EXAMINATIONS 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 **29 OCTOBER 2009** **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.

This question paper consists of 12 printed pages.

1 All measurable features or properties of objects are called •••

A SI units.

B measurements.

C physical quantities.

D images.

2 Which of the following numbers has four significant figures?

A 0.0002

B 0.0020

C 0.0200

D 0.2000

3 A motorist travels 320km at 80km/h and then 320km at 100km/h. What is the average speed of the motorist for the entire trip?

A 84km/h

B 89km/h

C 90km/h

D 91km/h

4 A stone of mass 400g is lowered into a measuring cylinder containing water. The water level rises from $300cm^3$ to $500cm^3$. What is the density of the stone?

A $0.50g/cm^3$

B $0.80g/cm^3$

C $1.33g/cm^3$

D $2.00g/cm^3$

5 A force acts on a mass of 1kg producing an acceleration of $1m/s^2$. This force is called •••

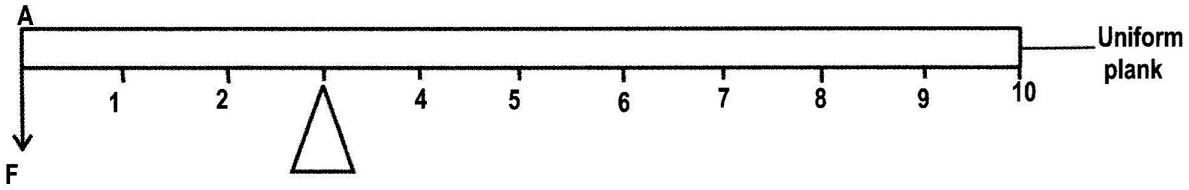
A tension (T)

B Newton (N)

C weight (W)

D friction (F)

6 A uniform plank of length 10cm is in equilibrium as shown in the figure below.



A force of 100N is applied at point A in the direction shown. What is the weight of the plank?

A 50N

B 100N

C 150N

D 200N

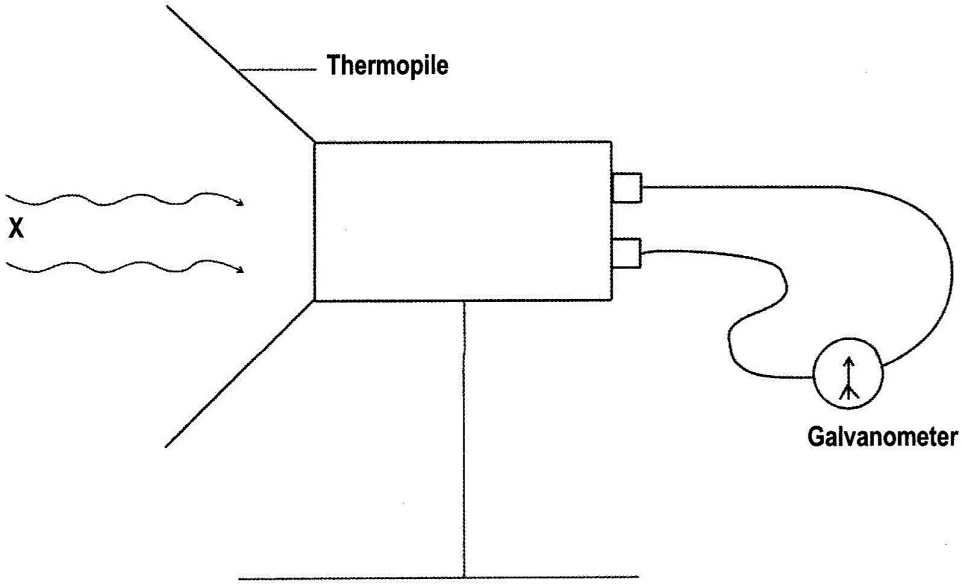
7 A ball of mass 5kg moves vertically upwards from ground level till it reaches a maximum height of 4m. What is its Kinetic energy when it is half way up? Assume $g = 10m/s^2$.

