

**MALAPPURAM DISTRICT HIGHER SECONDARY CHEMISTRY TEACHERS  
ASSOCIATION**

**FIRST YEAR CHEMISTRY MODEL EXAMINATION-2022**

[Redox Reactions,Hydrogen,The s-Block Elements,The p-Block Elements,Organic Chemistry – Some Basic Principles and Techniques,Hydrocarbons and Environmental Chemistry]

**Time : 2 Hours, Cool-off time : 15 Minutes**

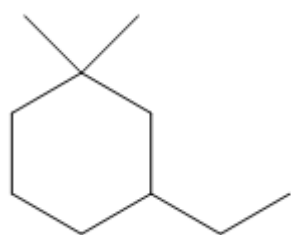
**Score: 60 Marks**

**Answer any 8 questions from 1-11. Each carries 2 scores**

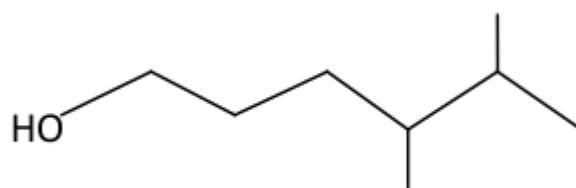
**(8x2=16)**

1. Calculate the oxidation number of N in (i)  $\text{HNO}_3$  (ii)  $\text{NO}_2^-$
2.  $\text{H}_2\text{O}_2$  is stored in wax-lined glass or plastic vessels in dark. Why ?
3. Discuss the position of hydrogen in the periodic table.
4. Write the chemical formula of gypsum. Why gypsum is added during the manufacture of cement?
5. Name the process used for the industrial preparation of sodium carbonate.  
Is this method suitable for the preparation of potassium carbonate? Justify.
6. Draw the structure of diborane.  
Write the name of special bond present in diborane
7. Give the IUPAC name of

(I)



(ii)



8. What is metamerism? Write the metamers of  $\text{C}_4\text{H}_{10}\text{O}$ .
9. Draw the Newman Projections of the eclipsed and staggered conformations of ethane molecule.
10. Give the chemical equations for the steps involved in the ozonolysis of propene.
11. Write any two applications of green chemistry in day-to-day life.

Answer any 8 questions from 12-23. Each carries 3 scores

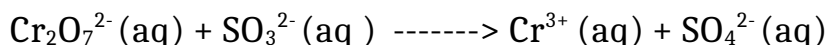
(8x3=24)

12. a) The oxidation number of an atom in the elementary form is ..... (1)

b) Using Stock notation, represent the following compounds :

(i) FeO (ii) H<sub>2</sub>AuCl<sub>4</sub> (2)

13. Balance the following Redox reaction by ion-electron method or oxidation number method (Acid medium)



14. a) Why hard water is unsuitable for laundry purpose? (1)

b) Explain the methods used for the removal of temporary hardness of water. (2)

15. Give reasons for the anomalous behaviour of Li.

Write any two points of similarities between Li and Mg.

16. a) The solution of borax is alkaline. Give reason. (1)

b) Boric acid (H<sub>3</sub>BO<sub>3</sub>) is considered as a weak acid. Why? (1)

c) What is inorganic benzene? How it is prepared (1)

17. a) SiCl<sub>4</sub> can be hydrolysed but CCl<sub>4</sub> cannot. Why? (1)

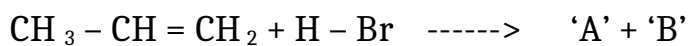
b) What are silicones? (1)

c) Graphite is used as a lubricant in machines. (1)

18. a) How will you detect the presence of nitrogen in an organic compound by Lassaigne's test? (2)

(b) Name two methods for the estimation of nitrogen in an organic compound. (1)

19. Analyze the following reaction:



If 'A' is the major product and 'B' is the minor product, identify 'A' and 'B'.

Also name and explain the related rule.

20. Explain

(i) Wurtz reaction. (1)

(ii) Huckel rule of aromaticity (1)

(iii) Baeyer's reagent (1)

21. a) Draw geometrical isomers of but-2-ene (2)
- b) Give the products formed when benzene reacts with  $\text{CH}_3\text{Cl}$  in presence of anhydrous  $\text{AlCl}_3$  (1)

22. Explain the following terms:

- (a) Acid rain (1)
- (b) BOD (1)
- (c) Green house effect (1)

23. a) Give the chemical name of perhydrol. (1)
- b) Why is  $\text{KO}_2$  paramagnetic? (1)
- c) Liquids having large difference in boiling points are separated by..... method (1)

**Answer any 5 questions from 24-31. Each carries 4 scores each. (5x4=20)**

24. a) What is disproportionation reaction. Write one example to it (2)
- b) Write the reaction involved when metallic zinc is placed in a copper sulphate solution. Justify the above reaction as a redox reaction (2)
25. a) What is heavy water? Mention one of its uses? (1)
- b) Explain the different types of covalent hydrides with suitable examples. (3)

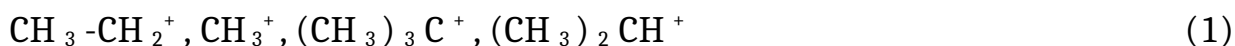
26. Give reasons.

- (i) Solutions of alkali metals in liquid ammonia are blue in colour. (1)
- (ii) When  $\text{CO}_2$  is passed through lime water it turns milky (1)
- (iii) Alkali metals are normally kept in kerosene (1)
- (iv) Be and Mg do not impart any colour to the flame. Give reason (1)

27. What is water gas and producer gas. Write its preparation and uses

28. a) What are nucleophiles? Give one example. (1)

b) Arrange the following carbocation in the increasing order of their stability.



c) Name the type of the fission of a covalent bond which gives free radicals. (1)

d) Explain electromeric effect (1)

29. a) How many 'σ' and 'π' bonds are present in the following compounds?



b) On complete combustion, 0.246g of an organic compound gave 0.198g of  $\text{CO}_2$  and 0.1014g of  $\text{H}_2\text{O}$ . Determine the percentage composition of carbon and hydrogen in the compound. (3)

30. How will you convert

(i) Ethyne to benzene.

(ii) Benzene to chloro benzene

(iii) Phenol to benzene

(iv) Bromo ethane to ethene

31. a) The smog that occurs in cool humid climate is called ..... (1)

b) Suggest any one method to control photochemical smog. (1)

c) The disease caused by excess nitrate in drinking water is..... (1)

d) Carbon monoxide gas is more dangerous than carbon dioxide gas. Why? (1)

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