HOME SCHOOLING MATERIAL

PASS O’LEVEL

MATHS, ICT, CHEMISTRY
1. (a) WORD PROCESSING

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(b) SPREADSHEETS

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2. DATABASE MANAGEMENT SYSTEMS

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3. ELECTRONIC PRESENTATION

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4. WEB DESIGN

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SECTION A

1. You have just found your parents’ photos in an older photo album. What hardware would you use to store them on your computer.
   A. Printer
   B. DVD player
   C. Scanner
   D. Photo editor

2. The operating system is involved in these tasks except:
   A. File management
   B. Formatting disks
   C. Scheduling print jobs
   D. Displaying a webpage

3. The process of starting a computer is called:
   A. Clicking
   B. Booting
   C. Surfing
   D. Blocking

4. The basic unit of measurement in computer storage is called:
   A. kilobit
   B. Byte
   C. MBs
   D. Gigabyte

5. A calculating machine was invented by:
   A. Leibniz
   B. John Napier
   C. Blaise Pascal
   D. Dr Herman

6. The caps lock is used to:
   A. Get help
   B. Send commands to the computer
   C. Toggle between the upper and lower case
   D. Turn on/off the menu

7. The following are characteristic of the first generation of computers except:
   A. Had limited memory
   B. Were very fast
   C. Used punched cards
   D. Used machine language

8. Windows is to operating system as Ms Word is to:
   A. Application software
   B. Off-shelf software
   C. Microsoft systems
   D. Computer programs

9. Your school is currently installing a network that will link up all the computers in the computer laboratory. Which of this best describes the network that will be used?
   A. Building network
   B. School network
   C. Local Area Network
   D. Bus Network

10. Which of the following is a computer program?
    A. CD Rom
    B. Virus
    C. Hard disk
    D. Optical scanner

11. Which of the following is odd?
    A. Scanner
    B. Monitor
    C. Keyboard
    D. Light pen

12. Which of the following acts as the brain of a computer system?
    A. Main memory
    B. Secondary memory
    C. Power supply
    D. Processor chip

13. Which type of operating system would be needed to allow a student in a computer laboratory to read a file that the teacher has also opened?
    A. Multi user
    B. Batch processing
    C. Multi-tasking
    D. Multi-processing

14. What does the antivirus do?
    A. It destroys all files that it thinks might probably be infected
    B. It stops people accessing your system via the internet and putting viruses into your computer
    C. It inspects computer files and e-mail attachments for viruses and quarantines any that is infected
    D. It destroys all files that it thinks might probably be infected

20. The following computers are classified according to size except:
   A. Mainframe computers
   B. Micro computers
   C. Digital computers
   D. Super computers

SECTION B

21. In reference to spreadsheet software,
   a. Distinguish between relative and absolute cell referencing.
   b. The formula in cell C2 is =IF (B2>5;"Y","N").
      i. What type of cell addressing is used in this formula?
      ii. If this formula is copied down in the column C, write the formula in cell C5
   c. What happens to the cell pointer when the following keys or key combinations are placed?
      i. Right arrow key
      ii. Shift + Tab
      iii. Ctrl + Home
   d. Distinguish between a formula and a function
   e. What is a legend?

22. One of the main devices required in a computer laboratory is a printer.
   a. Give two advantages and disadvantages of dot matrix printers over Laserjet printers.
   b. Identify at least three advantages of display devices such as the monitor over printers.
   c. Distinguish between impact and non-impact printers.
From page 1

non-impact printers.

d. What criteria would you use when buying a printer?

23. In reference to computer memory:
   a. Distinguish between Random Access Memory and Read Only Memory
   b. Define the following:
      i. Optical storage media
      ii. Magnetic storage media
   c. In formation of a disk, what do the following mean:
      i. Tracks
      ii. Sectors
   d. Give two examples of optical disks.

24. In reference to operating system:
   a. Give one example of multi-user and single user operating system
   b. Give at least three reasons why a computer may need an operating system
   c. What are the advantages of GUI over the command line?
   d. Explain the factors you would consider when choosing an operating system.