A 5J
B 50J
C 100J
D 200J

8 The Kelvin temperature of a liquid is 300K. Its temperature in ^{o}C is •••

A 27
B 57
C 100
D 273

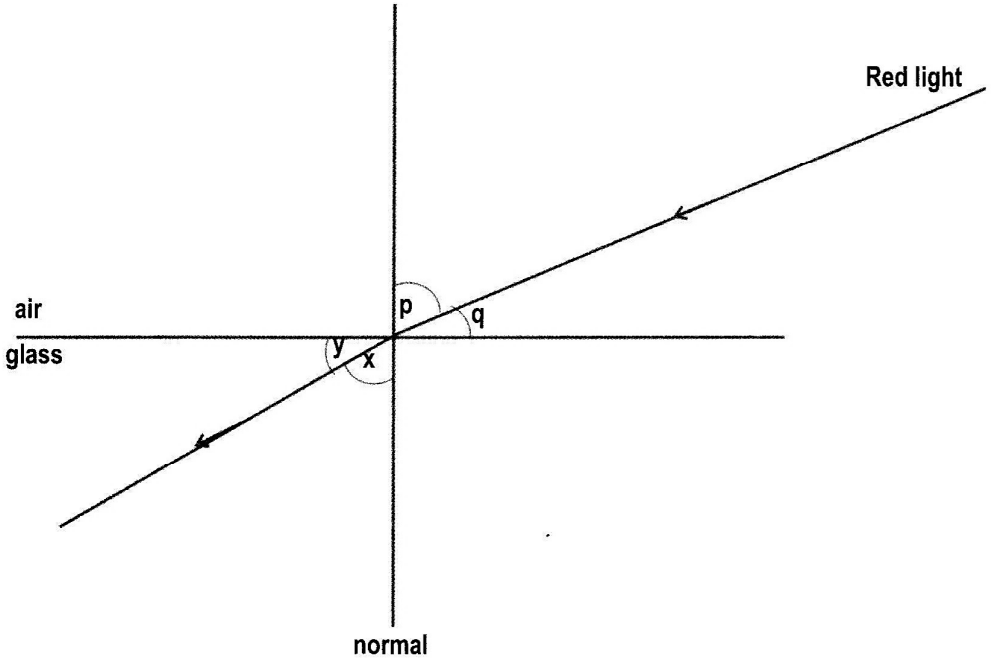
9 An experiment is arranged as shown below.



X is a radiation entering the thermopile. If the galvanometer needle shows a deflection,

A X has a shorter wavelength than X-rays.
B X has a longer wavelength than X-rays.
C X has a lower frequency than Radio waves.
D X has the same frequency as light.

10 The diagram shows a ray of red light passing from air into glass.



Which ratio gives the refractive index for red light?

A $\frac{\sin p}{\sin x}$

B $\frac{\sin p}{\sin y}$

C $\frac{\sin q}{\sin x}$

D $\frac{\sin q}{\sin y}$

11 A loud sound is made in front of a tall building. An echo is heard 4 seconds after the sound is produced. If the speed of sound in air is 320m/s, how far away is the building?

