

Candidate Name

Candidate Number

Centre Name

Centre Number

Model Paper

It is necessary to respond on the answer sheets provided alongside (2 hours) question paper. Additionally, you must have a soft pencil (preferably of type B or HB), a clean eraser, and a dark blue or black pen.

INSTRUCTIONS:

- You must write your name, candidate number, centre name, and centre number on the answer sheets in the designated spaces.
- The objective section consists of 25 questions, and you must attempt all of them.
- Each question has four options labelled A, B, C, and D. Select the option that you think is correct. Mark it on the multiple-choice answer sheet using a soft pencil.
- Attempt all the questions from the subjective section using a dark blue or black pen.
- It is important to follow the instructions provided on the answer sheets.
- Do not use correction fluid.

- Avoid writing on any bar codes.
- You are allowed to use a calculator if needed.

INFORMATION:

- This paper has a total of 100 marks.
- In the objective section, there are 25 questions, each carrying one mark. There is no negative marking for incorrect responses.
- Subjective section comprises 75 marks
- The number of marks assigned for every question or its parts is indicated within brackets ().
- Rough work must be completed on this question paper.

OBJECTIVE SESSION

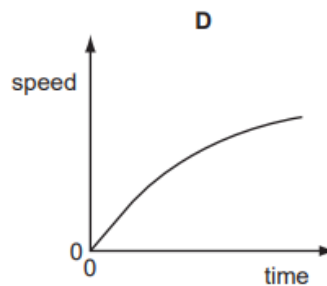
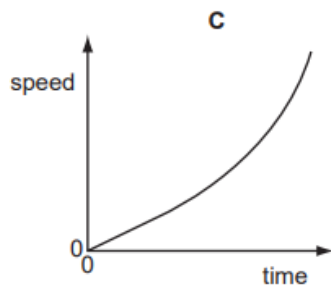
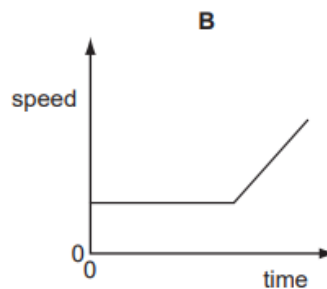
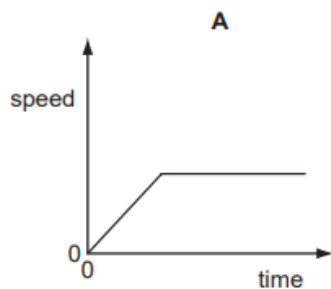
MARKS: 25

1. Which statement about mass and weight is correct?

- A. Mass and weight are both forces.
- B. Neither mass nor weight is a force.
- C. Only mass is a force.
- D. Only weight is a force.

2. An object moves initially with constant speed and then with constant acceleration.

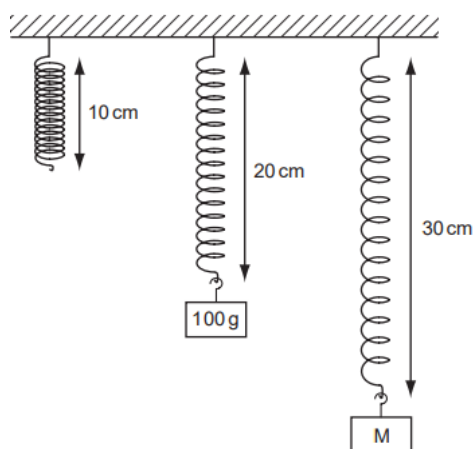
Which graph shows this motion?



3. An ice cube at a temperature of 0°C is put into a drink at a temperature of 10°C . After a short time, some of the ice has melted and the drink has cooled to a temperature of 8°C . What is the temperature of the remaining ice?

- A. 0°C
- B. 2°C
- C. 4°C
- D. 8°C

4. Objects with different masses are hung on a spring. The diagram shows how much the spring stretches.



The extension of the spring is directly proportional to the mass hung on it. What is the mass of object M?

