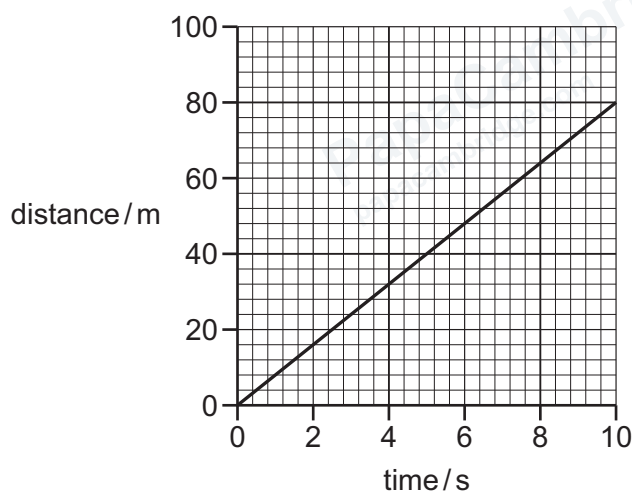
The sack is then pulled to one side and held stationary.



Which vector diagram represents the forces acting on the sack in its new position?

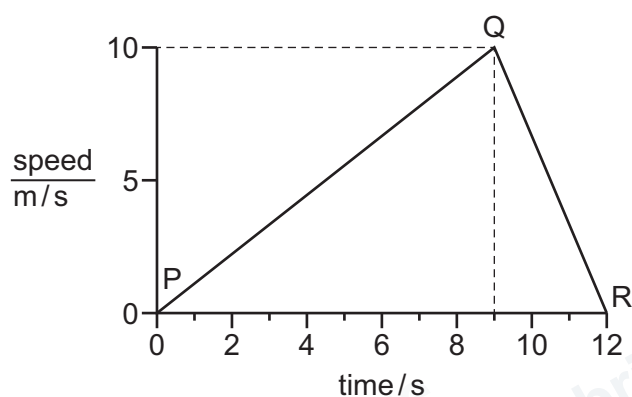


- 3 The graph is the distance–time graph for the motion of a cyclist.



Which statement describes the motion of the cyclist?

- A The cyclist is at rest.
 - B The cyclist is moving with constant speed.
 - C The cyclist is accelerating.
 - D The cyclist is decelerating.
- 4 The speed–time graph shows the motion of a lift working in a tall building.



At which of the points P, Q and R is the lift at rest?

- A P, Q and R
- B P and Q only
- C P and R only
- D Q and R only

- 5 Which term is used to describe the property of resisting a change in the state of rest or motion of an object?

A inertia
 B moment
 C momentum
 D resultant force

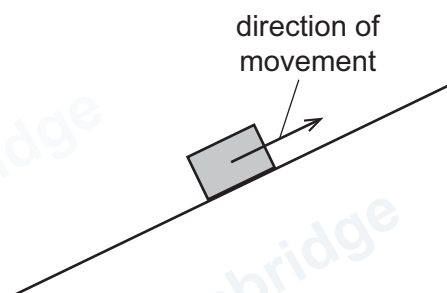
- 6 An object of mass 5.4 kg has a weight of 42 N on planet P.

The object is moved to Earth.

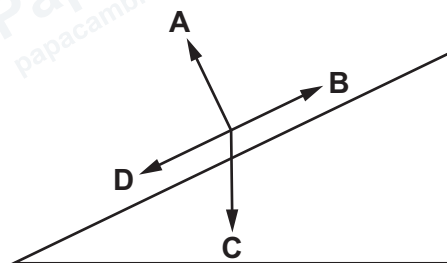
Which statement is correct?

A The gravitational field strength on planet P is 7.8 N/kg.
 B The mass of the object increases.
 C The weight of the object decreases.
 D The weight of the object on Earth is 42 N.

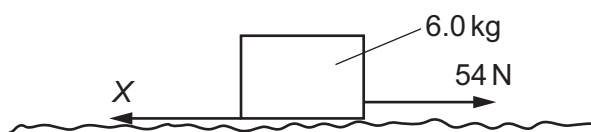
- 7 A box is pulled up a slope as shown. There is friction between the box and the slope.



