

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.

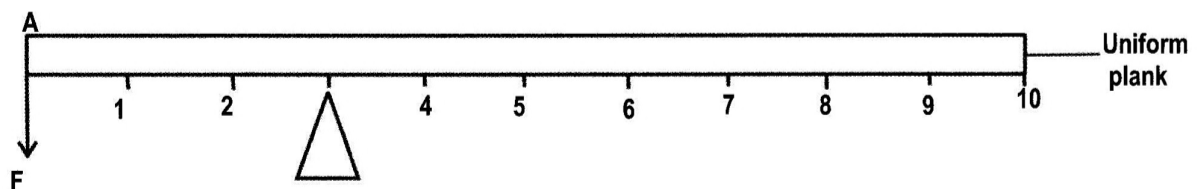
INFORMATION FOR CANDIDATES

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.

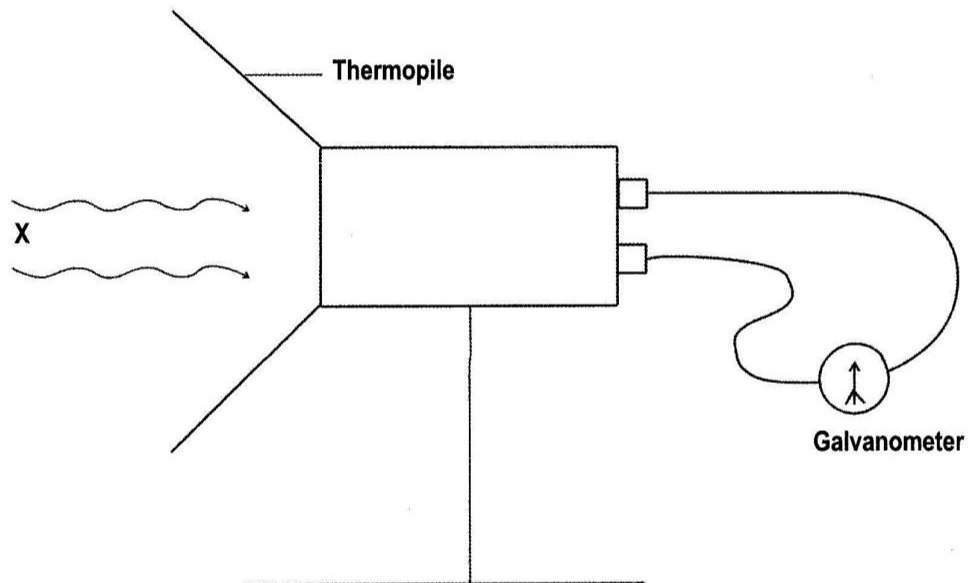
- 1 All measurable features or properties of objects are called ...
- A SI units.
 - B measurements.
 - C physical quantities.
 - D images.
- 2 Which of the following numbers has four significant figures?
- A 0.0002
 - B 0.0020
 - C 0.0200
 - D 0.2000
- 3 A motorist travels 320km at 80km/h and then 320km 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 300cm³ to 500cm³. What is the density of the stone?
- A 0.50g/cm³
 - B 0.80g/cm³
 - C 1.33g/cm³
 - D 2.00g/cm³
- 5 A force acts on a mass of 1kg producing an acceleration of 1m/s². 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

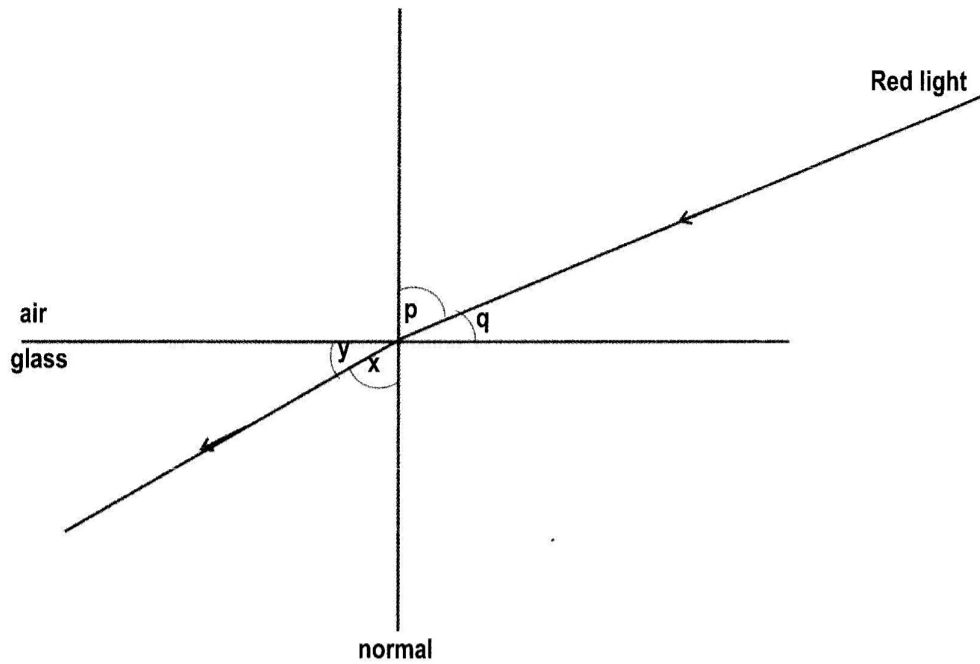
- 7 A ball of mass 5kg moves vertically upwards from ground level till it reaches a maximum height of 4m. What is its Kinetic energy when it is half way up? Assume $g = 10\text{m/s}^2$.
- A 5J
B 50J
C 100J
D 200J
- 8 The Kelvin temperature of a liquid is 300K. Its temperature in $^{\circ}\text{C}$ is ...
- 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?