- A. 110g
- B. 150g
- C. 200g
- D. 300g

5. When a liquid evaporates, some molecules escape from it and its temperature changes.

From where do the molecules escape and what is the effect on the temperature of the liquid?

	molecules escape from	temperature of liquid
A	all parts of the liquid	decreases
B	all parts of the liquid	increases
C	only the liquid surface	decreases
D	only the liquid surface	increases

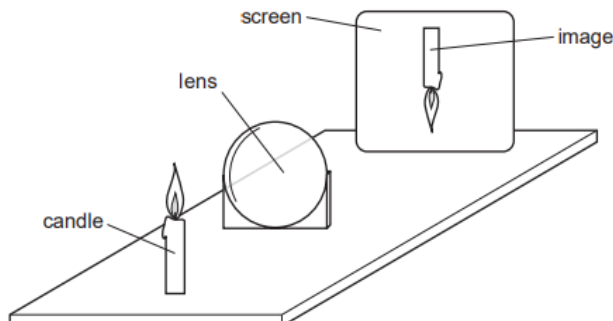
6. Which row gives an example of the stated form of energy?

	form of energy	example
A	gravitational	the energy due to the movement of a train along a level track
B	internal	the energy due to the flow of cathode rays in a cathode-ray tube
C	kinetic	the energy due to the position of a swimmer standing on a high diving board
D	strain	the energy due to the compression of springs in a car seat

7. Which energy resource is used to generate electricity by first boiling water?

- A. hydroelectric
- B. nuclear fission
- C. tides
- D. waves

8. A thin converging lens is used to produce, on a screen, a focused image of a candle.



Various focused images are produced on the screen by moving the lens and the screen backwards and forwards. Which statement is always correct?

- A. The image is at the principal focus (focal point) of the lens.
- B. The image is bigger than the object.
- C. The image is closer to the lens than the object is.
- D. The image is inverted.

9. Food is kept in a cool box which uses two ice packs to keep it cool. Where should the ice packs be placed to keep all the food as cool as possible?

- A. both at the bottom of the box

B. both at the top of the box

C. one at the front and one at the back of the box

D. one on the left and one on the right of the box

10. Sound travels by wave motion. Which property of waves causes echoes?

A. diffraction

B. dispersion

C. reflection

D. refraction

11. A student listens to a machine that makes sounds of different frequencies. He can only hear one of the sounds. Which frequency of sound is the student able to hear?

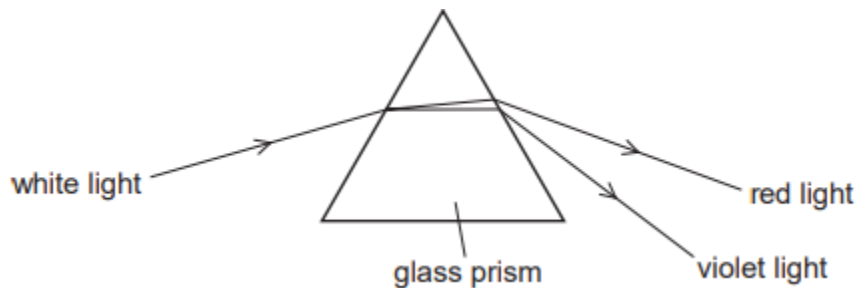
A. 2Hz

B. 10Hz

C. 2kHz

D. 30kHz

12. The diagram shows the dispersion of white light by a glass prism.



Why does dispersion occur when white light enters the glass?

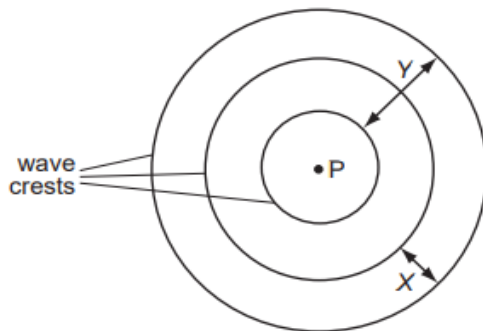
A. The frequency of red light decreases more than that of violet light.

B. The frequency of violet light decreases more than that of red light.

C. The speed of red light decreases more than that of violet light.

D. The speed of violet light decreases more than that of red light.

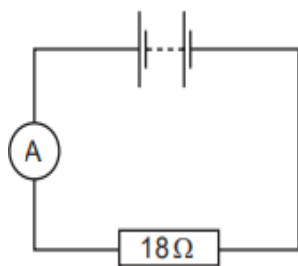
13. A vertical stick is dipped up and down in the water at P. In two seconds, three wave crests are produced on the surface of the water.



Which statement is correct?

- A. Distance X is the amplitude of the waves.
- B. Distance Y is the wavelength of the waves.
- C. Each circle represents a wavefront.
- D. The frequency of the waves is 3Hz.

14. An ammeter and an $18\ \Omega$ resistor are connected in series with a battery. The reading on the ammeter is 0.50A. The resistance of the battery and the ammeter can be ignored.



What is the electromotive force (e.m.f.) of the battery?

