MANGU HIGH SCHOOL
BIOLOGY DEPARTMENT
PREMOCKS

Name.. Adm.No........................./......

Candidates Signature.................. Date ....

231/2
BIOLOGY
Paper 2
2 Hours

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

- Write your **name** and **Adm. number** in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- This paper consists of two sections. Section A and section B.
- Answer ALL questions in section A in the spaces provided. In section B answer question 6 (compulsory) and either question 7 or 8 in the spaces provided after question 8

For Examiners use only.

Section	Question	Maximum Score	Candidates Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL SCORE	80	

This paper consists of 10 Printed pages.
Candidates should check the question paper to ensure that all the
Papers are printed as indicated and no questions are missing

SECTION A: (40 MARKS)

Answer all the questions in this section in the spaces provided

1. The diagram below represents a mature bread mould (Rhizopus)
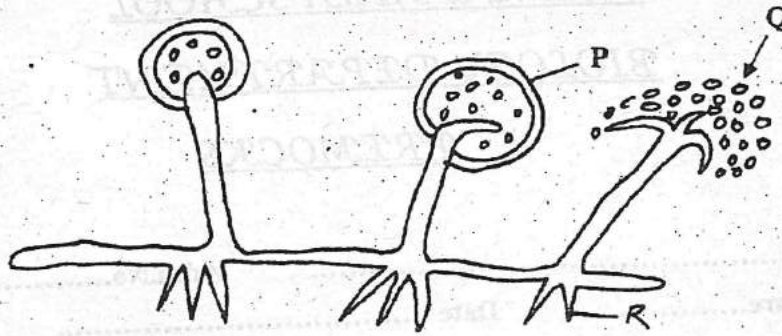
(a) Name the structures P, Q and R   (3mks)

P:...

Q:...

R:...

(b) What is the function of the structure P?   (1mk)

....

....

(c) State **two** economic importances of moulds   (2mks)

....

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(d) (i) Name the kingdom to which bread mould belong   (1mk)

....

....

(ii) List down **one** general characteristic of member of the kingdom named in d (i)
above.   (1mk)

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2. The diagram below represents a longitudinal section through a dicotyledonous root tip.
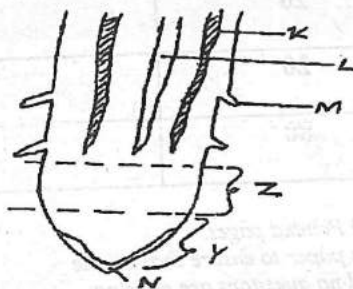
(a) State the function of the part labeled   (1mk)

K...

L..   ....
M..

(b)   State the function of the part labeled N

                                                                                    (1mk)

....
....

(c)   Name the process by which water moves from the soil particles into plant root   (1mk)

....

(d)   How is the structure labeled L different from that of the stem of the plant.   (1mk)

....
....

(e)   Name the zones labeled Y and Z
                                                                                    (2mks)
       Y...
       Z...

3.   Pure breed of red cows and pure breed of white bulls were crossed to give F_1 calves which had a mixture of red and white coat known as roan. The F_1 were selfed.

(a)   Using letter R to represent gene for red colour and W to represent gene for white colour work out the phenotypic ratio of F_2.
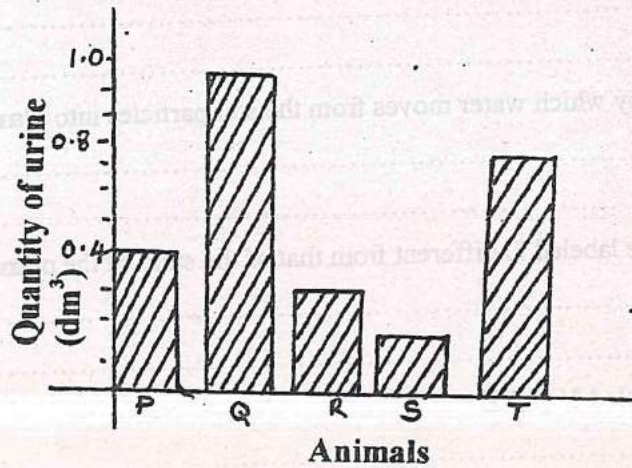   (4mks)

(b)   Work out the genotypic ratio of a cross between F_1 offspring and white bull.   (3mks)

(c)   Comment on the gene(s) controlling the colour of coats in cattle mentioned above.(1mk)

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4.   The quantities of urine passed out per day was established in five animals P, Q, R, S and T of the same species in their natural habitants. The results were as shown below.

