LIGHTAFRICASECONDARYSCHOOL

SENIOR FIVE

END OF TERM ONE ASSESSMENT 2025

Time: 2 hours
Answer all items in the answer sheets provided
Use R=8.314 WHERE NECESSARY.

Item One. As a rawmaterial for make food additives,magnesium oxide is used as an anticaking. The compound requires a lot of heat and also it is observed that when it dissolves in water , it conducts electricity and it gives hard time especially in solution .

TASK.

a) Explain how the bonds of magnesium oxide are formed using their Lewis bond structures.(atomic number of magnesium 12, oxygen is 8)
b) Explain why the compound uses a lot of heat and conducts electricity in solution.
c) Explain how the compound of magnesium oxide is different from that of ammonia

Item two. During a study on Aluminium. It was observed that it reacts with halogen(fluorine and chlorine) to form compound X and Y. It was observed that one of the compounds X sublimes. And on vapourising 0.1g of the compound vapourised at 350°C at 1 atm to produce 19.2cm^3 of vapour is formed. It is also observed that compound Y dissolves in water forms a different bond from compound X.

TASK.

a. Explain how compound Y is formed and how its properties are different from compound X.
b. Deduce the formular of X and show the structure and bonds of the compound X look like.
c. Explain why compound X forms different bonds from compound Y.

Item three. While determining the structure of SUBSTANCE Z with C_2H_6O. It was observed that Z has two appearences in structure. While making observations. It is observed that one of them quickly dissolves in water and has a higher boiling point than the other yet they both have the same formular mass

and a friend was wondering what the difference could be.

TASK

a) Deduce the two structural appearances and IUPAC names of the substance Z above.
b) Explain why one of them exhibited different properties from the other compound
c) Explain why 2 nitrophenol has a lower boiling point than 4 nitrophenol.

Item four: During examination on period 3 metal compounds. It was observed that they have possess different properties especially as an ion

Ion	Na^+	Mg^{2+}	Al^{3+}
Ionic radius(nm)	0.095	0.065	0.050

As students were still examining the different properties. They noted an increase in the melting points of the metals but a decrease in melting points of the chlorides formed. The students were wondering what would have caused that difference

metal	Na	Mg	Al
Melting point of the metal/°C	98	650	660
Melting point of the chloride /°C	801	712	180
compound	NaCl	$MgCl_2$	$AlCl_3$

TASK

Explain the difference of the properties of the compound

a) Ionic radius
b) Melting point of the metals
c) Melting point of the chlorides

End

THE PERIODIC TABLE

1	2											3	4	5	6	7	8
1 H 1.0																1 H 1.0	2 He 4.0
3 Li 6.9	4 Be 9.0											5 B 10.8	6 C 12.0	7 N 14.0	8 O 16.0	9 F 19.0	10 Ne 20.2
11 Na 23.0	12 Mg 24.3											13 Al 27.0	14 Si 28.1	15 P 31.0	16 S 32.1	17 Cl 35.4	18 Ar 40.0
19 K 39.1	20 Ca 40.1	21 Sc 45.0	22 Ti 47.9	23 V 50.9	24 Cr 52.0	25 Mn 54.9	26 Fe 55.8	27 Co 58.9	28 Ni 58.7	29 Cu 63.5	30 Zu 65.7	31 Ga 69.7	32 Ge 72.6	33 As 74.9	34 Se 79.0	35 Br 79.9	36 Kr 83.8
37 Rb 35.5	38 Sr 87.6	39 Y 88.9	40 Zr 91.2	41 Nb 92.9	42 Mo 95.9	43 Tc 98.9	44 Ru 101	45 Rh 103	46 Pd 106	47 Ag 108	48 Cd 112	49 In 115	50 Sn 119	51 Sb 122	52 Te 128	53 I 127	54 Xe 131
55 Cs 133	56 Ba 137	57 La 139	72 Hf 178	73 Ta 181	74 W 184	75 Re 186	76 Os 190	77 Ir 192	78 Pt 195	79 Au 197	80 Hg 201	81 Ti 204	82 Pb 207	83 Bi 209	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 Ac (227)															

57 La 139	58 Ce 140	59 Pr 141	60 Nd 144	61 Pm (145)	62 Sm 152	63 Sm 150	64 Eu 152	65 Tb 159	66 Dy 162	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175
89 Ac (227)	90 Th 232	91 Pa 231	92 U 238	93 Np 237	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cr 251	99 Es (254)	100 Fm (257)	101 Mv (256)	102 No (254)	103 Lw

1. 1 ← Indicates atomic number.
   H

2. H
   1.0 ← Indicates relative atomic mass.