INTERNATIONAL INDIAN SCHOOL- DAMMAM

SECOND TERMINAL EXAMINATION 2017-18

CHEMISTRY – CLASS XI

SET-A

TIME : 3 Hrs **MAXIMUM MARKS -70**

General Instructions:

1. All questions are compulsory.
2. Question numbers 1 to 5 are very short answer questions carrying 1 mark each.
3. Question numbers6 to 10 are short answer questions carrying 2 marks each.
4. Question numbers 11 to 22 are also short answer questions carrying 3 marks each.
5. Question number 23 is a value based question carrying 4 marks.
6. Question numbers 24 to 26 are long answer questions carrying 5 marks each.

1. State Pauli Exclusion Principle. 1

2. Predict the shape of ClF_3 and SF_6. 1

3. What happens when sodium metal is dropped in water? 1

4. What is standard electrode potential? 1

5. How many sigma and pi bonds are present in cyclohexene? 1

6. A golf ball has a mass of 40g and a speed of 45 m/s. If the speed can be measured with an accuracy of 2%, calculate the certainity in its position. 2
($h= 6.6\times10^{-34}$ J s)

7. (a) Using s,p,d,f notations, describe the orbital with the following quantum numbers. (i) n=3, l=1 (ii) n=4, l=2 2
(b) Write the electronic configuration of copper (atomic number -29).

8. Write chemical reactions to show the amphoteric nature of water. 2

9. i) Although both CO_2 and H_2O are triatomic molecules, the shape of H_2O molecule is bent while that of CO_2 is linear. Explain on the basis of dipole moment. 2
ii) Give the mathematical expression for dipole moment along with unit.

10. At 0°C, the density of a certain oxide of a gas at 2 bar is same as that of dinitrogen at 5 bar. What is the molecular mass of the oxide? 2

OR

2.9 g of a gas at 95°C occupied the same volume as 0.184 g of dihydrogen at 17°C, at the same pressure. What is the molar mass of the gas?

11. (i) What is the frequency and wavelength of light emitted when an electron in hydrogen atom undergoes transition from an energy level with n=5 to an energy level n=2? [h= 6.6×10^{-34} J s] 3
(ii) What do you mean by Bohr orbit?

12. i) Critical temperature for carbon dioxide and methane are 31.1°C and -81.9°C respectively. Which of these has stronger intermolecular forces and why? 3
ii) What is the difference between boyle temperature and critical temperature?
iii) Write the Van der Waals' equation for n moles of a gas.

13. (i) Define lattice enthalpy. 3
(ii) What is the lowest value of 'n' that allows 'g' orbitals to exist.
(iii) What is Zeeman effect?

14. Balance the following redox reaction by ion-electron method 3

$MnO_4^- + I^- \longrightarrow MnO_2 + I_2$ (basic medium).

15. The drain cleaner, 'Drainex' contains small bits of aluminium which react with caustic soda to produce hydrogen. What volume of hydrogen at 20°C and one bar will be released when 0.15 g of aluminium reacts (At. weight Al= 27u) ($R=0.083$ bar L K^{-1} mol^{-1}). 3

OR

What will be the pressure exerted (in pascal) by a mixture of 3.2 g of CH_4 and 4.4 g of CO_2 contained in a 9 dm^3 flask at 27°C ($R= 8.314$ Pa m^3 K^{-1} mol^{-1}).

16. a) Write the Lewis dot structure of CO. 3
b) Write the reasonating structures of CO_3^{2-} .
c) Define Hydrogen bond. Explain the types of hydrogen bond with an example.

17. i) Explain the reason for the fusion of an organic compound with metallic sodium for testing nitrogen, sulphur and halogen. 3
ii) Explain the following with an example a) Electromeric effect b) Nucleophile

18. (i) What do you understand by electron deficient, electron precise, electron rich compounds of hydrogen. Explain giving one example each. 3
ii) What is Water gas shift reaction?

19. (i) $(CH_3)_3CH \xrightarrow[\text{Oxidation}]{KMnO4} ?$ 3

(ii) Explain (a) dehydrohalogenation and (b) acidic dehydration of alcohols with example.

20. Give the reaction involved in Solvay's process for the preparation of sodium carbonate. Why K_2CO_3 is not prepared by this method. 3

21. a) Give reason: 3
(i) Trans -But-2-ene has more melting point than Cis-But-2-ene.
(ii) Benzene is extra ordinarily stable though it contains 3 double bonds.
b) What are the necessary conditions for any system to be aromatic?

22. i) Define homolytic cleavage 3
ii) Explain why $(CH_3)_3C^+$ is more stable than $CH_3CH_2^+$ and CH_3^+ is the least stable cation.

23. Super dry cleaning owner Mr.Lalit was using tetra chloroethene earlier as a solvent for drycleaning. As per the advice of his friend he started using liquefied CO_2 with a suitable detergent these days and hydrogen peroxide for bleaching purpose. 4
(i) What is the advantage of using liquid CO_2 for dry cleaning?
(ii) What is the advantage of using H_2O_2 as a bleaching agent?
(iii) In your opinion, how is Green chemistry beneficial to the wellbeing of human race?
(iv) What are the values shown by Mr. Lalit?

24. 1) a) Draw geometrical isomers of Hex-2-ene. 5
b) Draw the structure of 2-chloro-3-hydroxy pent-2-enoic acid.
2) Explain why an organic liquid vaporizes at a temperature below its boiling point in its steam distillation.
3) 0.40 g of organic compound gives 0.3 g of AgBr by Carius method. Find the percentage of bromine in the organic compound. [Atomic weight of Ag=108u, Br=80u].

OR

1) Out of benzene, m-nitrobenzene and toluene which will undergo nitration most easily and why?
2) Write the formula of Prussian blue colour formed in Lassaigne's test for nitrogen detection.
3) Explain inductive effect with an example.
4) 0.3780 g of organic chloro compound gave 0.5740 g of silver chloride by Carius method. Find the percentage of chlorine in the organic compound. (Atomic weight of Ag=108, Cl=35.5).

25. 1) Explain why the bond order of N_2 is greater than N_2^+, but the bond order of O_2 is less than that of O_2^+. 5

2) Write two conditions required for the linear combination of atomic orbitals to form molecular orbitals.

3) With the help of MO theory explain why Be_2 molecule does not exist?

OR

1)Describe the hybridization in PCl_5. Why the axial bonds are longer than equatorial bonds in PCl_5?

2) Why NF_3 is less polar than NH_3?

3) Distinguish between sigma and pi bond.

26. 1) Addition of HBr to propene gives 2-bromo propane as the major product. Explain the rule and the mechanism of the reaction. 5

2) An alkene 'A' on ozonolysis give a mixture of 2-methyl propanal and Propanone. Write the structure and IUPAC name of alkene 'A'.

3) Convert: Benzene to m-bromo nitrobenzene.

OR

1) Write short notes on

a) Wurtz reaction b) Decarboxylation

2) Give reason :

a) Acetylene> Benzene > Hexane (account for order of acidity).

b) Boiling point of pentane is more than propane.

3) Draw the Newman projection formula of stable conformation of ethane.