(a)   (i)   Which of the five animals was likely to be excreting urine very rich in ammonia.

(1mk)

....

....

(ii)   Give a reason for your answer in (a) (i) above   (1mk)

....

....

(b)   (i)   Which of the animals was likely to be living in a desert environment   (1mk)

....

....

(ii)   Give a reason for your answer in (b) (i) above   (1mk)

....

....

(c)   Explain how ingestion of very salty food may affect the quantity of urine produced.(2mks)

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5. The diagram below represents a section through the mammalian ear. Study it and answer the questions that follow.
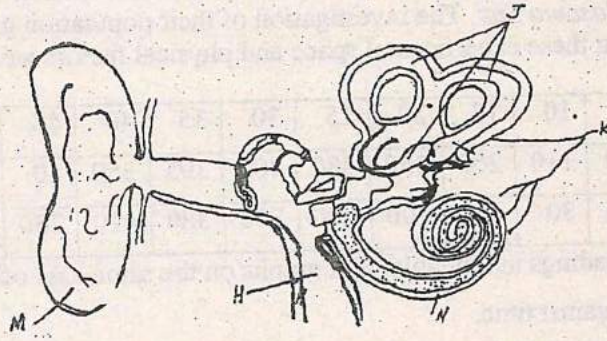
(a) Name the structures labeled H and J

H.. (2mks)

J..

(b) State how the structures labeled H, M and N are adapted to their functions (3mks)

H

....

....

M

....

N

....

....

(c) State what would happen if the structure labeled K was completely damaged (1mk)

....

....

(d) Name the fluid contained in structure N (1mk)

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....

(e) Apart from hearing, state the other role performed by the human ear (1mk)

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Answer question 6 (compulsory) in the spaces provided and either question 7 or 8 in the spaces provided after question 8.

6. The table below shows the population of a housefly *Muscadomistica* which is parasitized by wasps of species *Nasonia Spp*. The investigation of their population growth pattern was carried out for 70 weeks. In these experimental space and physical factors were assumed not to be limiting.

Time in weeks	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70
Muscadomestica	40	70	110	260	350	480	400	395	350	40	60	140	250	240	230
Nasoniaspp	10	20	30	45	100	200	300	380	410	250	60	20	40	200	280

(a) Using the readings in the table, plot graphs on the same axis of population growth of organisms against time.

