

COUNCIL OF ZAMBIA

**Joint Examination for the School Certificate
and General Certificate of Education Ordinary Level**

SCIENCE

5124/1

(CHEMISTRY, PHYSICS)

PAPER 1 Multiple Choice

Thursday

28 OCTOBER 2010

1 hour

Additional materials:

Mathematical tables (No calculators)

Multiple Choice answer sheet

Soft clean eraser

Soft pencil (types B or HB is recommended)

INSTRUCTIONS TO CANDIDATES

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Do not open this booklet until you are told to do so.

Write your name, centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in 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 separate answer sheet.

Read very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

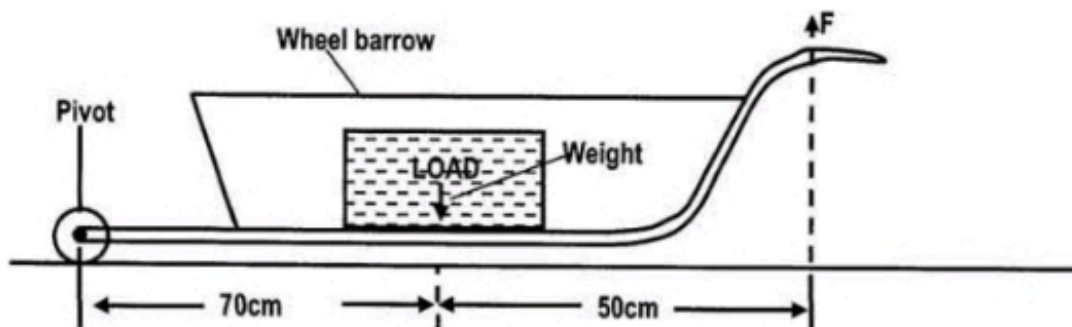
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is on page 10.

Cell phones are not allowed in the Examination Room.

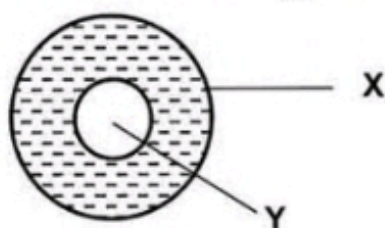
- 1 A plumber needs to measure the internal diameter of a water pipe as accurately as possible. The instrument that should be used is the ...
 - A vernier calipers
 - B engineer's calipers
 - C measuring tape
 - D metre rule
- 2 Starting from rest at $t=0$, an object moves in a straight line with a constant acceleration of 2cm/s^2 . At what time is the speed of the object 20 m/s ?
 - A 0s
 - B 1s
 - C 2s
 - D 5s
- 3 Which property of a body cannot be changed if a force is applied to it?
 - A velocity
 - B volume
 - C shape
 - D mass
- 4 Give the name of the force which gives a mass of 1kg an acceleration of 1m/s^2 .
 - A Weight
 - B Friction
 - C Newton
 - D Centripetal force
- 5 A load is to be moved using a wheelbarrow. The total mass of the load and wheelbarrow is 60kg . The gravitational field strength is 10N/kg ...



What is the size of force F needed just to lift the loaded wheel barrow?

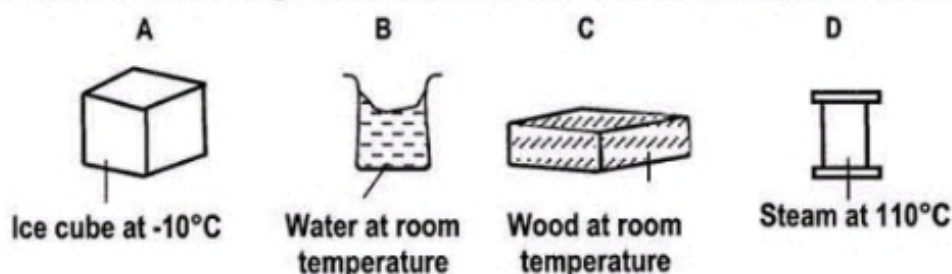
- A 350N
- B 430N
- C 600N
- D 840N

- 6 The diagram below shows a copper disc **X** with a circular hole **Y**.

