SECTION A-46 MARKS
ATTEMPT ALL QUESTIONS IN THIS SECTION.

1. Write equations to show how the following compounds can be synthesized.

a) Propanoic acid from bromoethane. (02 marks)

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b) Methylethanoate from bromoethane. (01 mark)

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2. State what is observed and write equation for the reaction which takes place when dilute sodium hydroxide solution is added drop wise until in excess to;

a) Ni^{2+}. (02½ marks)

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b) Mn^{2+}. **(02½ marks)**

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3.(a) What is meant by the term Osmotic pressure? (01 mark)

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b) State any two significance of osmosis. (01 mark)

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c) The osmotic pressure of a solution containing 2.48% of a polymer is 6.2×10^{-3} atmosphere at a temperature of 25°C.Determine the relative molecular mass of the polymer. [Universal gas constant, R = 0.08821dm^3atm/mol/k]
(03 marks)

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4.(a) State any four properties in which beryllium shows similarities with aluminium. (02 marks)

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(b)(i).Explain why beryllium behaves differently from other members of group (II) elements. (02 marks)

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(ii).Name two other elements which have similar relationships like beryllium and aluminium. (01 mark)

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5.(a) What is meant by the term boiling point constant of a liquid? (01 mark)

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b) Explain why the method of elevation of boiling point of a liquid is not used to determine the relative molecular mass of ethanoic acid in aqueous solution. (01½ marks)

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c) A solution of 2.8g of cadmium (II) iodide in 20g of water boiled at 100.2°C at a normal pressure. Calculate the relative molecular mass of cadmium (II) iodide.[The boiling point elevation constant for water = 0.52per mol per 1,000g]

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6.(a) Some half-cells and their emf values are given below:

Half-cells	E.M.F (V)
$I_{2(aq)}/2I^-_{(aq)}$	$^+0.54$

$Fe^{3+}_{(aq)}/Fe^{2+}_{(aq)}$ $^{+}0.76$

(i) Write the cell convention for a cell made up of the half-cells. (01 mark)

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(ii) Determine the e.m.f of the cell. (01½ marks)

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(iii) Calculate the standard free energy for the reaction. (01½ marks)

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b) State whether the cell reaction is possible or not and give a reason for your answer. (01 mark)

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7.(a) Compound,R has a molecular formula C_3H_8O.Write the structural formulae and names of all the possible isomers of compound, R. (03 marks)

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b) Compound,R was reacted with iodine solution and concentrated sodium hydroxide solution and the mixture warmed.A yellow precipitate was formed.

(i) Identify compound, R. (0½ mark)

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(ii) Write the equation of reaction that took place. (01½ marks)

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8.(a) (i).Define the term diffusion. (01 mark)

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(ii) State any two applications of diffusion. (02 marks)

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b) Nitrogen gas diffuses 1.25 faster than gas Y. Calculate the relative molecular mass of gas Y. (02 marks)

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9.(a) Sodium hydroxide is one of the raw materials used in the manufacture of soap.

(i) Name the other raw material used in the manufacture of soap. (0½ mark)

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(ii) Briefly describe the process by which soap is manufacture from sodium hydroxide and the material you have named in a (i) above. (03 marks)

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b) Write the equation leading to the formation of soap.

(01½ mark)

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SECTION B–54 MARKS

ATTEMPT ANY SIX QUESTIONS IN THIS SECTION.

10. **Two isomeric compounds *A* & *B* of molecular formula C_3H_8O can be oxidized to *C* & *D* respectively. *C* reacts with Fehling's solution to produce a red precipitate E.D has no action with Fehling's solution but it gives a white crystalline product when reacted with a saturated solution of sodium hydrogen sulphite just like *C*.**

a) Identify the compounds *A*, *B*, *C*, and D & E. (02 marks)

A: ……

B: …….

C: …….

D: …….

E: …….

b) Write equation for the reaction that takes place when the following compounds react with each other and name the main product.

(i) C and hydroxylamine. (01 mark)

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(ii) B and phosphorus (V) chloride. (01 mark)

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(iii) C and acidified potassium dichromate solution. (01½ marks)

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(iv) Product formed in b (ii) is heated with potassium hydroxide solution and ethanol. (01½ marks)

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11.(a) State five properties in which carbon differs from the rest of the members of group (IV) elements. (02½ marks)

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b) Explain why carbontetrachloride molecule is non-polar yet the bonds in carbontetrachloride are polar. (04 marks)

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c) A sample of lead (IV) oxide was treated with warm concentrated hydrochloric acid.

(i) State what was observed. (01 mark)

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(ii) Write equation for the reaction that took place. (02½ marks)

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12.(a) State what would be observed and write an equation for the reaction which takes place when:

(i) Magnesium is reacted with steam. (02½ marks)

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(ii) Barium is reacted with water. (02½ marks)

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(b) Describe how beryllium and barium reacts with hot concentrated sulphuric acid. (04 marks)

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13.(a) Define the term relative atomic mass. (01 mark)

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b)The mass spectrum of an element, A contained four lines at mass/charge ration of 54, 56, 57 & 58 with relative intensities of 5.84, 91.68, 2.17 & 0.31 respectively.

