(2 a) Table I

CHEMISTRY I

... elements P, Q and R.

Table 1

Element	Atomic Number
P	13
Q	2
R	9

i. To which group of the Periodic Table does Q belong?

_____

ii. Give a reason for the answer in 2a (i). **(1 mark)**

_____

iii. Draw a dot and cross diagram for a compound formed between P and R. **(1 mark)**

b. Give any two differences between "**ionic bonding**" and "**covalent bonding**". **(4 marks)**

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(4 marks)

Continued/...

b. Explain what happens to ionization energy of group 1 elements of the Periodic Table as the atomic radii increases. (4 marks)

c. Why should a half-full petrol tanker be filled with nitrogen gas? (2 marks)

4. a. Define 'conjugate acid'. (2 marks)

b. Sulphuric acid (H_2SO_4) ionises in water (H_2O) according to the following equation: $H_2SO_{4(l)} + H_2O_{(l)} \rightleftharpoons H_3O^+_{(aq)} + HSO^-_{4\ (aq)}$

Write the conjugate base. (1 mark)

Continued/...

4 c. Table 2 shows part of the voltage series

Table 2

Half reaction	Voltage (V)
$Zn^{2+}_{(aq)} + e^-$	0.76
$Fe^{2+}_{(aq)} + e^-$	0.44
$Ni^{2+}_{(aq)} + e^-$	0.25

Calculate the electromotive force for the following cell:

$Zn_{(s)} | Zn^{2+}_{(aq)} || Ni^{2+}_{(aq)} | Ni_{(s)}$

4 d. Mention two homologous series of hydrocarbons. (3 marks)

5. a. Define a 'monomer.' (2 marks)

b. Mention two types of polymers. (1 mark)

(2 marks)

3 (a) Explain the effect of isomerism on the boiling point of an alkane. 6 marks

(b) Describe how a home-made indicator for acids and bases can be produced from flowers. 4 marks

4) Explain the social and economic benefits of recycling plastic wastes 10 marks

5. c. Write a polymeric equation involving chloroethene ($C_2 H_3 Cl$) monomers.

d. Name the polymer formed in 5c. (3 marks)

6. a. The atmospheric abundance of element Q-16 is 0.9 and the rest is for Q-18. Calculate the average mass of element Q. (1 mark)

b. Why does common salt melt at a higher temperature than sugar? (3 marks)

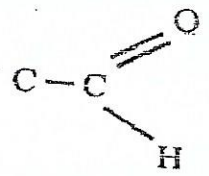
c. Why do ionic compounds conduct electricity only in molten state? (2 marks)

(2 marks)

Continued/...

a. Draw the skeletal formula for n-pentanol.

(2 marks)

b. Write a balanced equation for the combustion of 

(3 marks)

c. Describe how a sample of monoclinic sulphur can be made to exist as rhombic sulphur.

(3 marks)

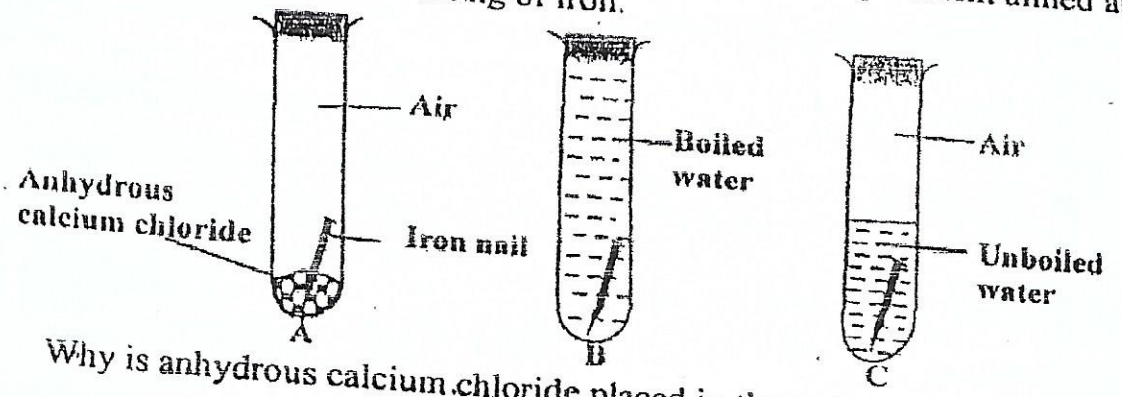
8. a. Mention any **two** ways of disposing solid wastes.

(2 marks)

Continued/...

8 (b. Express 3000, 000, 000m/s in standard form.

9. The figure below is a diagram showing the set up of an experiment aimed at investigating conditions for rusting of iron. **(1 mark)**



a. Why is anhydrous calcium chloride placed in the test-tube A?

b. Explain what would be observed in test tubes **B** and **C** after a few days. **(1 mark)**

c. Describe how a student would test the presence of iron (Fe^{2+}) in an known compound. **(2 marks)**

(4 marks)

End

Continued/...

11. (Continued)

b. Explain how hardness of water can be removed by using 'ion exchange' method.

(6 marks)

END

Continued/...