25. Data entry is the process by which raw data is put into the computer for processing:
   a. Mention at least four ways in which data can be entered in the computer
   b. What three factors you would consider when choosing a data entry method?
   c. Give two disadvantages of speech recognition type of data entry
   d. Which type of scanner can be used to grade multiple choice examinations?

26. The importance of data requires that it remains secure.
   a. What three things are involved in data security?
   b. Explain any three threats that might put data and information at risk.
   c. What three things can you do to keep your data and information safe?

SECTION C

27. In relation to computer programming:
   a. Define computer programming
   b. Explain 3 differences between compilers and interpreters
   c. Discuss at least six stages of program development in their respective order

28. When installing devices on a computer system:
   a. What safety precautions should be observed before you start installing the devices?
   b. What is the use of a user manual when installing devices?
   c. Discuss the factors you would consider when purchasing hardware.

29. In reference to networking:
   a. Discuss at least four network topologies that can be used for a Local Area Network
   b. Discuss the advantages and disadvantages of a computer network.

MATHEMATICS PAPER TWO SOLUTIONS (OM0010)

1. 45kg → 18900/= 
1 kg → $ \frac{18900}{45} = 4200/=$
Let $P$ be the old price
\[ \frac{114.5}{100} \times P = 4200 \]
\[ P = \frac{4200 \times 100}{114.5} \]
\[ P = 3668.1223 \]
$\therefore$ The old price is UGX 3668.1223

2. LCM
\[ \begin{align*} 
\text{HCF} &= a \times b \\
\text{LCM} &= \frac{x \times y \times ab}{x \times y \\
&= a \times x \times y \\
&= a xy \\
\end{align*} \]

3. \( A = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \)
\( B = \{2, 3, 5, 7\} \)
\( C = \{1, 2, 3, 4, 6\} \)

4. \( \frac{2^{3+3} + 20(8^{2})}{3^{2^{3+2}}} = \frac{2^{3} \times 2^{3} + 20 \times (2^{3})^{2}}{3^{2^{3} \times 2^{3}}} \)
\[ = \frac{8 \times 2^{3} + 20 \times 2^{3} \times 2^{3}}{12 \times 2^{3}} \]
\[ = \frac{28 \times 2^{3}}{12 \times 2^{3}} \]
\[ = \frac{28}{12} \]
\[ = \frac{7}{3} \]

5. \( f: x \rightarrow ax^{2} + bx \)
\( f(2) = a(2)^{2} + b(2) = 10 \)

ANSWERS FOR MATHEMATICS PAPER TWO (OM0010)
8. \( y + 3 = \frac{5}{4} (x - \frac{1}{2}) \)
\( y + 3 = -\frac{5}{4}x + \frac{5}{8} \)
\( y = -\frac{5}{4}x + \frac{5}{8} + 3 \)
\( y = -\frac{5}{4}x + \frac{19}{8} \)
\( y = -\frac{5}{4}x - \frac{19}{8} \)

9. Length \( XY = \sqrt{4^2 + 6^2} \)
\( = \sqrt{16 + 36} = \sqrt{52} \text{ m} \)

10. \( \overrightarrow{OA} = a, \overrightarrow{OB} = b \) and \( M \) divides \( \overrightarrow{AB} \) in the ratio 1 : 3.

9. Thickness of the walls = 30cm
\[ = \frac{30}{100} = 0.3 \text{ m} \]
Internal diameter = 10 - 2(0.3) \[ = 10 - 0.6 \]
d = 9.4m and D = 10m
\[ r = \frac{d}{2} = \frac{9.4}{2} = 4.7 \text{ m} \]
\[ R = \frac{D}{2} = \frac{10}{2} = 5.0 \text{ cm} \]
\( H = 3 + 0.3 = 3.3 \text{ m} \)
h = 3m
Volume of concrete
\[ = \pi RH - \pi h \]
\[ = \pi(5.2 	imes 3.3 - 4.7^2 	imes 3) \]
\[ = \pi(28.25 - 66.27) \]
\[ = \pi 	imes 16.23 \]
\[ = 50.9880 \text{ m}^3 \]

11. (Correction)

a) Given that \( \log_{10} 2 = 0.301 \) and \( \log_{10} 3 = 0.477 \), find correct to 3 decimal places the value of \( \log_{10}(2 \cdot 3) \).

b) 10 men can dig a trench of length 32m in 12 days. How many more men are needed to dig a trench of length 72m in 6 days?

c) Given that \( \sqrt[5]{5} + \sqrt[5]{5} = a\sqrt[5]{5}, \) determine the value of \( a \).