(8mks)
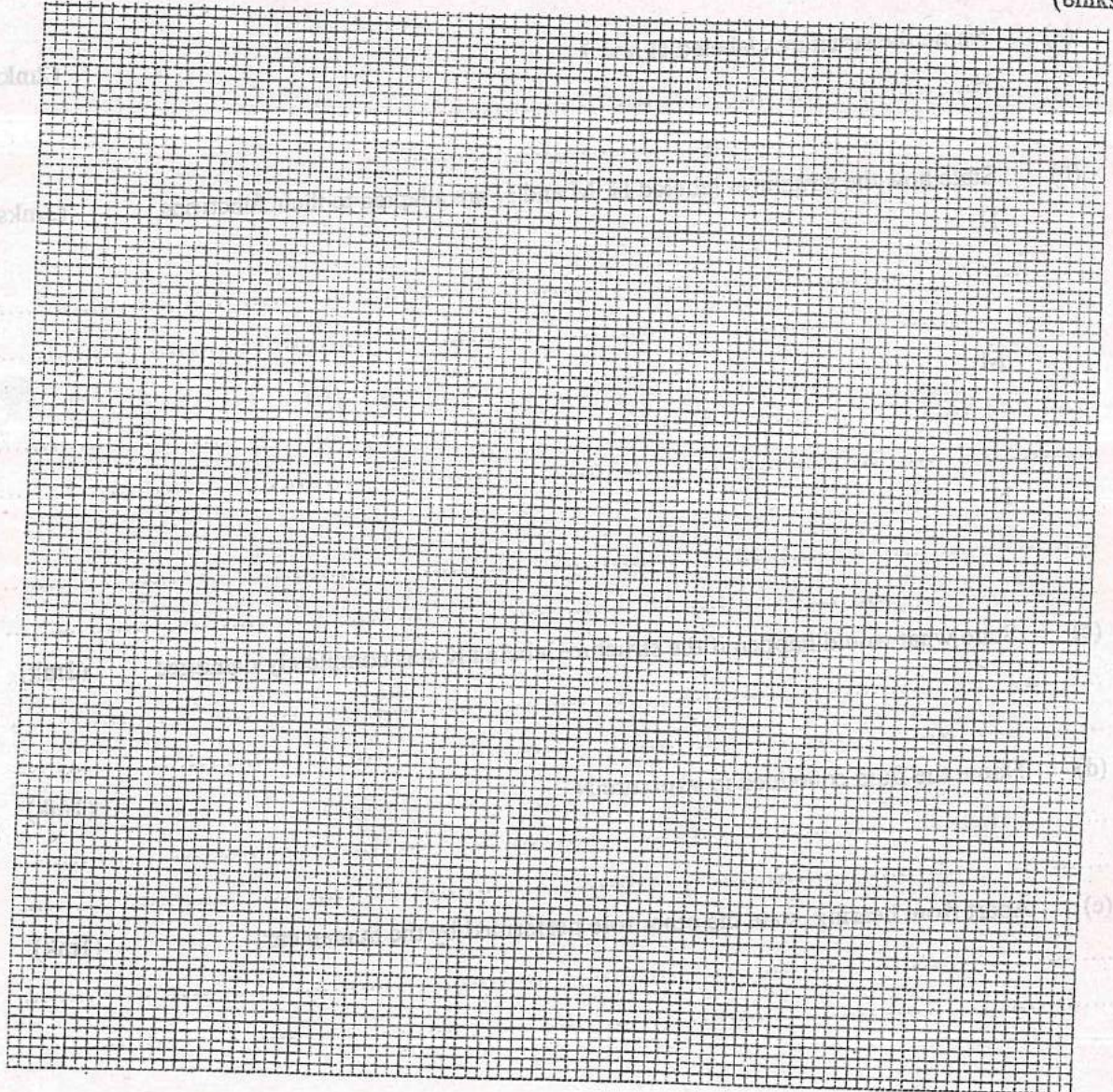
(b) Account for the growth of

(i) *Muscadomestica* between 10th week – 25th week (1mk)

....

....

(ii)   *Nasonia species* between 40th week – 50th week   .   (1mk)

....

....

....

(c)   What is the population of?

(i)   *NasoniaSpp* on the 62nd week   (1mk)

....

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(ii)   *Muscadomestica* on the 4th week   (1mk)

....

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(d)   Bemex, another parasite of housefly was introduced into the ecosystem. Giving a reason
        what will be the effect on the population of

(i)   Housefly *Muscadomestica*   (2mks)

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(ii)   *NasoniaSpp*   (2mks)

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(e)   In estimating the population of *Muscadomestica* in the experiment above, capture-
        recapture method was used. Describe the procedure which was followed.   (4mks)

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7. Describe how the following vertebrae bones are adapted to their function

    i. Thoracic(5mks)

    ii. Lumbar(5mks)

    iii. Cervical(5mks)

    iv. Sacrum (5mks)

8. (a) What is natural selection? (2mks)

    (b) Describe how natural selection brings about adaptation of a species of a living organism to its environment. (18mks)

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MANGU HIGH SCHOOL

Name.. ADM. No. ....

Class..