In which direction does friction act on the box?



- 8 A block of mass 6.0 kg is pulled across a rough surface by a 54 N force. Force X also acts on the block but in the opposite direction.



The acceleration of the block is 6.0 m/s^2 .

What is the magnitude of X ?

- A 9.0 N B 18 N C 36 N D 54 N

- 9 Force F_1 and force F_2 are a Newton's third law pair of forces.

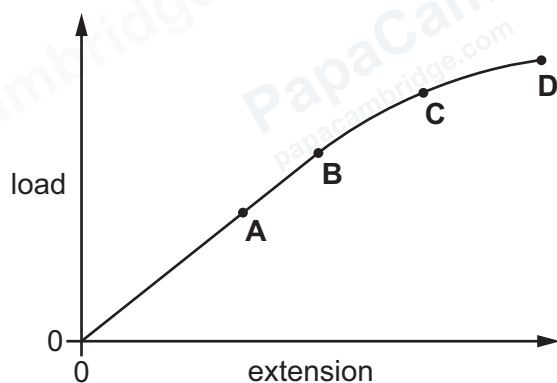
Force F_1 is a gravitational force that acts on object O.

Which type of force is force F_2 , and what is the object that it acts on?

- A F_2 is a gravitational force that acts on O.
 B F_2 is a gravitational force that acts on a different object.
 C F_2 is a force of a different type that acts on O.
 D F_2 is a force of a different type that acts on a different object.

- 10 A load–extension graph is plotted for a spring.

Which point marks the limit of proportionality for this spring?



11 Which quantity is a measure of the turning effect of a force?

- A the direction of a force
- B the moment of a force
- C the momentum of a force
- D the perpendicular distance of a force

12 Quantity 1 is equal to the change in quantity 2 per unit time.

What are quantity 1 and quantity 2?

	quantity 1	quantity 2
A	force	momentum
B	impulse	acceleration
C	momentum	velocity
D	velocity	acceleration

13 A microwave oven has an efficiency of 60%.

The useful power output of the microwave oven is 800 W.

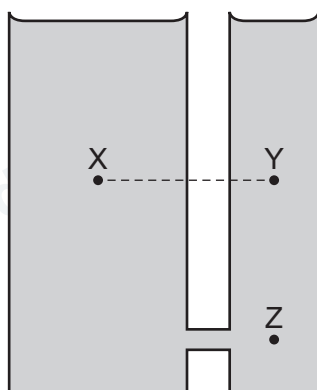
What is the total power input to the microwave oven?

- A 13 W B 75 W C 1300 W D 48 000 W

14 Why are fossil fuels described as non-renewable?

- A Burning fossil fuels badly affects the environment.
- B Fossil fuels are being used up faster than they are replaced.
- C Fossil fuels are only found in some countries.
- D The energy in fossil fuels comes initially from the Sun.

- 15 Two cylindrical vessels are joined together and filled with water as shown.



How does the pressure at point X compare to the pressure at points Y and Z?

	compared to Y	compared to Z
A	pressure at X is higher	pressure at X is lower
B	pressure at X is higher	pressure at X is the same
C	pressure at X is the same	pressure at X is lower
D	pressure at X is the same	pressure at X is the same

- 16 What is the name of the change of state that occurs when a substance changes from a solid to a liquid?