Answer

a) \( \log_{10} 2 = 0.301 \) and \( \log_{10} 3 = 0.477 \)
\[ 2\log_{10}2 + \log_{10}3 = \log_{10}(2^2 \cdot 3) \]
\[ = 2(\log_{10}2 + \log_{10}3) - \left( \log_{10}2^2 + \log_{10}3 \right) \]
\[ = 2\log_{10}2 + 2\log_{10}3 - 2\log_{10}2 \]
\[ = 2\log_{10}3 \]
\[ = 2 \times 0.477 - 0.301 \]
\[ = 0.954 - 0.301 \]
\[ = 0.653 \]

b) 10 men - 32m - 12 days

The more the men, the longer the Trench and the fewer the days.
Let \( M \) represent men
\( L \) represent length
\( D \) represent days

\[ M \alpha \frac{L}{D} \]
\[ M = k \frac{L}{D} \]

K is a constant of proportionality
\( K = \frac{32}{12} \)
\( K = \frac{120}{32} \)
\[ M = \frac{15}{4} \frac{L}{D} \]

When \( L = 72 \)m and \( D = 6 \) days

\[ M = \frac{15}{4} \frac{72}{6} \]
\[ M = \frac{15}{4} \times 12 = 45 \text{ men} \]

\[ \frac{5}{\sqrt[5]{5}} + \sqrt[5]{5} = a\sqrt[5]{5} \]
\[ \frac{s}{\sqrt[5]{5}} + \sqrt[5]{5} = a\sqrt[5]{5} \]
\[ \frac{2s}{\sqrt[5]{5}} + 2\sqrt[5]{5} = a\sqrt[5]{5} \]
\[ \frac{2s}{\sqrt[5]{5}} + 2\sqrt[5]{5} = a\sqrt[5]{5} \]
\[ 5 + 2 \times 5 = a \times 5 \]
\[ = 15 \times 5a \]
\[ = 3 \]
Question 12. (Correction)

In a street of 150 houses, the different newspapers are delivered N, M and R. Of these, 40 received N, 35 received M and 60 received R, 7 received N and M, 10 received M and R and 4 received N and R, 34 received no paper at all.

a) Represent the information on a Venn diagram.

b) How many houses in the street received:
   (i) all the three papers.
   (ii) at most two papers.
   c) What is the probability that a house selected at random in the street received exactly two papers?

Answer

a) \( n(\varepsilon) = 150 \)

\( n(N) = 40 \)

\( n(M) = 35 \)

\( n(R) = 60 \)

\( n(N \cap M) = 7 \)

\( n(N \cap R) = 4 \)

\( n(N \cap M \cap R) = 2 \)

Let those that received all be \( x \)

\( n(x) = 150 \)

\( n(N) = 40 \)

\( n(M) = 35 \)

\( n(R) = 60 \)

\( n(N \cup M \cup R) = 34 \)

b) (i) \( N \)

\[ a + 7 - x + x + 4 - x = 40 \]
\[ a + 11 - x = 40 \]
\[ a - x = 29 \]
\[ a = 29 + x \quad \ldots \ldots \quad (i) \]

\( M \)

\[ b + 7 - x + x + 10 - x = 35 \]
\[ b - x = 17 \]
\[ b - x = 35 - 17 \]
\[ b - x = 18 \]
\[ b = 18 + x \quad \ldots \ldots \quad (ii) \]

\( R \)

\[ c + 4 - x + x + 10 - x = 60 \]
\[ c - x = 14 \]
\[ c - x = 60 - 14 \]
\[ c - x = 46 \]
\[ c = 46 + x \quad \ldots \ldots \quad (iii) \]

\( e \)

\[ n(N) + b + 10 - x + c + 34 = 150 \]
\[ 40 + b + 44 - x + c = 150 \]
\[ 84 + b + c - x = 150 \quad \ldots \ldots \quad (iv) \]