- A. 9.0N
- B. 9.0V
- C. 36N
- D. 36V

15. Which circuit includes a capacitor and what does the capacitor do in this circuit?

	circuit	what the capacitor does
A	potential divider	stores current
B	potential divider	stores energy
C	time delay	stores current
D	time delay	stores energy

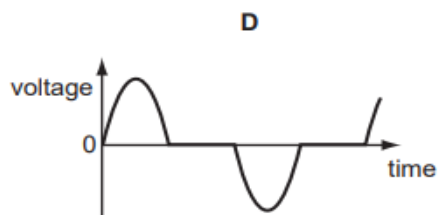
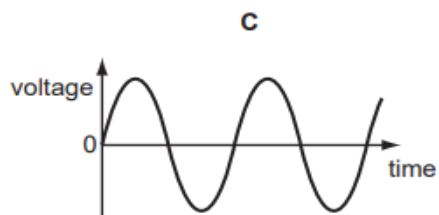
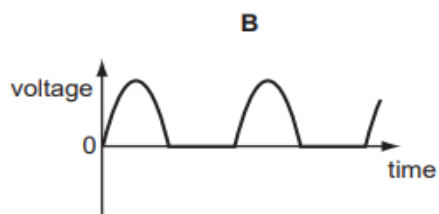
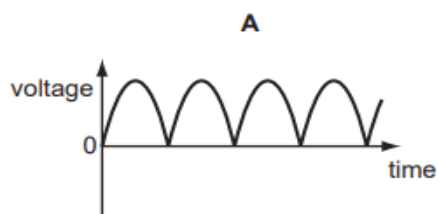
16. Which test could be used to find which end of a magnet is the north pole?

- A.** putting it near a compass needle
- B.** putting it near a ferrous metal
- C.** putting it near a non-ferrous metal
- D.** putting it near a steel spoon

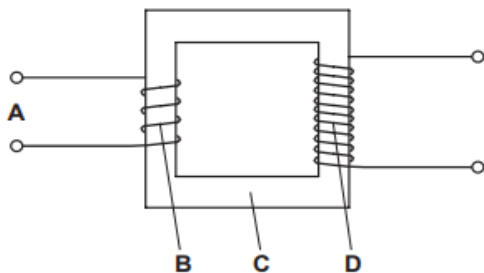
17. A polythene rod repels an inflated balloon hanging from a nylon thread. What charges must the rod and the balloon carry?

- A.** The rod and the balloon carry opposite charges.
- B.** The rod and the balloon carry like charges.
- C.** The rod is charged but the balloon is not.
- D.** The balloon is charged but the rod is not.

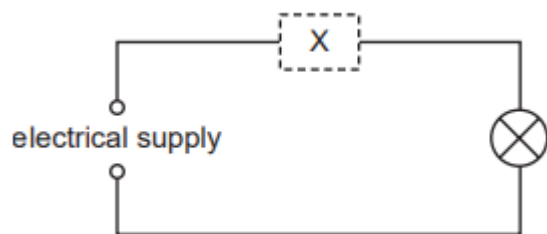
18. Which graph shows how the output voltage varies with time for a simple a.c. generator?