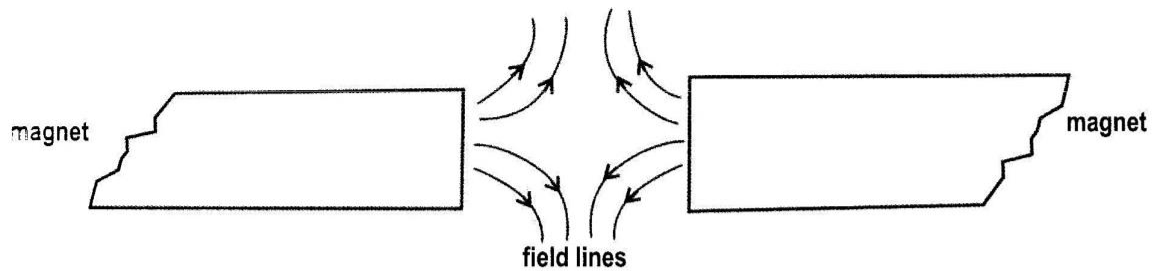
A 80m

B 160m

C 640m

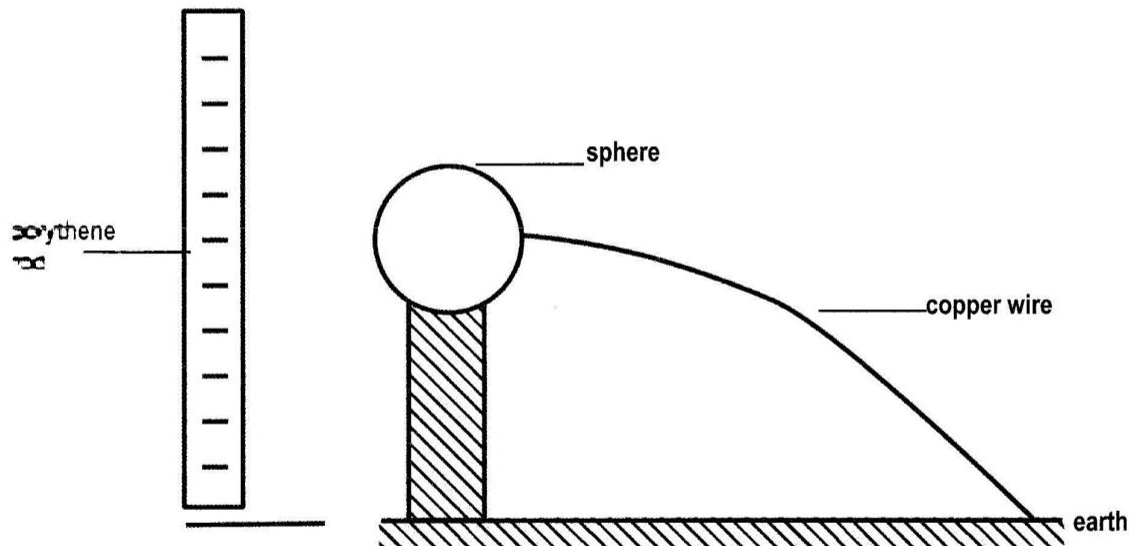
D 1280m

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



The field pattern is produced by ...

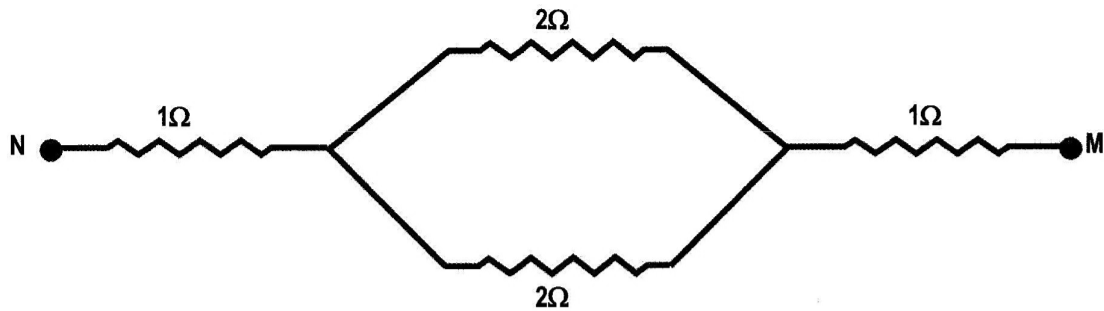
- A two north poles
 - B two south poles
 - C a north pole and a south pole
 - D a south pole and an unmagnetized iron bar.
- 13 The figure below shows a negatively charged polythene rod getting closer to a metal sphere which is on an insulator. A copper wire connects the sphere to the Earth.