Substitute \( b = 18 + x \) and \( c = 46 + x \) in equation (iv)

\[ 84 + 18 + x + 46 + x - x = 150 \]
\[ 148 + x = 150 \]
\[ x = 150 - 148 \]
\[ x = 2 \]

- 2 homes received all the three papers
- (ii) At most two
  - those who received 2 + those who received 1 + those who received none.

\[ 34 \]

13. a) \( x = 30^\circ \)

From SOHCAHTOA

\[ \tan 30^\circ = \frac{r}{9.3205} \]
\[ 9.3205 = 30^\circ \]
\[ r = 9.3205 \tan 30^\circ \]
\[ r = 5.3812 \]

Volume = \( \frac{1}{3} \pi r^2 h \)
\[ = \frac{1}{3} \pi \times 5.3812^2 \times 9.3205 \]
\[ = 282.6351 \]

Volume of the fluid = 1813.7994 - 282.6351
\[ = 1531.1643 \text{m}^3 \]

14. Number of phones

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<tr>
<td>Second</td>
<td>140 \times 100 = 140</td>
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<tr>
<td>Third</td>
<td>110 \times 100 = 110</td>
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Commission in the 3rd month = commission in the first 20 + commission on the excess
\[ = 20 \times 50,000 \times \frac{3}{100} + (77 - 20) \times 50,000 \times \frac{12}{100} \]
\[ = 80,000 + 342,000 \]
The commission in the 3rd month is UGX 422000

Commission on the first 20 = \( 20 \times 50,000 \times \frac{8}{100} \)
\[ = 80,000 \]
Since 30,000 is less than 260,000, the number of phone are more than 20.

Let the number of phone be \( N \).

\[ 80,000 + (N - 20) \times 50,000 \times \frac{12}{100} \]
\[ = 260,000 \]
\[ 80,000 + 6000 (N - 20) = 260,000 \]
\[ 80 + 6(N - 20) = 180 \]
\[ N = 20 \]
\[ N = 50 \]

The number of phones are 50.

15 a) (i) \[ a = \left(\frac{3}{2}\right), b = \left(\frac{1}{2}\right), c = \left(\frac{-1}{2}\right) \]
\[ 2a + b + k = 3(a - c) \]
\[ 2\left(\frac{3}{2}\right) + 1 + k = 3\left(\frac{3}{2}\right) - \left(\frac{-1}{2}\right) \]
\[ \left(\frac{6}{2}\right) + 1 + k = \frac{3}{2} - \frac{-1}{2} \]
\[ \left(\frac{6}{2}\right) + 1 + k = \frac{3}{2} - \frac{-1}{2} \]
\[ \left(\frac{6}{2}\right) + 1 + k = \frac{4}{2} \]
\[ \left(\frac{6}{2}\right) + 1 + k = \frac{4}{2} \]
\[ \left(\frac{6}{2}\right) + 1 + k = \frac{4}{2} \]
\[ \left(\frac{6}{2}\right) + 1 + k = \frac{4}{2} \]
\[ \left(\frac{6}{2}\right) + 1 + k = \frac{4}{2} \]
16. a) U = \{Natural numbers between 1 and 10\}  
U = \{2, 3, 4, 5, 6, 7, 8, 9\}  
P = \{(2, 5), (3, 6), (4, 7), (5, 8), 6, 9\}  
P is less than

(ii)

\[ \begin{align*}  
\text{Domain (x)} & \quad \text{Range} \\
-\frac{1}{2} & \quad \frac{4x + 5}{2} \\
\frac{1}{4} & \quad \frac{4x + 5}{2} \\
-1 & \quad \frac{4x + 5}{2} \\
\frac{1}{4} & \quad \frac{4x + 5}{2} \\
\end{align*} \]

b) Distance away from B during the return journey.  
= 10 - 8 = 2km  
They met at 2km from town B during their return journey.

c) Speed = \frac{\text{total distance}}{\text{total time}}  
= \frac{10}{195}  
= \frac{3.0769}{1} \, \text{kmh}^{-1}