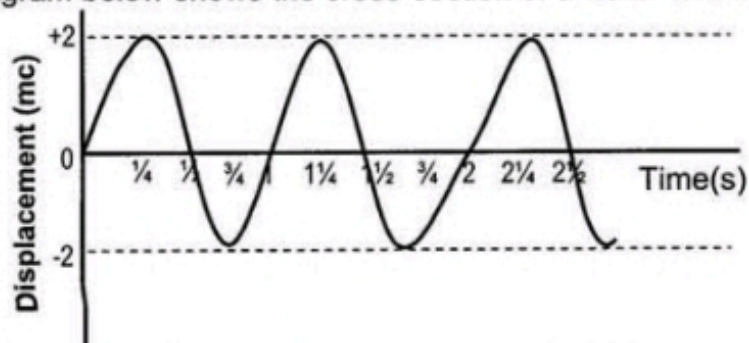


When the disc is heated ...

- A the area of **x** increases and the area of **y** decreases
 B the area of **x** decreases and the area of **y** increases
 C **x** and **y** have the same area as before
 D the area of **x** increases and the area of **y** stays the same
- 7 Which of the following contains the molecules with the highest average speed?



- 8 The diagram below shows the cross-section of a water wave.



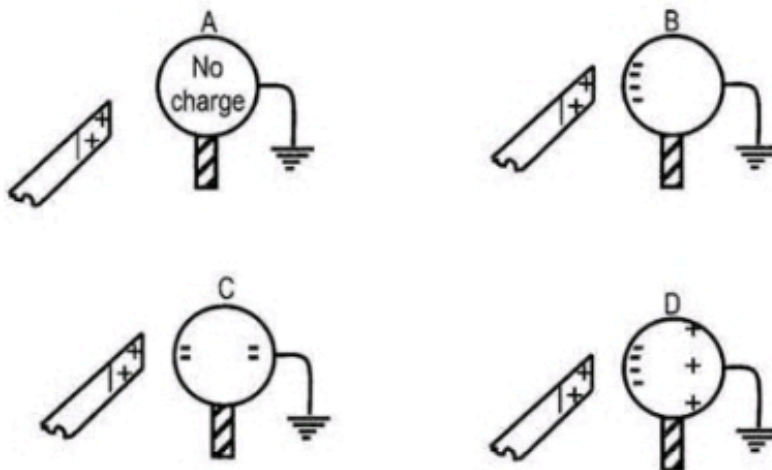
The values that correctly represent the period and frequency of this wave are shown ...

	Period (s)	Frequency (HZ)
A	0	1
B	1	1
C	1	2
D	2	1

- 9 A typist uses new carbon-paper under her top typing paper for making a copy of a letter. When she holds the carbon-paper close to a plane mirror, she can read the letter. This is because the mirror ...

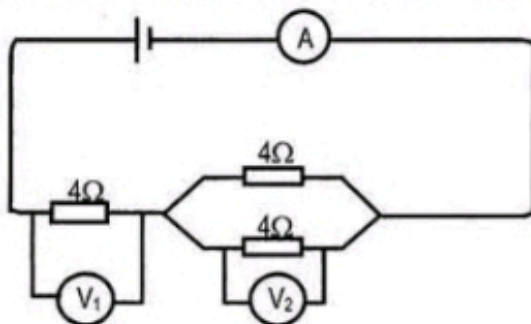
- A produces a laterally inverted image
 B forms an image the same size as the object
 C forms a virtual image
 D forms an image the same distance

- 10 Echo-sounding equipment on a ship receives sound pulses reflected from the sea bed 0.03 seconds after they were sent out. If the speed of sound in sea water is 1500m/s, what is the depth of water under the ship?
- A 22.5m
B 45.0m
C 25 000m
D 50 000m
- 11 Which of the following units is the same as a coulomb?
- A V/A
B As
C ws
D V/ Ω
- 12 A metal ball is charged by induction. To do this, a positively charged rod is held close to one side of the ball and the other side is earthed.
- The diagram that shows the charge distribution at this stage of the experiment is ...