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
1 ¾ HOURS)

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

➤ Write your name and index number in the spaces provided at the top of this page.
➤ Answer all the questions
➤ You are required to spend the first 15 minutes of the 1 ¾ hours allowed for this paper reading the whole paper carefully before commencing your work
➤ Answer must be written in the space provided in the question paper

1. You are provided with 20% glucose solution about 2.0grams of substance labeled J and solution labeled K place 20cm3 of glucose solution in a boiling tube. To the boiling tube add 2.0g of substance. Tightly fit a rubber stopper carrying a delivery tube to the boiling tube. Place the boiling tube in a water bath maintained at 35^0 to 40^0C. Place the delivery tube into a test tube containing $1.0cm^3$ of solution K. Allow the set up to stand for twenty minutes.

a) Record your observations (2mks)

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....
....
....

b) i) What conclusion would you draw for your observations in (a) above? (2mks)

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c) i) Name the biological process that took place in the boiling tube (2mks)

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....

ii) Explain the process you have named in c(i) (2mks)

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....

d) Suggest the identity of J (1mk)

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....

e) i) Suggest a reason why the temperature range in this experiment was maintained between 35^0 and 40^0 (2mks)

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....
....

ii) With reasons, suggest the expected results if the experiment was performed at (4mks)

0^0C

....

Reason

....

100^0C

....

Reasons

....

2. Examine the seedling below and use them to answer the questions that follow
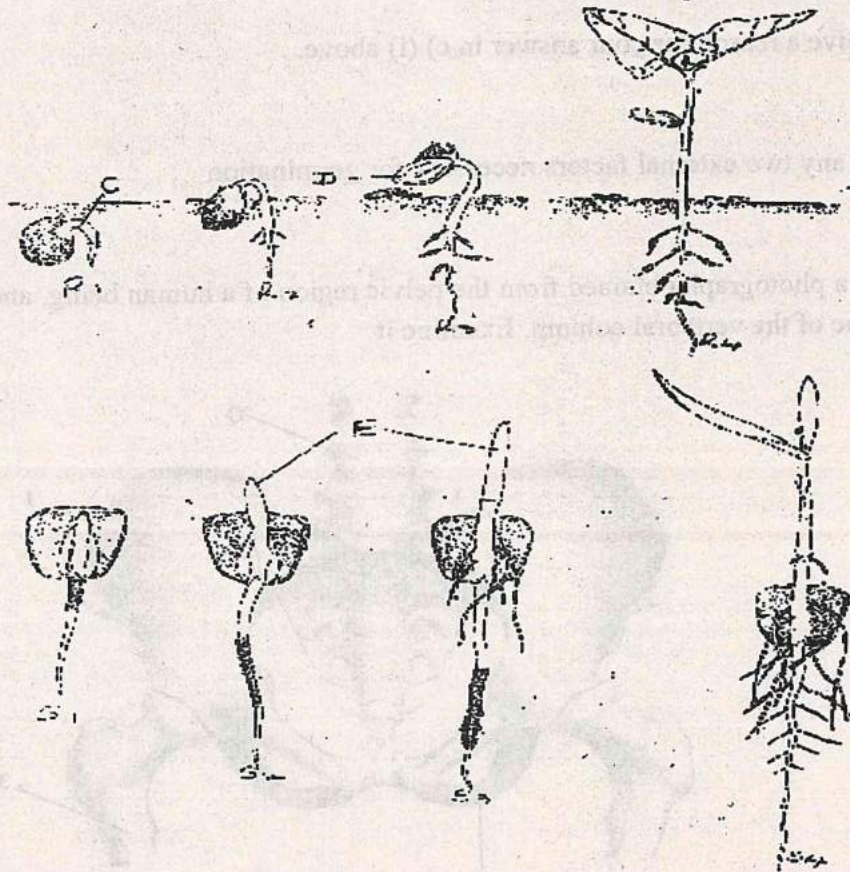
a) Name the parts labeled C, D, E and state their importance for the seedling.

C: .... (1mk)

Importance ....

D: .... (1mk)

Importance ....

E: .... (1mk)

Importance ....

b) The R series of seedlings form swellings on the roots later in its life.

i) What is the name of the swellings (1mk)

ii) Name the organisms that would be found in the swellings (1mk)

iii) Explain the relationship that exists between the named organisms and the plant.

