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

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

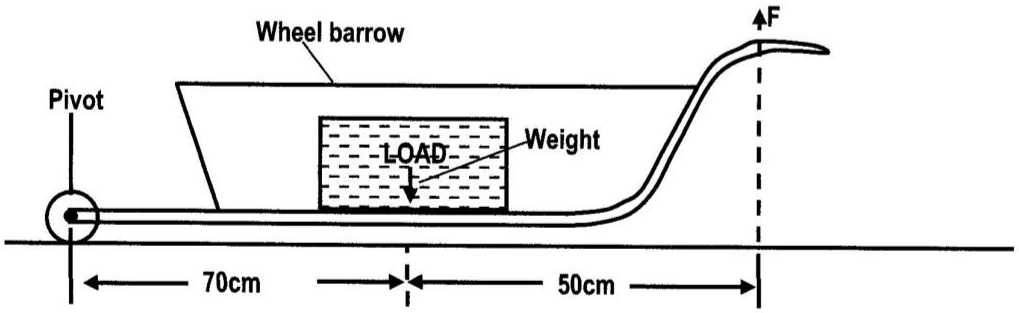
3 Which property of a body cannot be changed if a force is applied to it?

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

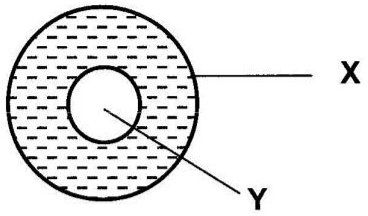
5 A load is to be moved using a wheelbarrow. The total mass of the load and wheelbarrow is 60kg. The gravitational field strength is 10N/kg ...



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 •••

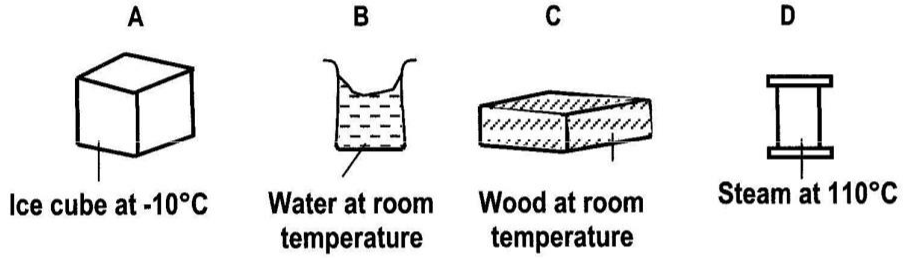
A the area of x increases and the area of y decreases

B the area of x decreases and the area of y increases

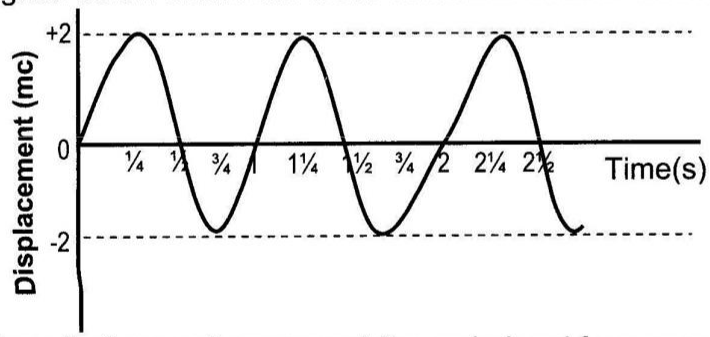
C x and y have the same area as before

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

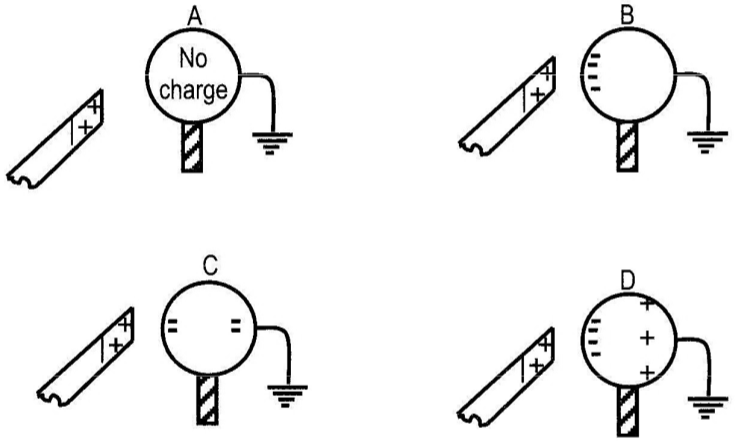
B As

C ws

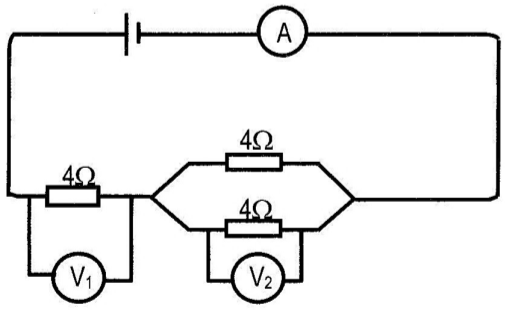
D V/Ω

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 •••



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_3
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.