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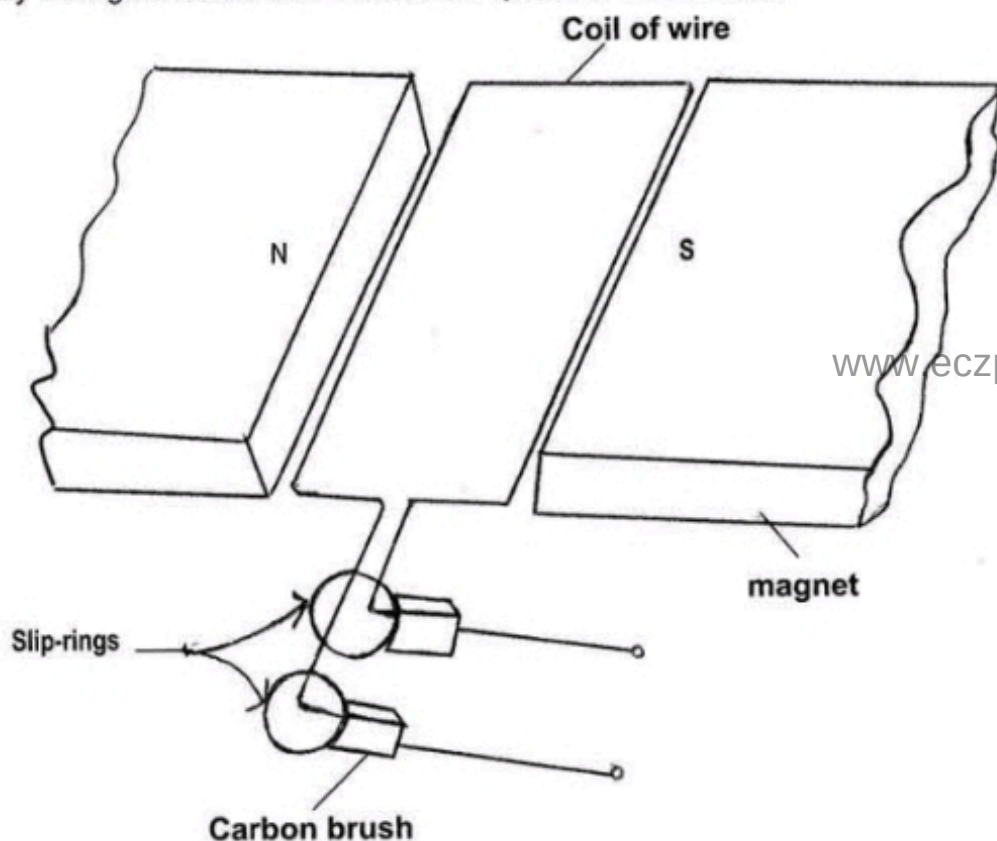
- 13 In the circuit shown the reading on the ammeter is 1A.



What readings are shown by the voltmeters V_1 and V_2 ?

	V_1	V_2
A	2V	2V
B	4V	2V
C	2V	4V
D	4V	4V

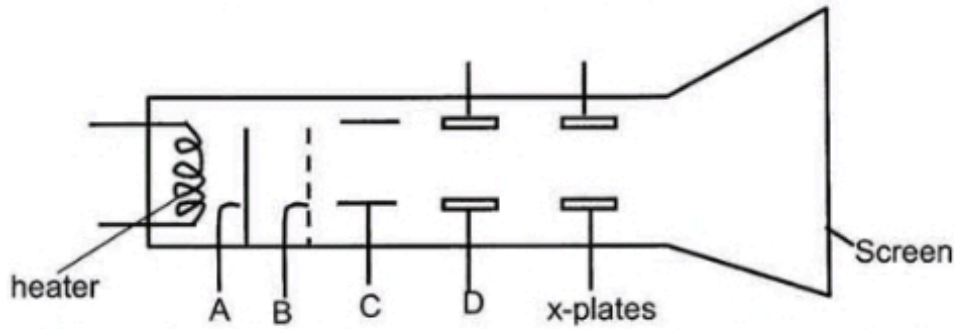
- 14 Which of the following equations cannot be used to determine electrical energy?
- A $E = VQ$
 - B $E = VIt$
 - C $E = I^2Rt$
 - D $E = \frac{V^2t}{I}$
- 15 An electrical appliance is rated 250v, 500w. Find the cost of using this appliance for 120 minutes if electrical energy costs K100 per unit.
- A K100
 - B K200
 - C K800
 - D K1200
- 16 Study the figure below and answer the question that follows.