(2mks)

c) i) State the types of germination exhibited by R series of the seedlings (1mk)

ii) Give a reason for your answer in c) (i) above. (1mk)

d) State any two external factors necessary for germination (2mks)

3. Below is a photograph obtained from the pelvic region of a human being, and showing some bone of the vertebral column. Examine it
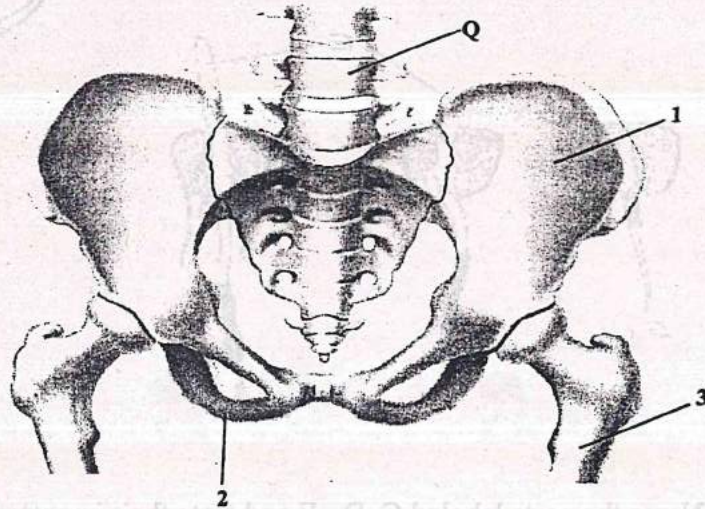
a) Name the bones labeled 1, 2 and 3 on the photograph (3mks)

1: ....

2: ....

3: ....

b) i) Name the type of joint formed at the proximal end bone 3 as it articulates with the adjacent bone (1mk)

....

....

ii) Give an observable feature on bone 3 for your answer in (b) (i) above (1mk)

c) (i) Name the part labeled Q (1mk)

Q: ....

ii) Give TWO functions of the part named in c (i) above (2mks)

....

....

d) Indicate on the above diagram the position of pubis symphysis (1mk)

e) Using observable features only, state how bone I as adapted to its functions (4mks)

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MANGU HIGH SCHOOL

233/1
CHEMISTRY
PAPER1
APRIL
TIME: 2 HOURS
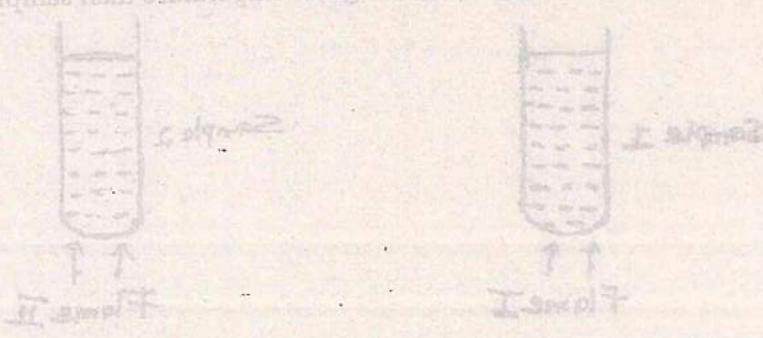
NAME: _____

ADM NO: _____   CLASS: _____

Kenya Certificate of Secondary Education
Pre Mock Examinations
Chemistry
Paper 1
2 Hours

- Answer **ALL** the questions in the spaces provided.

This paper consists of **12 printed pages.**
Make sure that all the pages are printed and that no page is missing.

Turn Over

1. a) A patient was given tablets with prescription 2 x 3 on the envelope. Clearly outline how the patient should take the tablets. (1 mark)

_____

b) Two samples of equal volumes of water were put in 250cm³ beaker and heated for 10 minutes. Sample.1 registered a higher temperature than sample 2.
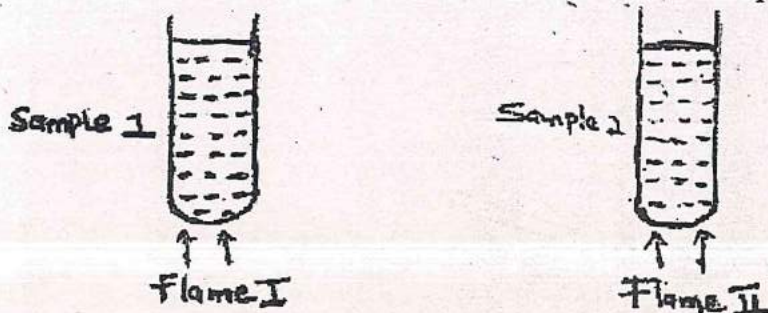
State the conditions under which flame 1 is produced in Bunsen burner. (1 mark)