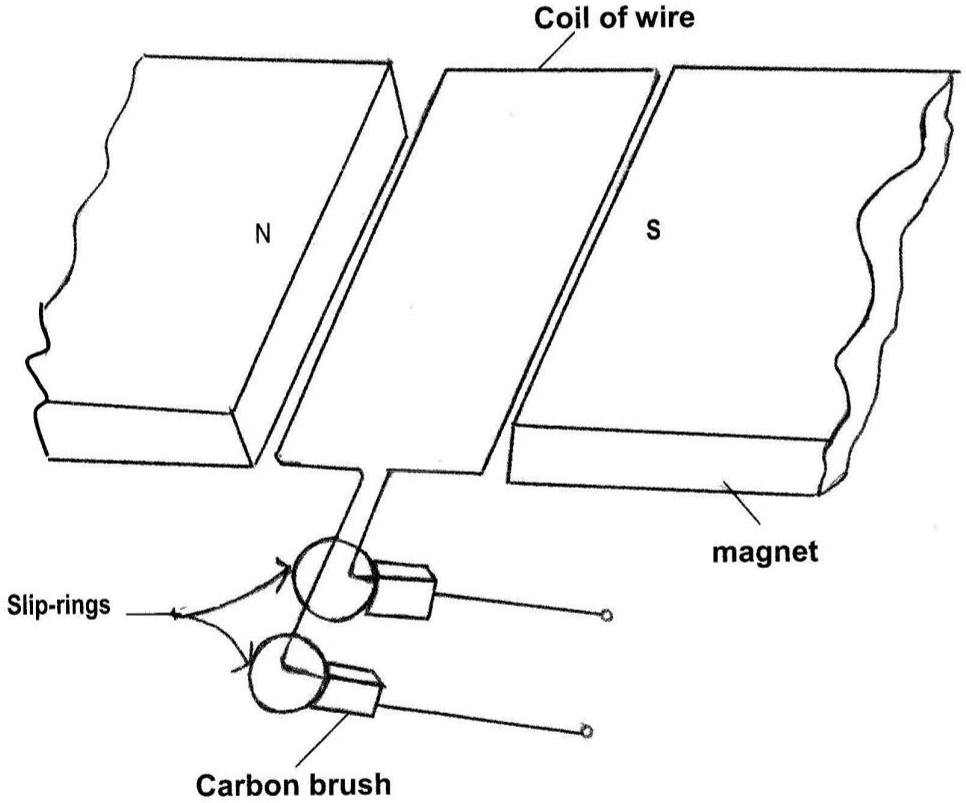
A K100

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) •••

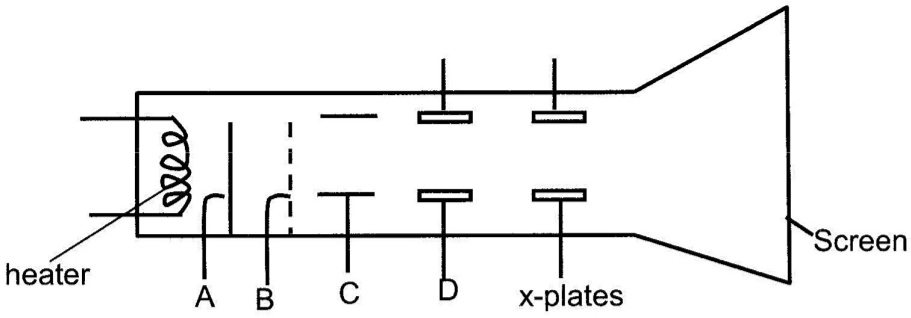
A changes a.c. to d.c.

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.

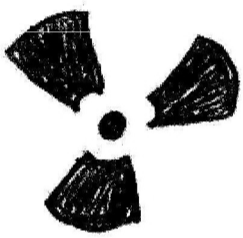


Which of the parts labeled A, B, C or D accelerates the electrons towards the screen?

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



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.

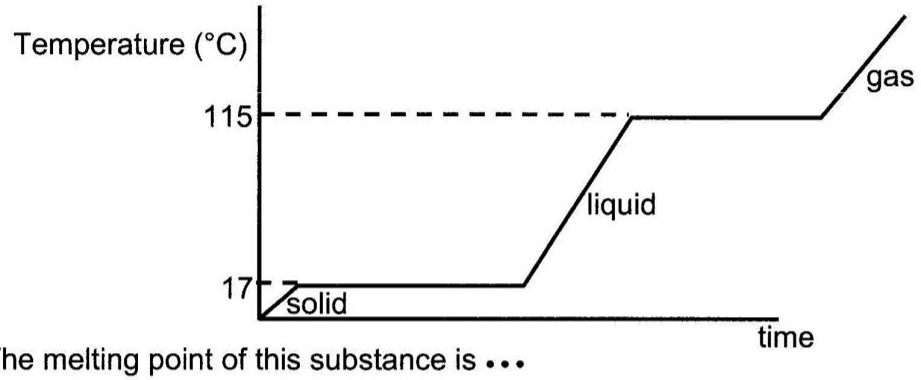
22 Air is used to inflate tyres because •••

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

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 $Ca(NO_3)_2$
C $Ca(NO_2)_3$
D $CaNO_6$

28 What is the formula mass of magnesium nitrate, $Mg(NO_3)_2$?

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:
$2H_2(g) + O_2(g) \longrightarrow 2H_2O(g)$

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 (°C)	
	Water	Solution
$NH_4C\ell$	25	15
$CaC\ell_2$	25	45

Which of the following is true about the compounds?

A *The temperature change for $NH_4C\ell$ is +10°C*
B The temperature change for $CaC\ell_2$ is +20°C
C $CaC\ell_2$ dissolves endothermically
D $NH_4C\ell$ dissolves exothermically

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

A =
B ≃
C ⇌
D ⟷

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 Phosporus
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.

DATA SHEET

The Periodic Table of the Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 0
							1 H Hydrogen 1										4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	104 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mecury 80	204 Tl Thallium 81	207 Pb lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radius 88	227 Ac Actinium 89 +															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

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

Key

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

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).