G.C.E. A/L Examination July - 2017

FWC

Conducted by Field Work Centre, Thondaimanaru

In Collaboration with

Provincial Department of Education Northern Province.

Chemistry I	Grade :- 12 (2018)	Time :- Three hours

Part -I

$N_A = 6.022 \times 10^{23} mol^{-1}$ $h = 6.62 \times 10^{-34}$ Js $C = 3 \times 10^8$ ms^{-1}

❖ **Answer all the questions**

1. In the hydrogen spectrum of hydrogen, The wavelength of green light was found to be 442nm. The energy of one mole of photon of green light is
   1) 4.5×10^{-19} kJ 2) 4.5×10^{-22} kJ 3) 1.5×10^{-19} kJ
   4) 270.8 J 5) 270.8 kJ

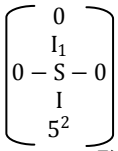
2. Which of the following atoms absorbs highest energy when acquiring one electron in gaseous state.
   1) N 2) P 3) Be 4) Mg 5) Li

3. Which of the following statements is wrong, regarding the properties of atoms.
   1) The Vander Waal's radius of a particular atom is larger than it's covalent radius.
   2) The charge felt by the valence electron of Na atom is less than its atomic number.
   3) The anion of an atom is smaller than it's neutral atom.
   4) In pauling's scale, electro negativity of N atom is equal to that of Cl atom
   5) The radius of an atom is decided by nuclear charge, screening effect and the number of orbitals.

4. If the quantum numbers of the outer most electron of an element is $\left(4, 0, 0, +\frac{1}{2}\right)$ the element is
   1) Na 2) K 3) Li 4) Ca 5) Mg

5. For the complete combustion of 1 mol of an organic compound A 2 mol of 0_2 was required and 2 mol CO_2, 2 mol H_2O were the only products. The molecular formula of A is,
   1) $C_2H_4O_2$ 2) C_2H_4O 3) C_2H_4 4) C_2H_6 5) CH_4O

6. In the Lewis stucture of $S_20_3^{2-}$ ion the oxidation states of atoms $S^1, and\ S^2$ are

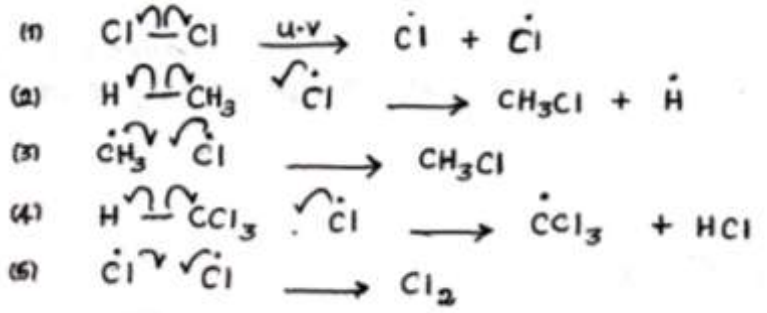


   1) +4,0 2) +6, +2 3) +2, +3 4) +3, 0 5) +6, 0

7. The chemical formula of ammonium aquabromidotricyanidohydridoferrate (III) according to IUPAC rules is
   1) $NH_4[Fe\ (H_2O)Br(CN)_3H]$ 2) $(NH_4)_2[Fe\ Br(CN)_3H(H_2O)]$
   3) $(NH_4)_2[Fe\ Br(CN)_3H(H_2O)]$ 4) $[NH_4Fe\ (H_2O)Br(CN)_3H]$
   5) $[(NH_4)_2Fe\ Br\ (CN)_3H(H_2O)]$

8. Which one of the following statements is not true, regarding the 3d block elements in the periodic table.
   1) The highest oxidation state of each of the elements Sc, Ti, V, Cr, Mn are equal to the group number of those elements.
   2) V has the highest melting point among 3d elements.
   3) In all the cations of the elements 4S orbitals are completely vacant and at the same time all valence electrons occupy 3d orbitals.
   4) Some metallic oxides are amphoteric.
   5) The oxo ions of Cr and Mn, support oxidation.

9. Which of the following reactions shows one correct step in the free radical chlorination of methane.



10. How many stabe resonance structures could be drawn to N_2O_5 molecule.
    1) 9 2) 8 3) 6 4) 5 5) 4

$$\left[\begin{array}{cc} O & O \\ I & I \\ O-N-O-N-O & \end{array}\right]$$

11. The molar ratio of $Mg\,CO_3$: $CaCO_3$ in a mixture of carbonates is 7:3 When a known mass is reacted with excess of HCl $112dm^3$ of CO_2 was produced at standard temperature and pressure. What is the mass of the mixture that reacted with, the acid.
    1) $444g$ 2) $59.4g$ 3) $294g$ 4) $300g$ 5) $29.4g$