_____

_____

2. The apparatus below was used to separate a mixture of liquid A and B
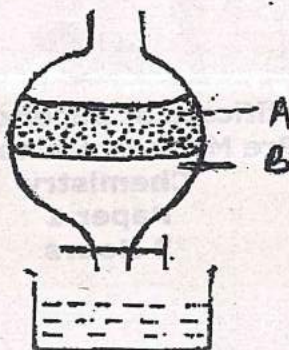
State two properties of the liquids that make it possible to separate them using such apparatus. (2 marks)

_____

_____

_____

3. Describe how solid samples of salts can be obtained from a mixture of lead (II) chloride, sodium chloride and ammonium chloride. (3 marks)

_____

_____

_____

_____

4. An ion of element X is represented as

$$^{24}_{}X^{2+}$$
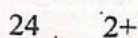
12

i)   Write electronic configuration of ion of x   (1 mark)

_____

ii)   To which group does element x belong?   (1 mark)

_____

5. The set-up below can be used to study the reaction of magnesium and steam.
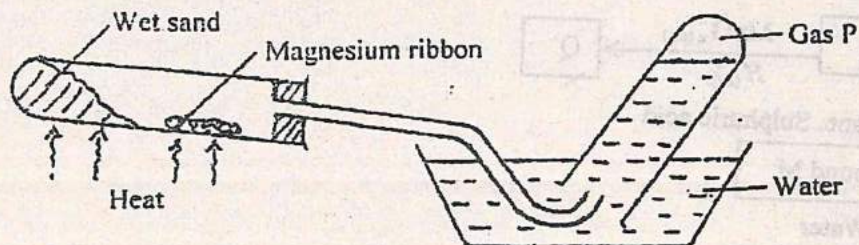
a) Name gas P.   (1 mark)

_____

b) How would you expect copper to behave compared to magnesium in the combustion tube?   (1 mark)

_____

c) Write the equation for the reaction between magnesium and steam   (1 mark)

_____

6. An approximately x molar solution of potassium manganite (VII) solution was standardized against precisely 0.1M iron (II) ammonium sulphate [$(NH_4)_3$ $Fe(SO_4)_2.6H_2O$] solution. 25.0cm3 of the solution of the iron (II) salt were oxidized by 24.15cm3 of the manganite (VII) solution. The equation of the reaction is:

$$MnO_{4(aq)}^{-} + 5Fe_{(aq)}^{2+} + 8H_{(aq)}^{+} \longrightarrow Mn_{(aq)}^{2+} + 5Fe_{(aq)}^{3+} + 4H_2O_{(l)}$$
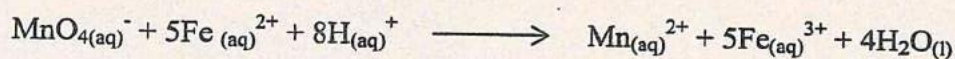
What is the molarity of the potassium manganite (III) solution?   (3 marks)

_____

_____

_____

_____

7. During extraction of iron in the blast furnace, state the uses of the following in the furnace.
(a) Molten slag.   (1 mark)

_____

(b) Waste gases leaving the furnace   (1 mark)

_____

(c) Limestone (1 mark)