- A** boiling
- B** condensation
- C** evaporation
- D** melting

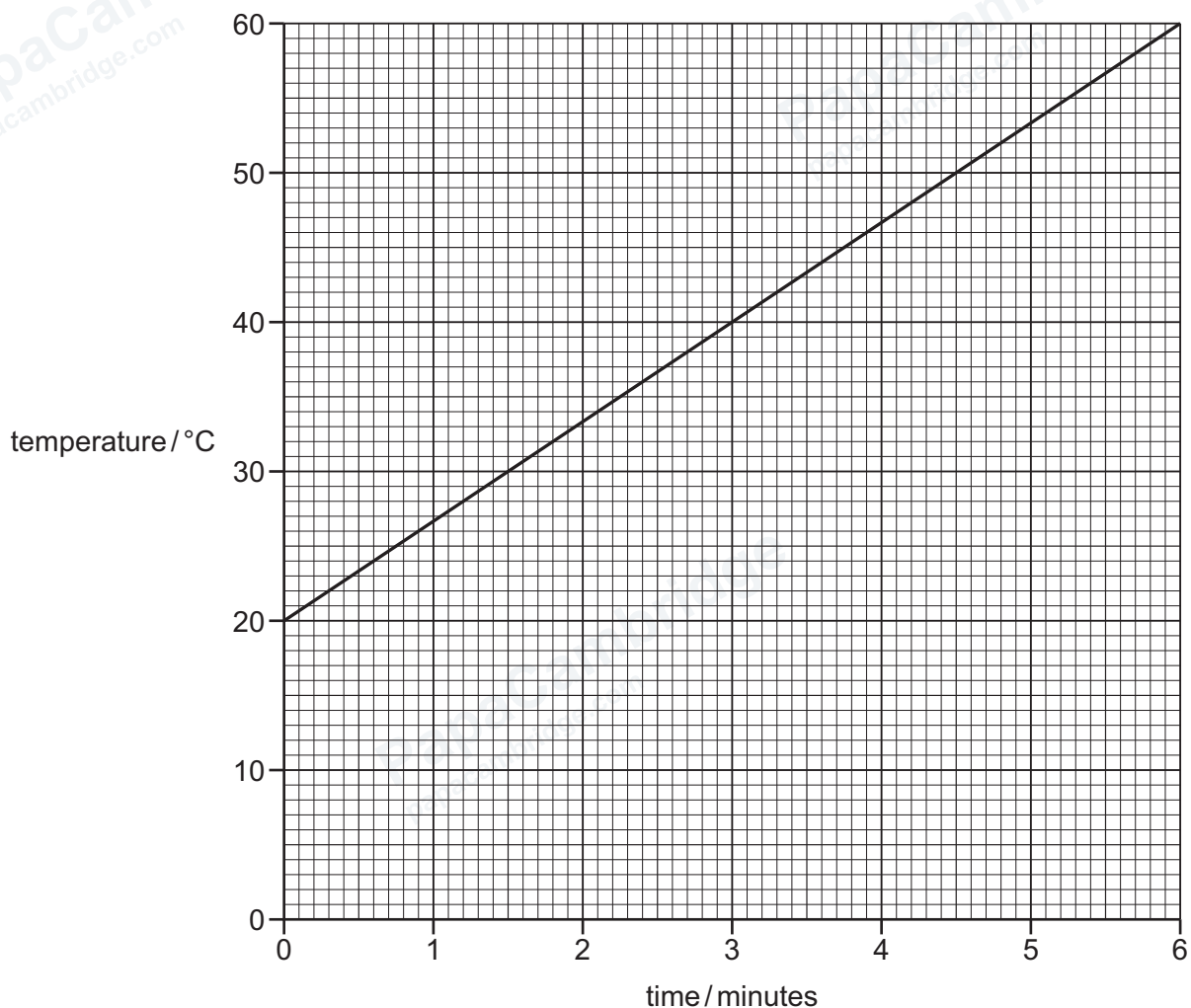
- 17 Liquid nitrogen boils at 77 K.

What is the boiling temperature of liquid nitrogen in °C?

- A** -196°C
- B** -77°C
- C** 3.8°C
- D** 350°C

- 18 Cooking oil of mass 0.25 kg is heated using a heater of power 50 W.

The graph shows how the temperature of the cooking oil changes with time.



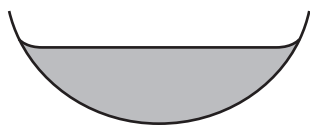
Thermal energy transfer from the oil to the surroundings is negligible.