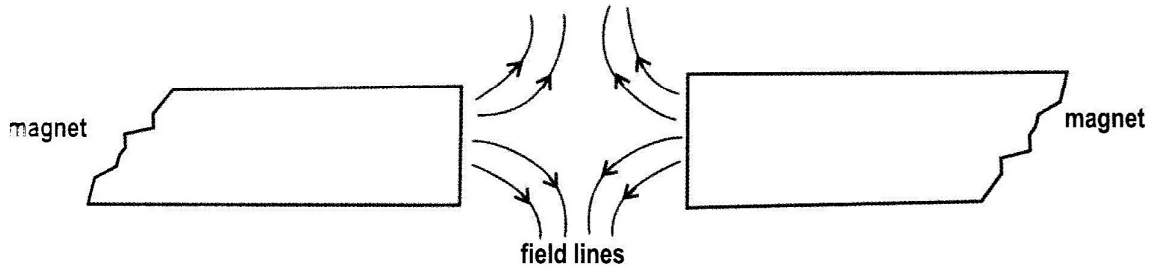
A 80m

B 160m

C 640m

D 1280m

12 The figure below shows the magnetic field lines on two pieces of permanent magnets.



The field pattern is produced by • • •

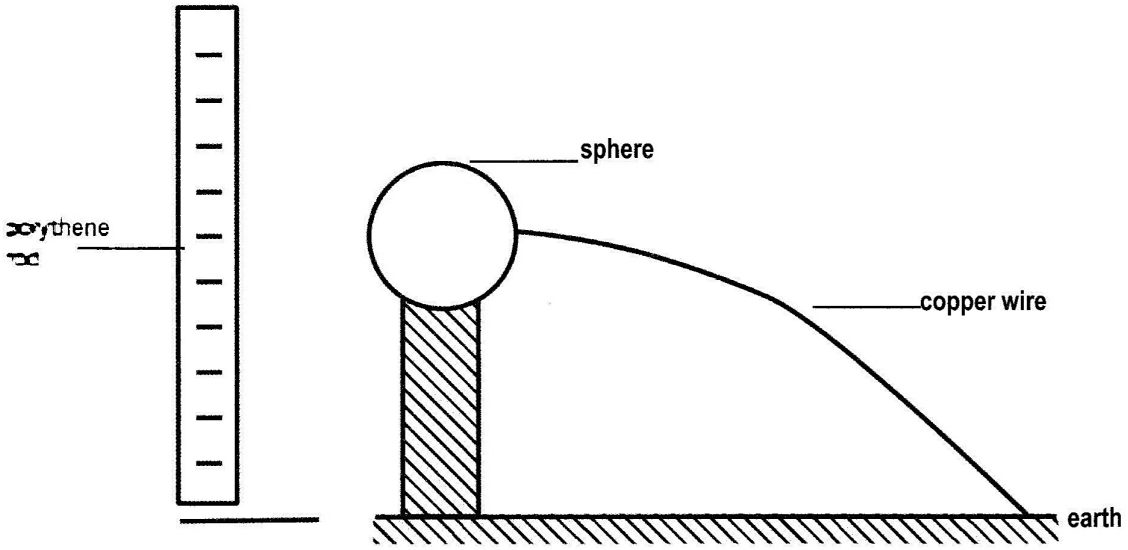
A two north poles

B two south poles

C a north pole and a south pole

D a south pole and an unmagnetized iron bar.

13 The figure below shows a negatively charged polythene rod getting closer to a metal sphere which is on an insulator. A copper wire connects the sphere to the Earth.



Which of the following is true?

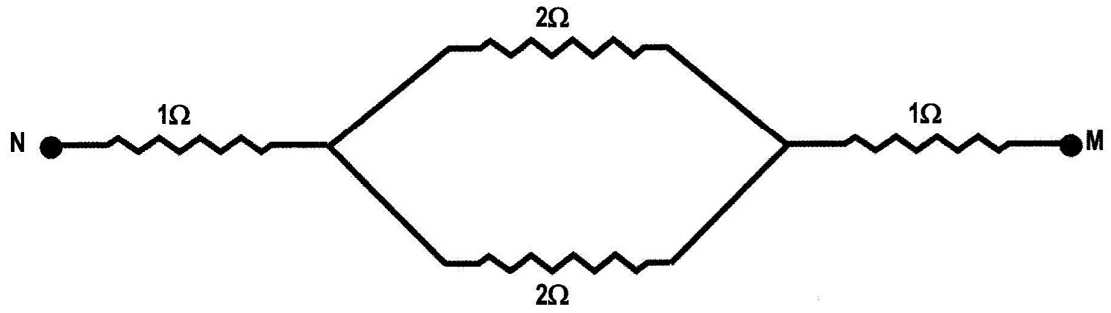
A Current flows from the Earth to the sphere