19. The diagram shows a simple step-down transformer used to decrease a voltage. Which part is the primary coil?



20. In this circuit, a component at X automatically protects the wiring from overheating if there is a fault.

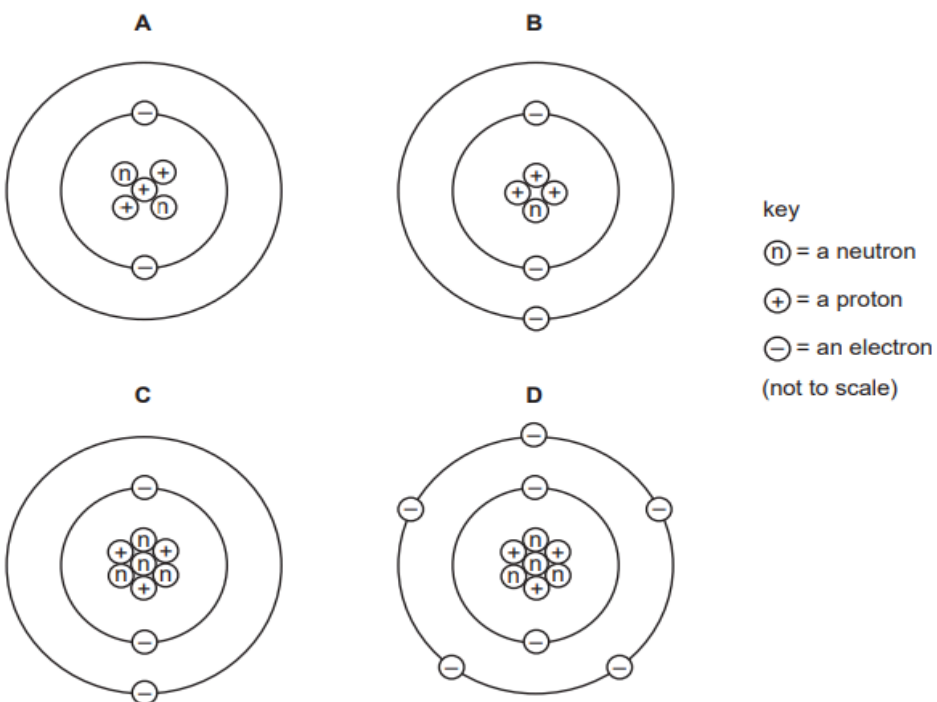


Which components are suitable to use at X?

- A. a circuit breaker, a fuse or a switch
- B. only a circuit breaker or a fuse
- C. only a circuit breaker or a switch
- D. only a fuse

21. An atom of the element lithium has a nucleon number of 7 and a proton number of 3.

Which diagram represents a neutral atom of lithium?



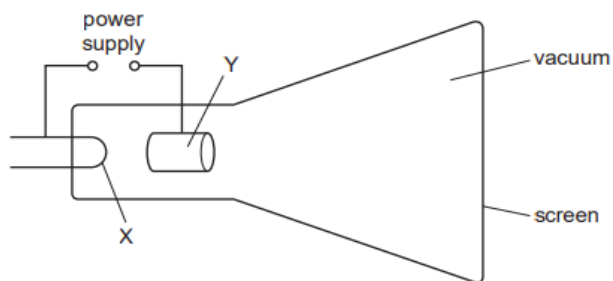
22. A powder contains 400mg of a radioactive material that emits α -particles. The half-life of the material is 5 days. What mass of that material remains after 10 days?

- A. 0 mg
- B. 40mg
- C. 100mg
- D. 200mg

23. Which row shows the relative ionising effects and penetrating abilities of α -particles and β -particles?

	ionising effect	penetrating ability
A	α greater than β	α greater than β
B	α greater than β	α less than β
C	α less than β	α greater than β
D	α less than β	α less than β

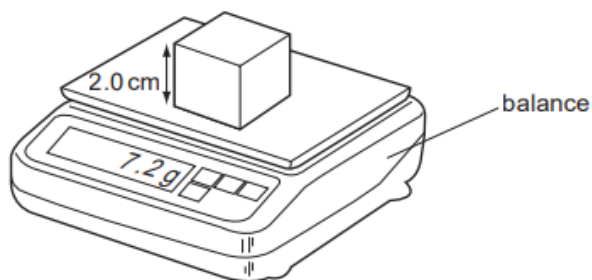
24. The diagram shows a cathode-ray tube.



What are the correct labels for X and Y?

	X	Y
A	negative anode	positive cathode
B	negative cathode	positive anode
C	positive anode	negative cathode
D	positive cathode	negative anode

25. A cube of side 2.0cm is placed on a balance. What is the density of the cube?



- A. $0.90\text{g}/\text{cm}^3$
- B. $1.2\text{g}/\text{cm}^3$
- C. $1.8\text{g}/\text{cm}^3$
- D. $3.6\text{g}/\text{cm}^3$

THEORETICAL PORTION

MARKS: 45

1. i) Write 2 advantages of radioactivity.

[2]

ii) Define the terms alpha-particle and alpha decay.

[2]

iii) State Dalton`s Atomic Theory.

[3]

iv) Write 3 applications of Electromagnetic Induction.

[3]

v) Describe the effects of a magnetic force on a current-carrying conductor.

[2]

2. i) Which is the correct symbol for an AC power supply?

[2]

ii) Define Insulator with examples.

