MALAPPURAM DISTRICT HIGHER SECONDARY CHEMISTRY TEACHERS ASSOCIATION

OXY CHEMISTRY 3.0

FIRST YEAR MODEL EXAMINATION 3.4 BASED ON FOCUS AREA 2021

Time 2 hrs Cool Off Time : 20 minutes(Maximum score 60)

- **There is a cool off time of 20 minutes in addition to the writing time.**
- **Read questions carefully before answering.**
- **Calculations,figures and graphs should be shown in the answer sheet itself**

Answer any 6 questions from 1 to 12. Each carries 2 scores. **[6 X 2 = 12]**

1. (i). Which one is not considered as a green housegas
   (Water vapour, Ozone, Carbon monoxide, Methane, Carbon dioxide)
   (ii). What is meant by green houseeffect. [2]

2.Write the difference between inter molecular and intra molecular Hydrogen bond. [2]

3.Draw Sawhorse projection formula for staggered and eclipsed conformations of ethane. [2]

4. a) Name the test to detect the presence of Nitrogen in an organic compound . [1]
   b) What is homologous series? [1]

5. Suggest a method to convert ethyne to benzene . [2]

6. State whether the following statements are true or false. [2]
   (i) Sodium carbonate is commonly known as baking soda.
   (ii) Group I elements are called alkali metals.
   (iii) Sodium bicarbonate is a mild antiseptic for skin infections.
   (iv) Except lithium chloride, other alkali metal chlorides form hydrates.

7. (i). Important oxides of carbon are carbon monoxide and carbon dioxide. Why carbon monoxide is considered as a poisonous gas?. [1]
   (ii). Write the general formula of silicones. [1]

8. State Hess's law of constant heat summation. [2]

9. Calculate pH of 0.01M HCl. [2]

10. a) Name any one salt responsible for permanent hardness of water. [1]
    b) Suggest one method to remove permanent hardness. [1]

11. Electron gain enthalpy of chlorine is greater than that of fluorine. why? [2]

12. Write the numerical values of universal gas constant (R) in J/K mol , L atm / K mol and L bar /K mol [2]

Answer any 8 questions from 13 to 28 Each carries 3 scores **[3x8=24]**

13.Match the following:

[3]

A	B	C
1) Sodium	i) Lithium	a) Solvay process
2) Washing soda	ii) Liquid ammonia	b) Strong reducing agent
3) Alkali metal	iii) $Na_2CO_3.10H_2O$	c) Deep blue solution

14. The simplest boron hydride is diborane

[3]

(i). Draw the structure of diborane.

(ii). From diborane how can you prepare borazine

(iii). Why borazine is called inorganic benzene.

15. (i). Write any two harmful effect of acid rain.

[1]

(ii). Biochemical Oxygen Demand (BOD) for pure water is about 1ppm.

What is the BOD value of highly polluted water? [1]

(iii). How the green chemistry is useful in bleaching of paper? [1]

16. Name different types of molecular hydrides . Give one example for each. [3]

17. Balance the given equation in acidic medium using half reaction method. [3]

$MnO_4^- + I^- \longrightarrow Mn^{2+} + I_2$

18.a) Write expression for K_c for the following reaction [1]

$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

b) What is the relation between K_p and K_c for above reaction. [2]

19.a) Identify the conjugate acid and conjugate base of the following . [2]

i) NH_3

Ii) HCO_3^-

b)Identify Lewis acid among the following [1]

i) NH_3 ii) Na^+ iii) Cl^- iv) $AlCl_3$

20. Distinguish between intensive and extensive properties .

Give one example for each [3]

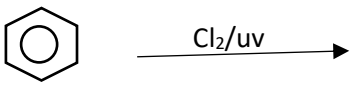
21. a) The hybridisation of carbon in ethane is sp^3 .Then what is the hybridization of Carbon in ethyne?