What is the specific heat capacity of the cooking oil?

- A 20 J / (kg °C)
- B 30 J / (kg °C)
- C 1200 J / (kg °C)
- D 1800 J / (kg °C)

- 19 Some of the liquid in a dish evaporates, as shown in the diagrams.

before evaporation



after evaporation



Which molecules leave the liquid and which molecules in the liquid have greater average kinetic energy?

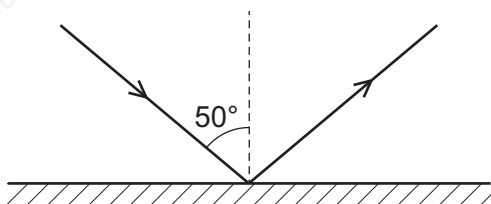
	molecules that leave have	molecules in the liquid have greater average kinetic energy
A	high energy	before evaporation
B	high energy	after evaporation
C	low energy	before evaporation
D	low energy	after evaporation

- 20 The tubes inside solar heating panels use the Sun's radiation to warm water.

Why are the tubes painted black?

- A Black surfaces absorb radiation well.
- B Black surfaces conduct heat well.
- C Black surfaces emit radiation well.
- D Black surfaces reflect radiation well.

- 21 The ray diagram shows light reflecting off a plane mirror.



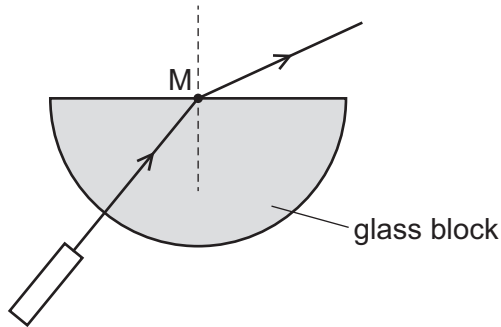
What is the angle between the incident and reflected rays?

- A 40°
- B 50°
- C 80°
- D 100°

22 Which equation gives the speed of a wave?

- A speed = amplitude $\div$ frequency
- B speed = amplitude $\times$ frequency
- C speed = wavelength $\div$ frequency
- D speed = wavelength $\times$ frequency

23 A ray of red light from a laser passes into a semi-circular glass block.

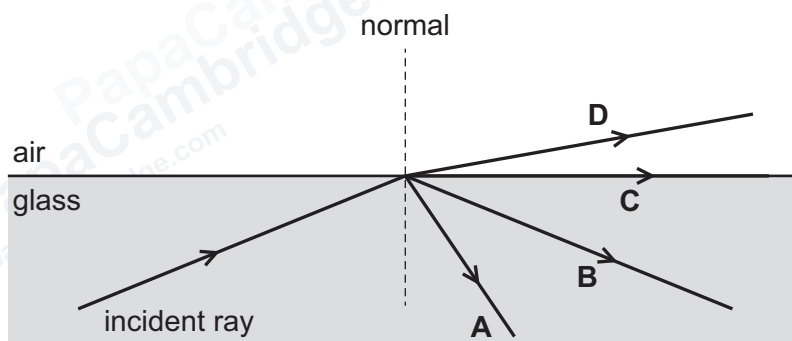


What is shown at M?

- A dispersion
- B rarefaction
- C reflection
- D refraction

24 Light travelling in glass is incident on a glass–air boundary. The angle of incidence of the light is greater than the critical angle.

Which arrow shows the direction of the light after it is incident on the boundary?



- 25** Three students suggest an advantage of using optical fibre cables in telecommunications rather than using copper cables.