17. JOEL

Distance (km) 0 10 10 12 14 16 18 20 22 24
Time (m) 0 120 150 210

DOREEN

Distance (km) 10 7 5 9 12 14 16 18 20 22
Time (m) 0 60 120 180

\[ \begin{align*}  
\text{Distance (km)} & \quad \text{Time (m)} \\
8 & \quad 0 \\
9 & \quad 60 \\
8 & \quad 120 \\
6.5 & \quad 180 \\
\end{align*} \]

10. State the matrix of reflection in the line y = -x, hence find the image of R (-3 -5) under the reflection.
1. a) C\(_{2}H_{4}\)(g) + O\(_{2}\)(g) \rightarrow CO\(_{2}\)(g) + H\(_{2}\)O(l)
   b) i) Water
   ii) When added to white anhydrous copper sulphate blue.
   c) to condense vapour from the candle
2. a) The metals are C and D the non-metals are A, B and E
   b) Element A
   c) Element D
   d) Element E
   e) D and B
3. a) P
   b) Fe
   c) Mg
   d) Mg
   e) C
4. a) The solution is heated in a round bottomed flask up to 100°C, the vapour is condensed by passing it through a Liebig condenser. Then distillate is collected in a conical flask tapped at the end of the Liebig condenser.
   b) Filtration
   c) Cu
   d) O
   e) C
   f) 9.72
   g) 38.87
   h) 51.42
   i) 16
   j) 63.5
   k) 0.8098
   l) 0.81
   m) 2.4294
   n) 0.8098
   o) 0.8098
   p) 1
   q) 1
   r) 3
   s) The empirical formula of the compound is Cu\(_{2}\)O.
5. a) i) A monomer is a molecule that can react together with other monomer molecules to form a larger polymer chain in a process called polymerisation.
   ii) H–C=O–H
   b) i) Non-biodegradable material or substance is a material which cannot be decomposed easily by bacterial action.
   ii) They accumulate and pollute soil, making a poorly drained and less useful for farming.
6. a) Combustion of carbon fuels, exhalation and volcanic eruptions
   b) Photosynthesis.
   c) Greenhouse gas; any gas that has the property of absorbing infrared radiation (net heat energy) emitted from earth’s surface and reradiating it back to earth’s surface, thus contributing to the greenhouse effect.
   d) Methane, sources of methane include, bio-
eruptions
7. a) H\(_{2}\)SO\(_{4}\)(aq) + 2NaOH(aq) \rightarrow Na\(_{2}\)SO\(_{4}\)(aq) + 2H\(_{2}\)O(l)
   b) i) Molarity of sodium hydroxide = \(\frac{4}{40}\) = 0.1M
   c) moles of sodium hydroxide;
   1000cm\(^3\) of solution contain 0.1 moles of sodium hydroxide
   1cm\(^3\) of solution contains \(\frac{0.1}{1000}\) moles of sodium hydroxide
   20.0cm\(^3\) of solution contains \(\frac{0.1 \times 20}{1000}\) moles of sodium hydroxide
   2.002 moles of sodium hydroxide
   ii) 2 moles of sodium hydroxide react with 1 mole of acid
   1 mole of sodium hydroxide reacts with \(\frac{1}{2}\) moles of acid
   0.002 moles of sodium hydroxide react with \(\frac{1}{2} \times 0.002\) moles of acid
   0.001 moles of acid.
   iii) 8.0cm\(^3\) of solution contain 0.001 moles of acid
   1000cm\(^3\) of solution contain \(\frac{0.001}{8}\times 1000\) moles of acid.
   = 0.125M
8. a) HCl(aq) + NaOH (aq) \rightarrow NaCl(aq) + H\(_{2}\)O(l)
   b) i) moles of sodium hydroxide
1000cm\(^3\) of solution contain 11.0 moles of sodium hydroxide
1cm\(^3\) of solution contains \(\frac{11}{1000}\) moles of sodium hydroxide
46cm\(^3\) of solution contains \(\frac{11}{1000} \times 46\) moles of sodium hydroxide
   = 0.506 moles of sodium hydroxide
   Mole of acid:
   From equation, mole ratio is 1:1, therefore moles of acid = 0.506 moles of acid.
   25cm\(^3\) of solution that reacted contain 0.506 moles of acid
250cm\(^3\) of solution that reacted contains \(0.506 \times 250\) moles of acid
   = 0.506moles in 250cm\(^3\) of solution

9. a) Place a sample of white anhydrous copper(ii) sulphate on a petri-dish, then drop the suspected liquid on the solid.
   b) The white solid turned blue.
   c) CuSO\(_{4}\)(s) + H\(_{2}\)O(l) \rightarrow CuSO\(_{4}\)·H\(_{2}\)O(s)
10. a) i) Alkyne
    a) Carbonyl
    b) i) Vulcanisation of rubber
    ii) It increases the tensile strength of rubber.