[1]

b) Explain the geometry of a molecule in which the hybridization involve "d" orbital. [2]

22 .a) Explain the geometrical isomerism using 2-butene as example. [2]

b) Complete the following [1]



23. a) Give an example for homologous series [1]

b) Give the structural formula of the following:

i) 2,4,7- Tri methyl octane [1]

ii) 2-Chloro-4- methyl pentane [1]

24. 2 mol H_2& 2 mol O_2 combine to give 2 mol H_20.

a)Which reactant is the limiting reagent? [1]

b)Why limiting reactant is called so? [1]

c) Calculate the amount of excess reactant? [1]

25. (a) What are the conclusions of Alpha ray scattering experiment? [2]

(b) Write Rydberg formula. [1]

26. Quantum mechanical model gives information about orbital.

(a) Define orbital? [1]

(b) Which quantum number is used to indicate the orbital? [1]

(c) Which quantum number has no direct relation with position of electron within atom? [1]

27.a) Atomic radius of noble gases is greater than halogens.Why? [1]

b) Ionisation enthalpy of Boron is less than Be. Why? [2]

28.a) Why real gases deviate from ideal behaviour? [2]

b) Write van der Waals equation for one mole of gas . [1]

Answer any 6 questions from 29 to 40. Each carries 4 scores . [6 X 4 = 24]

29. a) Write possible chain isomers of the compound with molecular formula C_5H_{12}. [3]

b) How many Sigma and Pi bonds are present in the following

i) CH_3-CH_2-CH_3 ii) CH_3- CH=CH_2 [1]

30. Complete the following : [4]

a)  $\xrightarrow{CH_3Cl/\ AlCl_3}$

b) CaC_2+ H_2O $\longrightarrow$

c) CH_3COONa $\xrightarrow{NaOH+\ CaO}$

d)  $\xrightarrow{con.HNO_3/\ H_2SO_4}$

31. (a). How will you prepare $Ca(OH)_2$ and $CaCO_3$ from CaO [2]

(b).Complete the following reaction [2]

(i). CaO +SiO_2 $\longrightarrow$

(ii). $CaCO_3$ + CO_2 + H_2O $\longrightarrow$

32. Some elements can exist in different crystalline forms and are called allotropes

(i) Write any two important allotropic forms of carbon. [2]

(ii) Which allotropic form of carbon is thermodynamically most stable? [1]

(iii) Name the allotropic forms of carbon in which carbon is undergoing sp^2 and sp^3 hybridisation. [1]

33. The spontaneity of a process is expressed in terms of Gibbs free energy change

(a) How is Gibbs free energy change related to enthalpy change and entropy change? [1]

(b) How is Gibbs free energy change useful in predicting feasibility of a process? [1]

(c) Enthalpy change and entropy change of a reaction are -20KJ/mol and -50J/K mol respectively. Identify the temperature at which reaction becomes spontaneous. [2]

34. a) Write molecular formula of hydrogen peroxide. [1]

b) Draw structure of hydrogen peroxide. [1]

c) Why is hydrogen peroxide stored in wax lined glass or plastic vessels in dark. [1]

d) Give one use of hydrogen peroxide. [1]

35. When some sodium acetate is added to a solution of acetic acid, the concentrationof unionized acetic acid increases.

a) Write the phenomenon involved in the above statement ? Substantiate. [2]

b) What is homogeneous equilibrium ? Give an example. [1]

c) Give an example for acidic buffer. [1]

36. a) What do you mean by lone pair and bond pair of electrons. [2]

b) Based on bond order compare the relative stability of O_2 and O_2^- [2]

37. a) In terms of oxidation number define oxidation and reduction. [2]

b) Identify oxidizing and reducing agent in the following reaction. [2]

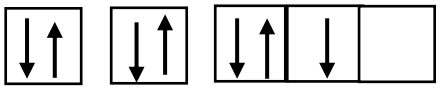
$$H_2S + Cl_2 \longrightarrow 2HCl + S$$

38. a) The compound NaCl is obtained from salt mines and sea water. Which law of chemical combination is illustrated here. State the law? [2]

b) Calculate the amount of CO_2 produced by complete combustion of 72g carbon? [2]

39. a) What are the defects of Bohr Atom model? [2]

b) The electronic configuration of an element is depicted as given below. Which law of electronic configuration is violated here? State the law. [2]



40. a) Write the equation to calculate compressibility factor (Z) ? [1]

b) What is 'Z' value for ideal gas? [1]

c) At 0̊C, N_2 gas has a volume of 2 litres. What will be its volume at 546K? [2]