

CHEMISTRY(Sample Paper)
Class-XI
Second Term Exam

Time:3.00 Hr.

MM:70

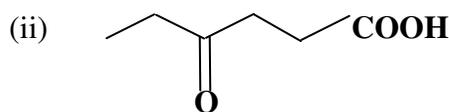
[SET-A]

General Instructions :

- i). All questions are compulsory.
- ii). Questions no. 1 to 8 are very short answer questions and carry 1 mark each.
- iii). Questions no. 9 to 18 are short answer questions and carry 2 marks each.
- iv). Questions no. 19 to 27 are also short answer questions and carry 3 marks each.
- v). Questions no. 28 to 30 are long answer questions and carry 5 marks each.
- vi). Use log tables if necessary, use of calculators is not allowed.

1. The mass of a hydrogen atom is 1.008 *u*. What should be the mass of 32 hydrogen atoms expressed in appropriate number of significant figures. 1

2. Write IUPAC name for: 1



3. How many electrons in an atom may have the following quantum numbers : 1

- (i) $n = 4, s = -\frac{1}{2}$ (ii) $n = 3, l = 0$

4. State one application of aqueous tension. 1

5. State what is +E effect ? 1

6. Define standard enthalpy of formation of a compound.. 1

7. What are polyprotic acids? Give one example 1

8. Of skew, staggered and eclipsed conformations of ethane, which one would have minimum energy? Why? 1

9. What will be simplest formula of the compound with the percentage composition : carbon 80%, hydrogen 20% ? If the molecular mass is 30, calculate its molecular formula. 2

10. Write down the equations only corresponding to the following reactions: 2

- (a) Wurtz reaction (b) Controlled oxidation of methane to methanol

11. State why : 2

- (a) Ionic radii are always different from the corresponding atomic radii.
 (b) Helium although a noble gas is a s-block element.

12. For the main group of the periodic table, the metallic properties of elements vary approximately

with their position as shown in the periodic table : 2

1	2	13	14	15	16	17	18
H							He
A				B			
C				D			

- (i) Will the most metallic element be found at A, B, C or D ? Why ?
 (ii) Will the most non metallic element be found at A, B, C or D ? Why ?

13. (a) Which would have more energy— a photon of red light or a photon of blue light? Why?
 (b) Why Bohr's orbits are called stationary states? 2

OR

- (a) Write down the Rydberg formula for Pfund series.
 (b) What is the significance of the '-e' sign in the expression: $E_n = (-1312 \times Z^2)/n^2 \text{ KJmol}^{-1}$?
14. How do you think the following are related? Justify your answers. 2
 (a) ethanol and dimethyl ether (b) propan-2-one and prop-1-en-2-ol
15. Explain the buffer action of a basic buffer. 2
16. With the help of a suitable reaction, state what is meant by 'Aromatization' of alkanes. 2
17. Account for the following : 2
 (a) Alkali metals and their salts burn with specific coloured flames..
 (b) Li among the alkali metals, happens to be the strongest reducing agent in aqueous media.
18. Explain why : 2
 (i) Atomic radius of Ga is less than that of Al.
 (ii) Only thallium forms a mono chloride.
19. What is meant by β -elimination reaction? With the help of a suitable chemical equation, show how this reaction can be used for preparing an alkene 3
20. (a) Explain the order of stability of carbocations as $(\text{CH}_3)_3\text{C}^+ > (\text{CH}_3)_2\text{C}^+\text{H} > \text{CH}_3\text{C}^+\text{H}_2 > \text{H}_3\text{C}^+$.
 (b) Why do you think, hyperconjugation can be called no-bond resonance? 3
21. Drycleaners in your area frequently use tetrachloroethane for the purpose of drycleaning. They were advised to use liquefied carbon dioxide with suitable detergent as an alternative solvent. Answer the following questions:
 (i) What type of harm to the environment can be prevented by avoiding the use of tetrachloroethane?
 (ii) Will the use of liquefied carbon dioxide and detergent be completely safe from the point of view of pollution? Comment.
22. (a) What is Hund's rule ? 3
 (b) A golf ball has a mass of 40 g and a speed of 45ms^{-1} . If the speed can be measured within an accuracy of 2 %, Calculate the uncertainty in the position.

23. (i) State what is coefficient of viscosity ? 3
 (ii) Calculate the volume occupied by 8.8 g of CO₂ at 31.1⁰C and 1 bar pressure.
 [R = 0.083 bar L K⁻¹mol⁻¹]
24. (i) Derive the relationship : $K_p \neq K_c (RT)^{\Delta n}$. Symbols having usual sense. 3
 (ii) What will be the conjugate bases of the following species :
 (a) HCO₃²⁻ (b) CH₃COOH
25. Balance the following equation in acidic medium by half equation method 3
 $Sn(s) + NO_3^-(aq) + H^+(aq) \rightarrow Sn^{2+}(aq) + NH_4^+(aq) + H_2O(l)$
26. State what are : 3
 (a) Non-stoichiometric hydrides (b) ortho- hydrogen (c) Hydride gap
27. (a) What is slaking of lime? Write the corresponding equation. 3
 (b) Alkali and alkaline earth metals cannot be obtained by chemical reduction method. Comment.
 (c) Why Potassium carbonate cannot be prepared by Solvay process?
- OR**
- (a) Li shows similarities to which element of periodic table ? What this phenomenon is called ?
 (b) What is dead burnt plaster? How is it obtained from gypsum?
 (c) Halides of Li are most covalent whereas halides of Cs are most ionic. Explain.
28. (a) Account for the following : 5
 (i) Although geometries of NH₃ and H₂O are distorted tetrahedral, bond angle in NH₃ is larger than that in H₂O .
 (ii) pi-bond is always formed in association with sigma-bond.
 (b) Use MOT to compare the stabilities and magnetic behavior of H₂⁺ and H₂⁻.
- OR**
- (a) Write two differences between bonding and non bonding molecular orbitals.
 (b) Compare the stability and magnetic behaviour of N₂⁺ and N₂.
29. (a) Derive $\Delta H = \Delta U + \Delta_{ng}RT$, symbols having usual sense. 5
 (b) Calculate the difference between heat of reaction at constant pressure and that at constant volume for the combustion of 2 mole of liquid benzene at 298 K
- OR**
- (a) Explain why heat of neutralization of a strong acid and strong base is always constant irrespective of their nature?
 (b) Calculate the heat of reaction of the following reaction:
 $CO_2(g) + H_2(g) \rightarrow CO(g) + H_2O(g)$
 Given that; $\Delta H_f^\circ CO(g) = -110.5 \text{ KJ}$, $\Delta H_f^\circ CO_2(g) = -393.8$, $\Delta H_f^\circ H_2O(g) = -241.8 \text{ KJ}$ respectively.
30. (a) Complete and balance the following equations :
 (i) $BCl_3 + LiAlH_4 \rightarrow$



- (ii) $B_2H_6 + NH_3 \rightarrow$
(iii) $B_2H_6 + Cl_2 \rightarrow$
(b) Explain why $SiCl_4$ can be hydrolyzed whereas CCl_4 cannot.

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OR

- (a) Complete and balance the following equations :
(i) $BF_3 + NaH \rightarrow$
(ii) $B_2O_3 + CuSO_4 \rightarrow$
(iii) $B(s) + HNO_3(aq) \rightarrow$
(b) Account for the following :
(i) $PbCl_4$ is less stable than $SnCl_4$ but $PbCl_2$ is more stable than $SnCl_2$.
(ii) Elemental silicon does not form graphite like structure.