8. The flow chart below gives some reactions starting with ethane. Study it and answer the questions that follow.
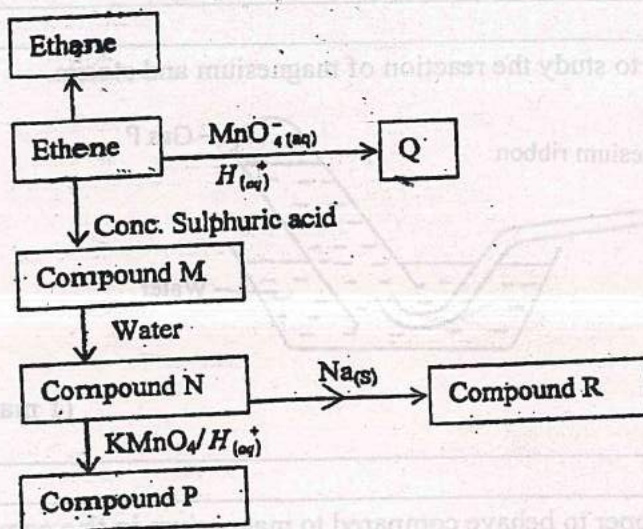
(a) Draw the structure of compounds

P: _____ (1 mark)

Q: _____ (1 mark)

(b) Write the name of compound R. _____ (1 mark)

9. Study the organic compound below:
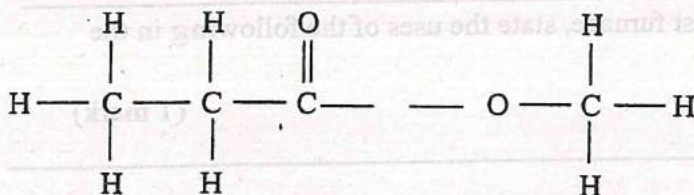
(a) In which homologous series does the compound belong to? (1 mark)

(b) Name and draw the structures of two compounds that can be used to prepare the above compound.

(3 marks)

_____

_____

_____

10. (a) State one factor that can determine the stability of an atom (1 mark)

_____

_____

(b) Radioactive polonium – 216 decay as shown below.

$$^{216}_{90}Po \longrightarrow\ ^{208}_{82}Pb + M \square + n\beta$$
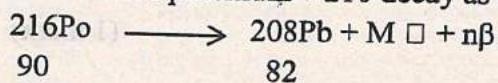
Find the value of M and n

(2 marks)

_____

_____

_____

(c) If after 112 days $^1/_{16}$ of polonium remained, calculate the half-life of polonium

_____ (1 mark)

_____

11. A metal oxide has a formula M_2O_3.
   (a) Write an equation to show how M form an ion (1 mark)

_____

   (b) Write the formula of the chloride of M. (1 mark)

_____

12. The thermodynamic equation for the formation of ammonia in the Haber process is

$$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}, \Delta H = -92kJ\ mol^{-1}$$
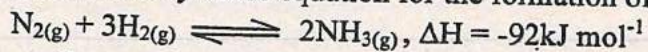
State and explain one way in which the yield of ammonia can be increased. (2 marks)

_____

_____

13. A certain carbonate, JCO_3, reacts with dilute hydrochloric acid according to the equation below.

$$JCO_3 + 2HCl_{(aq)} \longrightarrow GCl_{(aq)} + CO_{2(g)} + H_2O_{(l)}$$

If 1g of the carbonate reacts completely with $20cm^3$ of 1M hydrochloric acid, calculate the relative atomic mass of J. (C = 12, O = 16)

(4 marks)

_____

_____

_____

14. (a) What is meant by the term solubility? (1 mark)

_____

(b) The mass of a solution A is 120g. This solution has 8g of salt A dissolved in it. The solubility of this salt is 25g/100g of water at 30°C. 55g of salt A are added to the solution at 30°C. How much of salt A will remain undissolved. (2 marks)

_____

_____

15. (a) Using electrons in the outermost energy level, draw the dot (•) and cross (X) diagrams to represent bonding in.

i) C_2H_6 (C = 6, H = 1) (1 mark)

ii) NH_4Cl (N = 7, H = 1, Cl = 17) (1 mark)

(b) The formula of a complex ion is $[Cu(NH_3)_4]^{2+}$ name the type of bond that is likely to exists between copper and ammonia in the complex (1 mark)

_____

16. (a) State Hess's law (1 mark)

_____

(b) Study the information below and answer the questions that follow.