SECTION B:
11. a) The change in the volume of carbon-dioxide gas produced with time can be measured in a syringe the change in the concentration of reactants or products can be as well measured with time.
   b) i) Smaller pieces increase the surface area of a solid reactant, exposing more of its particles to attack. This results in an increased chance of collisions between reactant particles, so there are more collisions in any given time and the rate of reaction increases.
   ii) An increase in temperature will increase the average kinetic energy of the molecules. As the particles move faster, they will likely collide with each to form products, hence a faster rate of reaction.
   c) At STP, 22400cm\(^3\) occupy 1 mole of a gas 1cm\(^3\) occupies \(\frac{1}{22400}\) moles of carbon dioxide
   4.4645 x 10\(^{4}\) moles of carbon dioxide gas.
   Mole ratio Ca\(_{3}\)CO\(_{3}\) : CO\(_{2}\) = 1:1
   moles of calcium carbonate = 4.4645 x 10\(^{4}\) moles
   Mass of calcium carbonate used = moles of calcium carbonate x Rfn of CaCO\(_{3}\)
   = 4.4645 x 10\(^{4}\) x 100
   = 0.00446 of calcium carbonate.
   d) The gas is bubbled through a solution of calcium hydroxide, a white precipitate is formed.
   a) CO\(_{3}\)(aq) + Ca(OH)\(_{2}\)(aq) \rightarrow CaCO\(_{3}\) (s) + H\(_{2}\)O(l)
   12. a) Describe a practical method by which the volume of hydrogen produced during the reaction can be determined.
   Procedure
   i) Measure 50cm\(^3\) of 1M hydrochloric acid using one of the measuring cylinders.
   Pour the acid into a
**SECTION A**

1. (a) State the principle on which each of the following methods of separating mixtures works:
   (i) Chromatography
   (ii) Fractional crystallisation

   (b) State what would be observed and give a reason for your observation if a mixture of water and the following substance was shaken, then allowed to stand for some time:
   (i) Ethanol
   (ii) Edible oil

   (c) A separating funnel was used to separate a mixture of kerosene and water.
   (i) Name the component that came off first.
   (ii) Give a reason for your answer in (c) (i).

2. When a mixture of sodium chloride and liquid, L, was heated, hydrogen chloride was evolved.
   (a) Identify L.
   (b) Write equation:
      (i) for the reaction leading to the formation of hydrogen chloride
      (ii) to show how an aqueous solution of hydrogen chloride would react with iron.
   (c) Write an ionic equation to show the reaction that would take place if:
      (i) hydrogen chloride was bubbled into aqueous silver nitrate solution
      (ii) State the application of the reaction in (c) (i) in analytical chemistry.

3. Name one reagent which could be used to distinguish between members of each of the following pairs of ions and in each state what would be observed if the reagent you have named was treated separately with each member of the pair.

4. In an experiment to investigate the decomposition of 50cm³ of 0.2M hydrogen peroxide, the following graph was obtained:

   ![Graph](image)

   (a) Write equation for the decomposition of hydrogen peroxide.
   (b) Name one compound that can be used to speed up the rate of this reaction.
   (c) On the same axes above, sketch the graph for the decomposition of the hydrogen peroxide if the compound you have name in (b) was used.
   (d) Calculate the rate of the reaction in the first 20 minutes.
   (e) Determine the rate of the reaction after 20 minutes.
   (f) Give a reason for your answer in (e) (f).

5. (a) Distinguish between the terms atomic number and atomic mass.
   (b) The full symbols of three atoms of a certain element are: X, Y and Z.
       (i) Suggest a reason for the difference in the atomic masses of the atoms.
       (ii) State one word which means the existence of X, Y and Z.

