MALAPPURAM DISTRICT HIGHER SECONDARY CHEMISTRY TEACHERS ASSOCIATION

CHEMISTRY MODEL EXAMINATION 2022

Time 2 hrs **Cool Off Time : 15 minutes** **(Maximum score 60)**

- **There is a cool off time of 15 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 8 questions from 1 to 11. Each carries 2 scores. **[8 X 2 = 16]**

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]

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Answer any 8 questions from 12 to 23 Each carries 3 scores **[3x8=24]**

12.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

13. 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.

14. (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]

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

16.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]

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

i) NH_3

Ii) HCO_3^-

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b)Identify Lewis acid among the following [1]

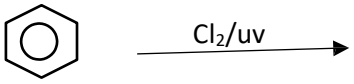
i) NH_3 ii) Na^+ iii) Cl^- iv) $AlCl_3$

18. Distinguish between intensive and extensive properties .

Give one example for each [3]

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

b) Complete the following [1]



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20. 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]

21. 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]

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

(b) Write Rydberg formula. [1]

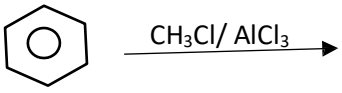
23(a) Define orbital?

[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]

Answer any 5 questions from 24 to 31. Each carries 4 scores . [8 X 4 = 32]

24. Complete the following : [4]

a) 

b) $CaC_2 + H_2O$ ⟶

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

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

25. 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]

26. 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]

27. When some sodium acetate is added to a solution of acetic acid, the concentration of 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]

28. 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]

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

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

$H_2S + Cl_2 \longrightarrow 2HCl + S$

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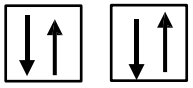
30. a) What are the defects of Bohr Atom model? [2]

b) The electronic configuration of an element is depicted as given below.

Which law of electronic configuration is violated here? State the law. [2]



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

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

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

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