$MgCl_{2(s)} \longrightarrow Mg_{(g)}^{2+} + 2Cl_{(g)}^-$, $\Delta H1 = -2487kJ \, mol^{-1}$

$MgCl_{2(s)} + (aq) \longrightarrow MgCl_{2(aq)}$, $\Delta H2 = -5142kJ \, Mol^{-1}$

$2Cl_{(g)}^- + (aq) \longrightarrow 2Cl_{(aq)}^-$, $\Delta H3 = -762kJ \, mol^{-1}$
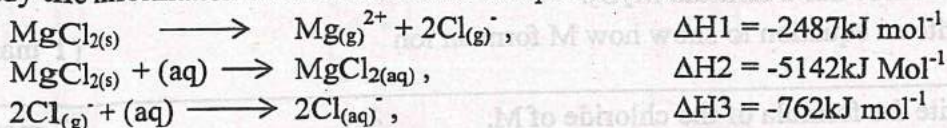
(i) Name the enthalpies H_1 and H_2 (2 marks)

H_1 _____

H_2 _____

(b) Determine the enthalpy for the reaction: (2 marks)

$Mg_{(g)}^{2+} + (aq) \qquad Mg_{(g)}^{2+}$

_____
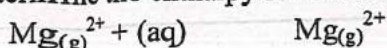
17. (a) Give two reasons why carbon (IV) oxide is used as a fire extinguisher (1 mark)

_____

(b) State the function of tartaric acid in baking powder. (2 marks)

_____

_____

18. When an electric current of 0.5A was passed through a molten chloride of J for 32 minutes and 10 seconds, a mass of 0.44g off J was deposited at the cathode. (IF = 96500C)

(a) Calculate the quantity of electricity used.

(1 mark)

_____

(b) Determine the value of x if the ion of metal J is represented as J^{x+} (R.A.M of J = 14

(1 mark)

_____

19. (a) What is meant by the term basicity of an acid?

(1 mark)

_____

(b) Describe briefly how potassium sulphate can be prepared using $50cm^3$ of 1M potassium hydroxide.

(3 marks)

_____

20. The diagram below represents a set-up used to prepare oxygen gas.
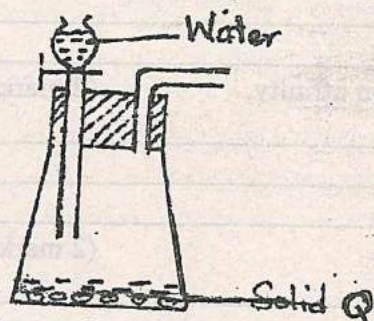
(a) Name substance Q

(1 mark)

(b) Complete the set up to show how oxygen gas is collected.

(1 mark)

(c) Write the equation for the reaction that occurs.

(1 mark)

21. The table below shows some solutions and their pH values

Solution	pH value
P	1.5
Q	6.0
R	14.0
S	8.0

Which of the above solution
(a) Is strongly basic.

(1 mark)

(b) Reacts with sodium carbonate more vigorously

(1 mark)

(c) Is ammonia solution _____ (1 mark)

_____

22. In an experiment, a jar containing sulphur (IV) oxide was inverted over another jar containing hydrogen sulphide gas.
   (a) State and explain the observation that was made. (2 marks)

_____

   (b) State two conditions necessary for the reaction to take place. (2 marks)

_____

_____

23. Two reagents that can be used to prepare chlorine gas are potassium manganite (VII) and hydrochloric acid.
   (a) Write an equation for the reaction. (1 mark)

_____

   (b) Give the formula of another reagent that can be used instead of potassium manganate (VII) (1 mark)

_____

   (c) Using an equation illustrate how chlorine bleach coloured substances. (1 mark)

_____

_____

24. (a) Distinguish between ionization energy and electron affinity. (2 marks)

_____

_____

_____

   (b) Explain why fluorine is more reactive than iodine. (2 marks)

_____

25. 280cm^3 of nitrogen gas diffuse through a porous plug in 70 seconds. How long will it take 400cm^3 of carbon (IV) oxide gas to diffuse through the same porous plug? (C = 12, O = 16, N = 7). (3 marks)

_____

_____

_____

26. An iron spoon was to be electroplated with silver. Sketch the set-up that could be used. (2 marks)

27. Write the equation for decomposition of:
   (a) Sodium nitrate. (1 mark)

_____

   (b) Copper (II) nitrate (1 mark)

_____