6. Plotting a graph of volume (y-axis) against time (x-axis), the slope of the graph is steepest at the beginning. This shows that the reaction is fastest at the start. As the magnesium is used up, the rate falls; the slope becomes less steep and then levels out when the reaction has stopped.

   (a) i) 1.35 mol/dm³
   (ii) At point A to B, during that period, the rate of change of concentration of HCl with time is highest as compared to other points along the curve.

   (b) i) Lead chloride, silver chloride
   (ii) Lead (II) chloride

7. Placing a piece of copper wire into water does not produce any observable change, copper does not react with water.

   (i) Suggest a reason for the difference in the atomic numbers of copper and lead as shown in the periodic table.
   (ii) Why is it important to galvanise iron.

8. When carbon dioxide was passed over strongly heated charcoal, gas B was formed, which reacted with heated copper (II) oxide to produce a brown solid residue and carbon dioxide.
   (a) Name (i) Gas B.
   (ii) The brown solid.

   (b) Write equation to show:
      (i) The reaction that led to the formation of B.
      (ii) The effect of B on copper (II) oxide.

   (c) i) Name one reagent that can be used to distinguish between carbon dioxide and gas B.
   (ii) State what would be observed if carbon dioxide and gas B were separately treated with the reagent you have named in (c) (i).

9. Combustion and fermentation are some of the reactions that increase the amount of carbon dioxide in the atmosphere.
   (a) State: (i) What is meant by the term fermentation?
      (ii) One difference between combustion & fermentation.
   (b) Write an equation to show:
      (i) Complete combustion of propane.
      (ii) Fermentation of glucose, C₆H₁₂O₆.

10. (a) Define the term acid.
    (b) When a mixture of concentrated sulphuric acid and potassium nitrate was heated, nitric acid was produced.
        State the property of concentrated sulphuric acid upon which this reaction depended.
    (c) i) Name the reagent(s) that is or are used to identify a nitrate ion in solution.
        (ii) State what would be observed when aqueous nitrate ion is treated with the reagent(s) you have named in (c) (i).

**SECTION B**

11. (a) Describe the extraction of sulphur using the Frasch pump.
    (b) Explain the reaction of sulphuric acid with:
       (i) Sugar (Sucrose), C₁₂H₂₂O₁₁
       (ii) Iron(ii) sulphide
    (c) State any two ways in which the gaseous product in (b) ii) pollutes air.

12. (a) Lead (II) oxide was added a little at a time to warm dilute nitric acid in a beaker until no further change.
    (i) State what was observed.
    (ii) Write equation for the reaction that took place.
    (iii) Describe how pure crystals of lead (II) nitrate can be obtained from the reaction mixture in the beaker.
    (b) State what would be observed and write equation for the reaction that would take place if lead (II) nitrate was heated strongly.
    (c) Explain how aqueous solution of sodium chloride were added to aqueous lead (II) nitrate solution.

13. (a) Explain how ethene can be prepared starting from ethanol.
    (b) Name one reaction that would be used to identify ethene and state what would be observed if ethene was treated with the reagent you have named.
    (c) Differentiate between the terms monomer and polymer.
    (d) Write an equation for the polymerisation of ethene; name the product and indicate which one of the substances is the monomer.

14. Sodium hydroxide is manufactured by electrolysis process in a mercury cathode cell, and it is used in manufacture of soap.
    (a) Name what is meant by the term “electrolysis”.
    (b) Name the substance used as,
       (i) the anode.
       (ii) the electrolyte.
    (c) Outline a process by which sodium hydroxide is manufactured. (Equations are not required)
    (d) Name one raw material used in the manufacture of soap.
    (e) Describe a process in which soap is produced from sodium hydroxide and the material you have named in (d) ii).
    (f) Write an equation for the reaction of oxygen and iron.
    (g) When 71.7g of an oxide W of lead was completely reduced by heating in a stream of carbon-monoxide, 6.21g of lead was produced.
        (i) Identify T.
        (ii) State the property of sodium hydroxide which made the reaction leading to formation of T possible.
        (iii) Name a laboratory reagent which is used to identify T and state what would be observed when T is treated with the reagent you have named.