B Current flows from the sphere to the Earth

C The sphere is negatively charged

D The Earth is at a positive potential

14 The figure below shows part of a circuit in which current is flowing.



If the p.d between **N** and **M** is 3V, the current is •••

A 1A

B 3A

C 6A

D 12A

15 A heater used on a 250V mains circuit has a 5A fuse in its plug. Which is the highest power rating for this heater?

A 50W

B 1000W

C 1250W

D 2000W

16 Induced current is such that it opposes the change which is causing it. This is •••

A Ohm's law

B Snell's law

C Faraday's law

D Lenz's law

17 Which of the following may not help to minimize the energy losses in a transformer?

A Using thicker copper wire

B Using thinner copper wire

C Using a laminated iron ore

D Ensuring an efficient core design

18 Which of the following is **not** a correct statement about cathode rays?

A They have a positive charge

B They travel in straight lines

C They are streams of electrons

D They are deflected by magnetic and electric fields

19 The radium nucleus, $^{226}_{86}Ra$ decays to Radon (Rn) as shown below

$$^{226}_{88}Ra \longrightarrow X + ^{222}_{86}Rn$$

X is •••

A an X-ray
B a gamma-ray
C a Beta particle
D an alpha particle

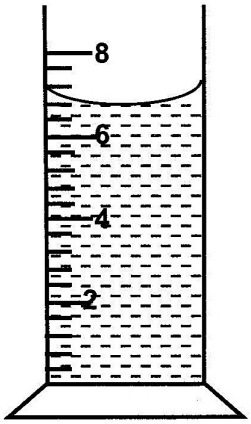
20 Compared to the charge and mass of a proton, an electron has •••

A the same charge and a smaller mass
B the same charge and the same mass
C an opposite charge and a smaller mass
D an opposite charge and the same mass

21 Which state(s) of matter exist(s) at the freezing point of a substance?

A Solid only
B Solid and liquid
C Liquid only
D Liquid and gas

22 A measuring cylinder below is used to measure the volume of a liquid.
What is the volume of the liquid contained in the cylinder?



A 6.3cm^3
B 6.4cm^3
C 6.6cm^3
D 7.2cm^3

23 The best and suitable method of collecting pure water from a solution of ink is ...

A chromatography.

B distillation

C crystallisation

D filtration

24 Which of the following is true about isotopes?

A Two or more elements belonging to the same Group of the Periodic Table.

B They have the same chemical properties.

C They have the same number of nucleons.

D They have the same physical properties.

25 Which of the following sets contain particles with the same number of electrons?

A Sodium, potassium and lithium ion

B Sodium ion, neon and oxide ion

C Helium, neon and argon

D Magnesium, calcium and beryllium

26 Limestone, $CaCO_3$ decomposes into lime, CaO according to the equation,

$$CaCO_3(s) \longrightarrow CaO(s)+CO_2(g)$$

What mass of limestone would produce 11.2g of lime?

A $\frac{100\times11.2}{56}$ g

B $\frac{100\times56}{11.2}$ g

C $\frac{100\times56}{100}$ g

D $11.2 \times 56 \times 100$g

27 Below is a chemical equation.

$$a\ C_2H_6 + bO_2 \longrightarrow c\ CO_2 + d\ H_2O$$

What are the correct values of ***a***, ***b***, ***c*** and ***d***?

	a	***b***	***c***	***d***
A	2	7	4	6
B	1	7	2	3
C	1	5	4	6
D	2	5	4	6

28 Which of the following is true about an exothermic reaction?

A Temperature of the surrounding decreases

B The enthalpy change, ΔH is positive.

C Bonds formed are relatively stronger than bonds broken.

D Heat is absorbed from the surroundings.

29 Silver oxide and hydrogen peroxide react as follows:

$Ag_2O + H_2O_2(\ell) \longrightarrow 2Ag + H_2O + O_2$

In this reaction hydrogen peroxide acts as ...

A a catalyst

B a base

C a reducing agent

D an oxidizing agent

30 Which of the following salts can be crystallized from an aqueous solution?

A Barium sulphate

B Lead (II) sulphate

C Silver chloride

D Ammonium sulphate

31 Solution R forms a white precipitate with little amount of aqueous ammonia. The precipitate dissolves in excess aqueous ammonia to form a colourless solution. Which cation is present in R?