The figure ...

- A represents a direct current generator
 - B requires current for the coil to rotate
 - C produces current by electromagnetic induction
 - D uses a commutator to produce an alternating current
- 17 An ideal transformer (one which is 100% efficient) ...
- A changes a.c. to d.c.
 - B does not lose any energy.
 - C has same number of turns in primary and secondary.
 - D has more power in secondary than in primary.

18 The figure below represents a Cathode Ray Oscilloscope.



Which of the parts labeled A, B, C or D accelerates the electrons towards the screen?

- 19 The fact that it is a matter of pure chance whether or not a particular radioactive nucleus will decay during a certain period of time implies that radioactive decay is ...
- A a time consuming process.
 - B a rotten process.
 - C a random process.
 - D a regular process.

20



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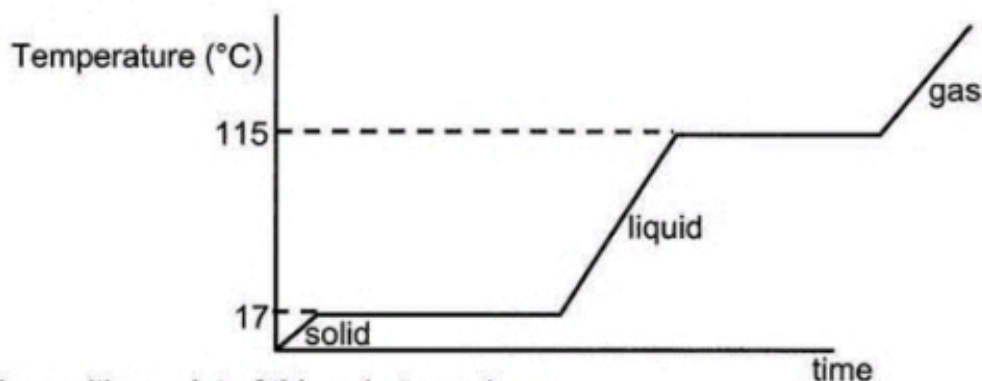
The symbol above is used to warn of the presence of ...

- A gamma rays.
 - B radioactive material.
 - C cancer cells.
 - D radiation burns.
- 21 Diffusion occurs more quickly in a gas than in a liquid because ...
- A molecules in a gas have more frequent collisions than those in a liquid.
 - B gas molecules are larger.
 - C gas molecules move randomly.
 - D on average molecules in a gas are further apart than those in a liquid.
- 22 Air is used to inflate tyres because ...
- A it is readily compressed.
 - B its molecules move randomly.
 - C it serves as a coolant.
 - D it gets into the tyres faster than other substances.

23 If two liquids are miscible, they must be separated by ...

- A a separating funnel.
- B filtration.
- C crystallisation.
- D fractional distillation.

24 The graph below is a heating curve for a pure substance. It shows how the temperature rises with time, when the solid is heated until it melts, and then the liquid is heated until it boils.



The melting point of this substance is ...

- A 0°C
- B 17°C
- C 100°C
- D 115°C

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25 The table below shows the structure of several particles.

Particle	Electrons	Protons	Neutrons
A	12	12	12
B	12	12	14
C	10	12	12
D	10	8	8

Which particle is a negative ion?