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

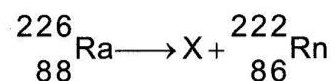
14 The figure below shows part of a circuit in which current is flowing.



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

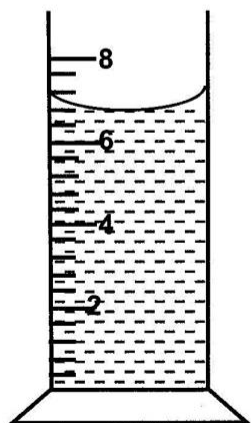
- A 1A
 - B 3A
 - C 6A
 - D 12A
- 15 A heater used on a 250V mains circuit has a 5A fuse in its plug. Which is the highest power rating for this heater?
- A 50W
 - B 1000W
 - C 1250W
 - D 2000W
- 16 Induced current is such that it opposes the change which is causing it. This is ...
- A Ohm's law
 - B 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, $^{226}_{88}\text{Ra}$ decays to Radon (Rn) as shown below



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

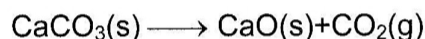
24 Which of the following is true about isotopes?

- 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,



What mass of limestone would produce 11.2g of lime?

- A $\frac{100 \times 11.2}{56} \text{g}$
- B $\frac{100 \times 56}{11.2} \text{g}$
- C $\frac{100 \times 56}{100} \text{g}$
- D $11.2 \times 56 \times 100 \text{g}$

27 Below is a chemical equation.



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.

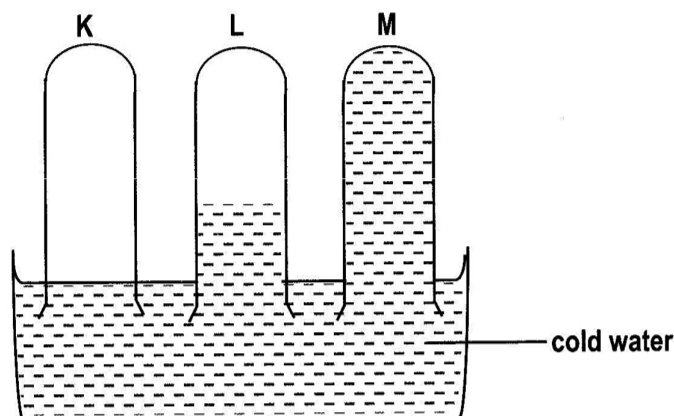
- 29 Silver oxide and hydrogen peroxide react as follows:
$$\text{Ag}_2\text{O} + \text{H}_2\text{O}_2(\ell) \longrightarrow 2\text{Ag} + \text{H}_2\text{O} + \text{O}_2$$

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 $4\text{KNO}_3 \longrightarrow 2\text{K}_2\text{O} + 4\text{NO}_2 + \text{O}_2$
B $2\text{KNO}_3 \longrightarrow 2\text{KNO}_2 + \text{O}_2$
C $\text{KNO}_3 \longrightarrow \text{No change}$
D $2\text{KNO}_3 \longrightarrow \text{K}_2\text{O}_2 + 2\text{NO} + \text{O}_2$
- 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.



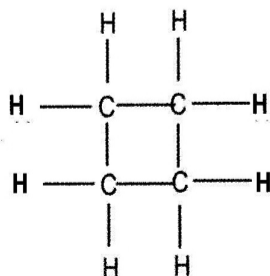
The gases K, L, and M could be ...

	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 200cm³ is enclosed in a tube containing moist iron filings. After the iron has stopped rusting, what volume of air would be remaining?

- A 40cm³
- B 200cm³
- C 160cm³
- D 200cm³

38 Cyclobutane has the structure ...

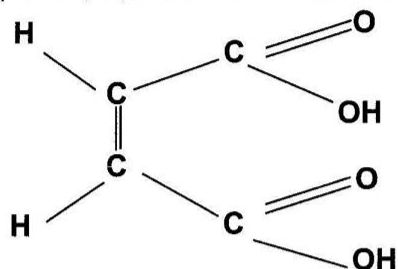


Which of the following is true about cyclobutane?

- 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.

The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
<div><div>1 H Hydrogen 1</div><div>2 He Helium</div></div>																	
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	58 Ce Cerium	59 Pr Praseodymium	60 Nd Neodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu Lutetium	72 Hf Hafnium
87 Fr Francium	88 Ra Radium	89 Ac Actinium	90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr Lawrencium	104 Rf Rutherfordium

*58-71 Lanthanoid series

+90-103 Actinoid series

a = relative atomic mass

x = atomic symbol

b = proton (atomic) number

Key

a

x

b

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