A Ca^{2+}

B Al^{3+}

C NH_4^+

D Zn^{2+}

32 Thermal stability of a metal nitrate depends on the reactivity of the metal. Which of the following represents the change when potassium nitrate is heated?

A $4KNO_3 \longrightarrow 2K_2O + 4NO_2 + O_2$

B $2KNO_3 \longrightarrow 2KNO_2 + O_2$

C $KNO_3 \longrightarrow$ No change

D $2KNO_3 \longrightarrow K_2O_2 + 2NO + O_2$

33 Which of the following is true about chlorine, bromine and iodine?

A They are good conductors of electricity.

B When in the gas phase, they have no smell.

C They are all coloured.

D They are non poisonous.

34 When hydrogen is fitted into the reactivity series of metals, it comes immediately after ...

A copper

B silver

C lead

D iron

35 Which of the following is used in the manufacturing of margarine?

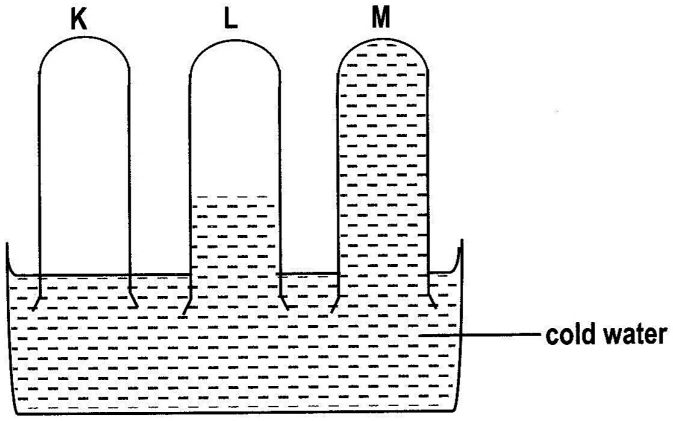
A Oxygen

B Nitrogen

C Propane

D Hydrogen

36 Three similar test tubes containing the gases K, L and M are inserted as shown in the figure below.



The gases **K**, **L**, and **M** could be •••

	K	L	M
A	CO	CO_2	NH_3
B	CO_2	NH_3	CO_2
C	CO_2	CO	NH_3
D	NH_3	CO_2	CO

37 A sample of air of volume $200cm^3$ is enclosed in a tube containing moist iron filings. After the iron has stopped rusting, what volume of air would be remaining?

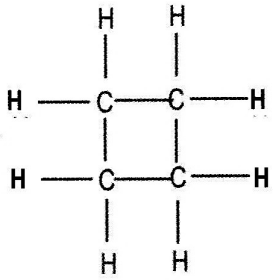
A $40cm^3$

B $200cm^3$

C $160cm^3$

D $200cm^3$

38 Cyclobutane has the structure •••



Which of the following is true about cyclobutane?

A It is alkene

B It is a saturated hydrocarbon

C Its empirical formula is the same as that of all alkanes

D It decolourizes bromine solution rapidly.

What is the reaction product when ethene is treated with steam using phosphoric acid as catalyst at 300°C?

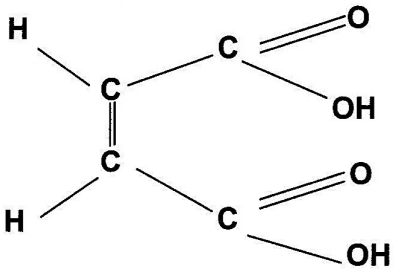
A ethyl phosphate

B ethanol

C ethanoic acid

D ethyl ethanoate

A compound, P, has the molecular structure as shown.



How can **P** be described?

A Both as an alkane and as an acid.

B Both as an alkene and as an acid.

C Both as an alkane and as an alcohol.

D Both as an alkene and as an alcohol.

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 Radium 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.).

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