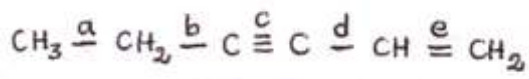
12. When $(NH_4)_2CO_3$ is heated to $25^{\circ}C$ it decomposes In this process which one of the following is true regarding $\Delta H^{\phi}, and\ \Delta S^{\phi}$

	ΔH^{ϕ},	ΔS^{ϕ}
1)	Positive	Negative
2)	Positive	Positive
3)	Negative	Positive
4)	Negative	Negative
5)	Positive	Zero

13. Which of the following statements is not true regarding the colours of complexes formed by 3d transition elements.
    1) $[FeCl_4]^- \Longrightarrow$ Yellow 2) $[NiCl_4]^{2-} \Longrightarrow$ Yellow 3) $[Co(NH_3)_6]^{2+} \Longrightarrow$ dark blue
    4) $[CuCl_4]^{2-} \Longrightarrow$ Yellow 5) $[Cr(H_2O)_6]^{3+} \Longrightarrow$ bluish purple

14. Which of the following statements regarding SO_2 is not true.
    1) SO_2 acts as oxidizing agent.
    2) SO_2 acts as reducing agent.
    3) SO_2 does not bleach dry objects
    4) SO_2 bleaches objects by oxidation
    5) SO_2 supports acid rain

15.



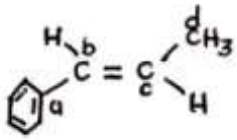
Which of the following arrangements correctly indicates the increasing order of bond lengths shown as a, b, c, d, e in the above molecule.

1) a < b < d < e < c 2) c < e < d < b < a 3) c < d < e < b < a
4) c < e < d < a < b 5) d < c < e < b < a

❖ **Instructions for questions 16 - 20**

1	*2*	*3*	*4*	*5*
only (a) and (b) are correct	only (b) and (c) are correct	only (c) and (d) are correct	only (a) and (d) are correct	any other number or combination is correct

16. Out of the following statements which is / are correct regarding the molecule.



a) The atoms named as a, b, c, d lie on a straight line.
b) The carbon atoms named as a, b, d are SP^2, SP^2, SP^3 hybridized respectively.
c) All the carbon bond lengths in benzene are equal and less than that of C –C bond length
d) All the carbon bond lengths in benzene are equal and greater than the C –C bond length

17. Out of the following cations which is / are precipitated by H_2S in basic medium.
a) Ba^{2+} b) Mg^{2+} c) Cu^{2+} d) Cd^{2+}

18. Li is an element which forms one type of oxide among group IA elements. In an experiment $21g$ of Li is reacted with $33g$ O_2. which of the statements given below is / are true.
a) Li reacts completely while some O_2 remains.
b) O_2 reacts completely while some Li remains.
c) Li and O_2 reacts completely.
d) The amount of products formed is $45g$

19. Which of the following substances is / are used to differentiate the gases $CO_2 and\ SO_2$.
a) $H^+/KMnO_4$ b) $FeCl_3$ c) H_2S d) Moistened litmus paper.

20. The values of $\Delta H\ and\ \Delta G$ are given for the following reactions at temperature T.

i. $2CH_{4(g)} \longrightarrow C_2H_{4(g)} + 2H_{2(g)}$ $\Delta H = 200kJmol^{-1}$ $\Delta G = 170kJmol^{-1}$
ii. $2CH_{4(g)} + O_{2(g)} \longrightarrow C_2H_{4(g)} + 2H_2O_{(g)}$ $\Delta H = -280kJmol^{-1} \Delta G - 290kJmol^{-1}$
iii. $2CH_{4(g)} + 2C_{(S)} \longrightarrow 2C_2H_{4(g)}$ $\Delta H = 250kJmol^{-1}$ $\Delta G = 240kJmol^{-1}$

Temperature T, which of the following statement is / are true.

a) To produce C_2H_4 from CH_4 only reaction II is possible.
b) Reaction III has positive entropy change.
c) Reaction I has negative entropy change.
d) To produce C_2H_4 from CH_4 reactions. I, II, III can be used.

❖ **Instructions for questions 21 - 25**

First statement	Second statement
1) True	Ture and correctly explains
2) True	Ture but does not explain correctly
3) True	False
4) False	Ture
5) False	False

	First statement	Second statement
21.	When glucose is reacted with concentrated H_2SO_4 it gives a black solid.	Concentrated H_2SO_4 is a strong dehydrating agent.
22.	$CH_3C \equiv C - H$ Produces white precipitate when reacted with ammoniacal $AgNO_3$	The acidic hydrogen of an alkyne can be displaced by metallic ion.
23.	The covalent character of KF is more than that of NaF	When cation is large in size and highly charged, polarizability is high.
24.	When water is vaporized in a closed system the entropy of the surrounding reduces.	The motion of the system increases by the heated absorbed by the system.
25.	The reaction between $H_2S, and\ SO_2$ is an example for disproponation.	Disproponation is a process by which an element in two different oxidation states change to produce one particular oxidation state.