(i) Explain what the term relative intensities means. (01 mark)

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(ii) Calculate the relative atomic mass of element, A. (02½ marks)

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c) Thorium decays according to the following equation:

$^{232}_{90}Th + \alpha \longrightarrow p + \beta \longrightarrow Q + \beta \longrightarrow R$

Describe the atomic & mass numbers of P, Q & R. (04½ mark)

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14.(a) Explain why zinc is not considered a typical transition metal. (02 marks)

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b) State three ways in which the chemical properties of zinc are similar to those of magnesium. (03 marks)

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c) (i).State what is observed when dilute ammonia solution is added drop wise to a solution containing zinc ions? (01 mark)

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(ii) Write equation(s) for the reaction(s) that take place in (c) (i) above. (03 marks)

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15.(a) Sketch a graph to show the variation of pH of the titration of hydrochloric acid with:

(i) Ammonia solution. (02 marks)

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(ii) Sodium hydroxide solution. **(02 marks)**

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b) Explain the shape of the graph in (a) (i). **(03 marks)**

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c) Calculate the pH of the resultant solution when 15cm^3 of 0.1M sodium hydroxide solution was added to 40cm^3 of 0.1M ethanoic acid.[K_a of ethanoic acid = 1.8 x 10^{-5}] **(02 marks)**

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16.(a) Explain the following terms: **(@01 mark)**

(i) Lattice energy.

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(ii) Hydration energy.

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(iii)Enthalpy of solution.

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c) The energy of solution and lattice energy of potassium iodide are $^{+}$21kJ/mol & $^{-}$645kJ/mol respectively. Calculate the hydration energy for potassium iodide. (04 marks)

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17.(a) Write equation to show how each of the following compounds can be prepared. Indicate the conditions for each reaction.

(i) Benzene from phenyl methanol. (01½ marks)

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(ii) $CH_3CH_2NH_2$ from propanoic acid. (01½ marks)

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b) Complete each of the following equations. State one use of the product in each case: (@02 marks)

(i) $nCH_2=CH_2 \xrightarrow{\text{Catalyst}}$ ……

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(ii) $nHOOC\text{-}C_6H_5COOH + HOCH_2CH_2OH \longrightarrow$ ……

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(iii) $nH_2N(CH_2)_6NH_2 + nHOOC(CH_2)_4COOH \longrightarrow$ ……

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THE PERIODIC TABLE

1	2											3	4	5	6	7	8
1.0 H 1																1.0 H 1	4.0 He 2
6.9 Li 3	9.0 Be 4											10.8 B 5	12.0 C 6	14.0 N 7	16.0 O 8	19.0 F 9	20.2 Ne 10
23.0 Na 11	24.3 Mg 12											27.0 Al 13	28.1 Si 14	31.0 P 15	32.1 S 16	35.4 Cl 17	40.0 Ar 18
39.1 K 19	40.1 Ca 20	45.0 Sc 21	47.9 Ti 22	50.9 V 23	52.0 Cr 24	54.9 Mn 25	55.8 Fe 26	58.9 Co 27	58.7 Ni 28	63.5 Cu 29	65.7 Zn 30	69.7 Ga 31	72.6 Ge 32	74.9 As 33	79.0 Se 34	79.9 Br 35	83.8 Kr 36
85.5 Rb 37	87.6 Sr 38	88.9 Y 39	91.2 Zr 40	92.9 Nb 41	95.9 Mo 42	98.9 Tc 43	101 Ru 44	103 Rh 45	106 Pd 46	108 Ag 47	112 Cd 48	115 In 49	119 Sn 50	122 Sb 51	128 Te 52	127 I 53	131 Xe 54
133 Cs 55	137 Ba 56	139 La 57	178 Hf 72	181 Ta 73	184 W 74	186 Re 75	190 Os 76	192 Ir 77	195 Pt 78	197 Au 79	201 Hg 80	204 TI 81	207 Pb 82	209 Bi 83	209 Po 84	210 At 85	222 Rn 86
223 Fr 87	226 Ra 88	227 Ac 89															

139 La 57	140 Ce 58	141 Pr 59	144 Nd 60	147 Pm 61	150 Sm 62	152 Eu 63	157 Gd 64	159 Tb 65	162 Dy 66	165 Ho 67	167 Er 68	169 Tm 69	173 Yb 70	175 Lu 71
227 Ac 89	232 Th 90	231 Pa 91	238 U 92	237 Np 93	244 Pu 94	243 Am 95	247 Cm 96	247 Bk 97	251 Cf 98	254 Es 99	257 Fm 100	256 Md 101	254 No 102	260 Lw 103

♥ ===END===

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This is the last page of the printed paper, Page 20