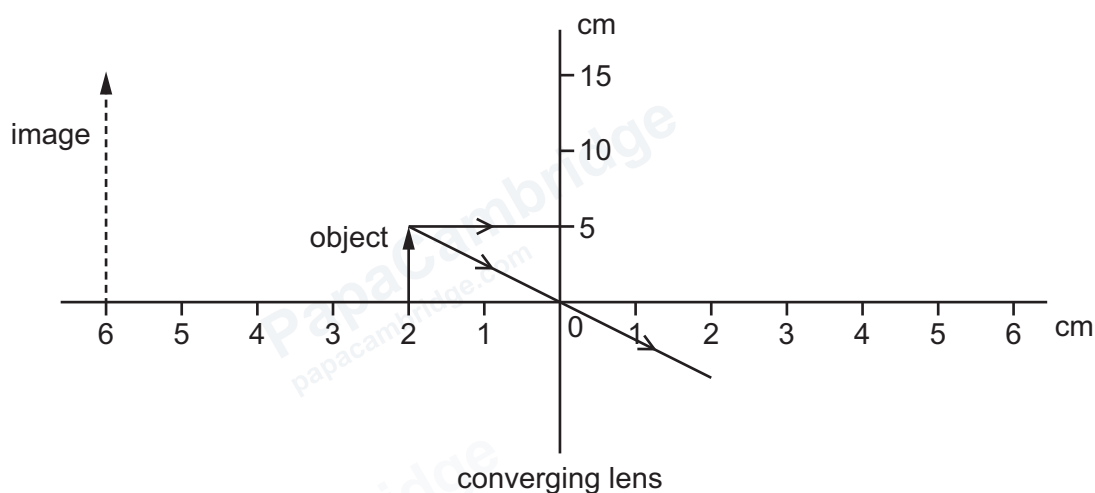
- 1 Optical fibre cables are more secure.
- 2 Optical fibre cables transmit over greater distances without boosting the signal.
- 3 Optical fibre cables transmit data at a greater rate.

Which suggestions are correct?

- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

- 26** An object of height 5.0 cm is placed 2.0 cm from a converging (convex) lens which is being used as a magnifying glass.

The image produced is 6.0 cm from the lens and has height 15.0 cm.



What is the focal length of the lens?

- A** 2.0 cm **B** 3.0 cm **C** 4.0 cm **D** 6.0 cm

- 27** The approximate range of audible frequencies for a sheep is 100 Hz to 30 000 Hz.

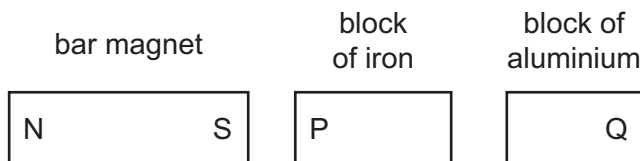
Which statement is correct?

- A** A human can hear sounds of higher frequencies than a sheep can hear.
- B** A sheep can hear sounds of lower frequencies than a human can hear.
- C** The highest frequency of sound that a human can hear is approximately 10 000 Hz lower than the highest frequency of sound a sheep can hear.
- D** The lowest frequency of sound that a human can hear is approximately 1900 Hz higher than the lowest frequency of sound a sheep can hear.

28 Which statement is correct?

- A Gamma rays have a longer wavelength than ultraviolet waves.
- B Infrared waves have a lower frequency than radio waves.
- C Microwaves have a longer wavelength than visible light.
- D X-rays have a higher speed in air than visible light.

29 A bar magnet is placed on a table. A block of iron is placed close to the bar magnet. A block of aluminium is added close to the block of iron.



What are the magnetic poles induced at points P and Q?

	magnetic pole at P	magnetic pole at Q
A	north	south
B	north	none
C	south	north
D	south	none

30 An uncharged plastic rod is rubbed with a cloth.

The plastic rod gains a negative charge.

Which statement is correct?

- A Electrons transfer from the cloth to the rod.
- B Electrons transfer from the rod to the cloth.
- C Protons transfer from the cloth to the rod.
- D Protons transfer from the rod to the cloth.