[3]

iii) Define Electric Dipoles, write their formula and draw a diagram. [4]

iv) Draw a diagram to prove the Angle of incidence is equal to the Angle of reflection. [4]

v) It takes 420.5 J to heat 55 grams of iron from 25°C to 40°C. What is the specific heat in Joules/g°C? [2]

3. i) What is the difference between boiling and evaporation? [2]

ii) When a body falls freely under gravity, the work done by gravity is positive or negative? [2]

iii) Name types of Potential Energy. [2]

iv) What quantity is a measure of the turning effect of a force? [3]

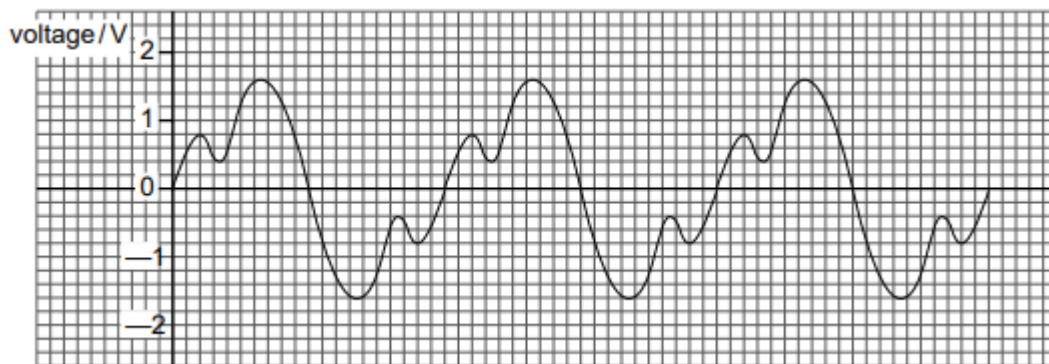
v) Explain what happens to the ultrasound wave when it reaches the kidney. [2]

3. i) The potential difference of the battery is 1.2 V. Each time Ben uses the shaver, 180 C of charge flows. Calculate the energy transferred each time he uses the shaver. [3]

ii) Explain the difference between vectors and scalars as it applies to velocity and speed. [3]

PRACTICAL PORTION**MARKS: 30**

1. Fig shows the screen of a CRO (cathode-ray oscilloscope). The CRO is being used to display the output from a microphone. The vertical scale on the screen is in volts.

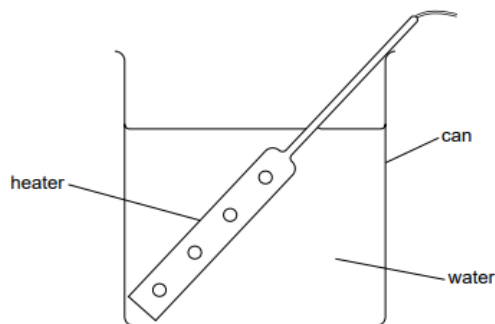


(i) Describe the output from the microphone. [2]

(ii) Use the graph to determine the peak voltage of the output. [2]

(iii) Describe how you could check that the voltage calibration on the screen is correct. [2]

2. Fig shows water being heated by an electrical heater. The water in the can is not boiling, but some is evaporating.



(a) Describe, in terms of the movement and energies of the water molecules, how evaporation takes place. [3]

(b) State two differences between evaporation and boiling. [4]

(c) After the water has reached its boiling point, the mass of water in the can is reduced by 3.2 g in 120s. The heater supplies energy to the water at a rate of 60 W. Use this information to calculate the specific latent heat of the vaporisation of water. [3]

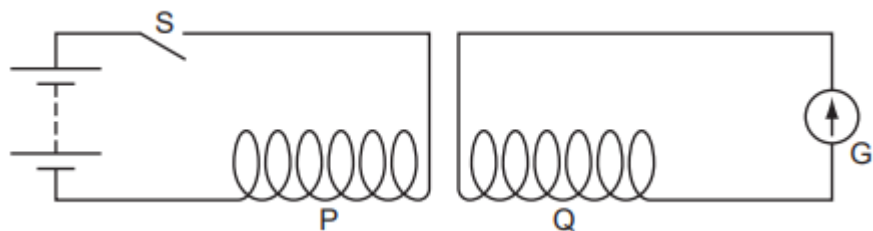
3. (a) A student places a book in front of a plane mirror. State three characteristics of the image of the book formed by the plane mirror. [3]

(b) Visible light is one region of the electromagnetic spectrum. Another region is ultraviolet radiation.

(i) Give two uses of ultraviolet radiation. [2]

(ii) Give two possible harmful effects of excessive exposure to ultraviolet radiation. [2]

4. a) Fig shows two coils of wire P and Q, each in a circuit. The ends of the coils are close but not touching.



Now, switch S is closed. The pointer in the sensitive ammeter G deflects and then returns to its zero position. Explain why the pointer in sensitive ammeter G deflects. [4]

(b) Describe the construction of a step-up transformer. You may draw a labelled diagram as part of your answer. [3]