26 When two atoms share electrons, they form ...

- A an ionic compound
- B a molecule
- C a lattice
- D an allotrope

27 Calcium nitrate has the ions Ca^{2+} and NO_3^- . The formula of the compound is ...

- A CaNO_3
- B $\text{Ca}(\text{NO}_3)_2$
- C $\text{Ca}(\text{NO}_2)_3$
- D CaNO_6

28 What is the formula mass of magnesium nitrate, $\text{Mg}(\text{NO}_3)_2$?

- A 54
- B 74
- C 148
- D 296

29 How many moles of oxygen molecules are there in 64 grams of oxygen, O_2 ?

- A 2 moles
- B 4 moles
- C 8 moles
- D 16 moles

30 Hydrogen burns in oxygen to form water. The equation for the reaction is:
 $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2\text{H}_2\text{O}(\text{g})$

How much oxygen is needed to burn 1 gram of hydrogen?

- A 2g
- B 4g
- C 5g
- D 8g

31 Water at 25°C was used to dissolve two compounds. Immediately after the compounds had dissolved, the temperature of each solution was measured.

Compound	Temperature ($^\circ\text{C}$)	
	Water	Solution
NH_4Cl	25	15
CaCl_2	25	45

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Which of the following is true about the compounds?

- A The temperature change for NH_4Cl is $+10^\circ\text{C}$
- B The temperature change for CaCl_2 is $+20^\circ\text{C}$
- C CaCl_2 dissolves endothermically
- D NH_4Cl dissolves exothermically

32 Reaction that is reversible, is shown by using the symbol ...

- A =
- B $\approx$
- C $\rightleftharpoons$
- D $\longleftrightarrow$

33 The lower the pH number of a substance ...

- A the more OH^- ions it contains.
- B the fewer H^+ ions there are.
- C the more H^+ ions there are.

- D the less acidic it is.
- 34 Which of the following does not produce a salt when it reacts with an acid?
- A Metal oxide
 - B Ammonia solution
 - C Metal hydrogen carbonate
 - D Pure water
- 35 Which of the following is **not** reactive?
- A Phosphorus
 - B Sulphur
 - C Chlorine
 - D Argon
- 36 No two metals can have exactly the same ...
- A volume.
 - B mass.
 - C properties.
 - D temperature.
- 37 During the Haber process, the unreacted nitrogen and hydrogen are ...
- A scrubbed again.
 - B compressed further.
 - C pumped back to the catalyst.
 - D run into tanks to be stored as a liquid.
- 38 Which of the following is a neutral oxide?
- A Nitrogen dioxide
 - B Magnesium oxide
 - C Carbon dioxide
 - D Carbon monoxide
- 39 Which of the following alkanes has the highest boiling point?
- A CH_4
 - B C_2H_6
 - C C_3H_8
 - D C_4H_{10}
- 40 Plastics which get soft only once-the first time they are heated are called ...
- A thermoplastics.
 - B thermosets.
 - C isomers.
 - D monomers.

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DATA SHEET

The Periodic Table of the Elements

Group																																			
I	II															III	IV	V	VI	VII	0														
1 H Hydrogen																		2 He Helium																	
3 Li Lithium	4 Be Beryllium																	5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon												
11 Na Sodium	12 Mg Magnesium																	13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulphur	17 Cl Chlorine	18 Ar Argon												
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton																		
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon																		
55 Cs Caesium	56 Ba Barium	57 La Lanthanum	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon																		
87 Fr Francium	88 Ra Radium	89 Ac Actinium	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86																		

*58-71 Lanthanoid series
+90-103 Actinoid series

a

X

b

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

140 Ce Cerium	141 Pr Praseodymium	144 Nd Neodymium	150 Sm Samarium	152 Eu Europium	157 Gd Gadolinium	159 Tb Terbium	162 Dy Dysprosium	165 Ho Holmium	167 Er Erbium	169 Tm Thulium	173 Yb Ytterbium	175 Lu Lutetium	
232 Th Thorium	238 Pa Protactinium	238 U Uranium	238 Np Neptunium	238 Pu Plutonium	238 Am Americium	238 Cm Curium	238 Bk Berkelium	238 Cf Californium	238 Es Einsteinium	238 Fm Fermium	238 Md Mendelevium	238 No Nobelium	238 Lr Lawrencium

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Key
 $\begin{matrix} a \\ X \\ b \end{matrix}$
 a = relative atomic mass
 X = atomic symbol
 b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).