31 What is a possible unit for electric current?

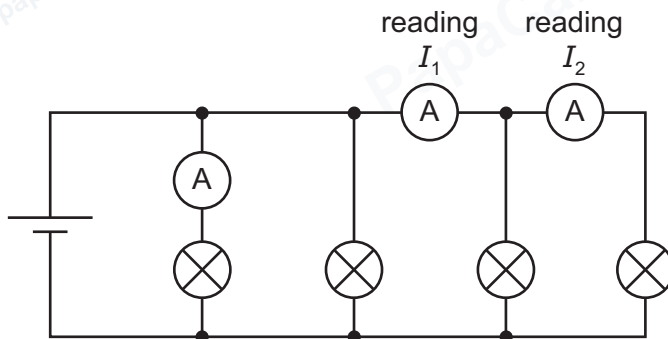
- A ampere / second
- B coulomb / second
- C joule / second
- D volt / second

32 The resistance of a metal wire depends on its length and on its cross-sectional area.

What are the relationships for the resistance of the wire?

	resistance and length	resistance and cross-sectional area
A	direct proportion	direct proportion
B	direct proportion	inverse proportion
C	inverse proportion	direct proportion
D	inverse proportion	inverse proportion

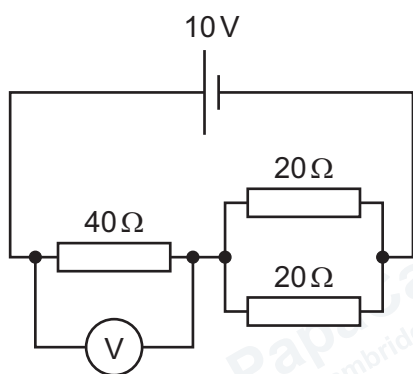
33 The diagram shows four identical lamps that are connected in parallel.



What are possible ammeter readings I_1 and I_2 ?

	reading I_1 / A	reading I_2 / A
A	3.0	3.0
B	3.0	9.0
C	6.0	3.0
D	9.0	12.0

- 34 The diagram shows a circuit that contains three resistors, a cell and a voltmeter.



What is the reading on the voltmeter?

- A 2.0V B 3.3V C 5.0V D 8.0V
- 35 A student uses a radiation detector to measure the count from a radioactive source.

Without any source present, the count he obtains in 2.0 min is C_1 .

With the counter next to the source, the count he obtains in 2.0 min is C_2 .

What is the count rate from the source alone, measured in counts/min?

- A $C_2 - C_1$ B $C_2 + C_1$ C $\frac{C_2 - C_1}{2.0}$ D $\frac{C_2 + C_1}{2.0}$
- 36 A nucleus of molybdenum-99, $^{99}_{42}\text{Mo}$, emits a beta particle (β -particle) as it decays to nucleus X.

What is the nuclide notation for X?

- A $^{98}_{42}\text{X}$ B $^{99}_{41}\text{X}$ C $^{99}_{43}\text{X}$ D $^{100}_{42}\text{X}$
- 37 Most household smoke detectors contain a sample of an isotope of americium.

The battery in a smoke detector is replaced very frequently, but the sample of the isotope of americium does **not** need to be replaced.

Why does the americium isotope **not** need to be replaced?

- A The isotope generates its own voltage.
 B The isotope has a long half-life.
 C The isotope is stable.
 D The isotope is dangerous to handle.

- 38 The Sun radiates most of its energy in three regions of the electromagnetic spectrum.

What are these three regions?

- A gamma rays, microwaves and visible light
- B infrared radiation, radio waves and ultraviolet radiation
- C infrared radiation, ultraviolet radiation and visible light
- D ultraviolet radiation, visible light and X-rays

- 39 Towards the end of its life cycle, a red supergiant explodes and leaves behind a neutron star.

What is the name of this type of explosion?

- A a big bang
- B a planetary nebula
- C a protostar
- D a supernova

- 40 Light is emitted from a distant galaxy with a frequency f_e and a wavelength λ_e .

The light from the galaxy, when observed on Earth, has a frequency f_o and a wavelength λ_o .

How does f_o compare with f_e and how does λ_o compare with λ_e ?

	f_o	λ_o
A	equal to f_e	greater than λ_e
B	equal to f_e	less than λ_e
C	less than f_e	greater than λ_e
D	less than f_e	less than λ_e

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