XI - CHEMISTRY PUBLIC EXAM QUESTIONS COLLECTION (UNIT-WISE)

UNIT-1

1. Calculate the equivalent mass of H_2SO_4.(March/2019)
2. Calculate Oxidation number of oxygen in H_2O_2(March/2019)
3. A Compound having the empirical formula C_6H_6O has the vapour density 47. Find its Molecular formula.(March/2019)
4. What do you understand by the term Mole ? (June/2019)& (June/2023)
5. What are auto redox reactions ? Give an example .(June/2019)
6. Define basicity. Find the basicity of ortho-phosphoric acid.(Sept/2020)
7. Calculate the empirical and molecular formula of a compound containing 76.6% carbon, 6.38% of hydrogen and rest oxygen. Its vapour density is 47.(Sept/2020), (Sept/2022)
8. What is the empirical formula of the following ?(Sept/2021)
a) Fructose ($C_6H_{12}O_6$) b) Caffeine ($C_8H_{10}N_4O_2$)
9. Distinguish between oxidation and reduction.(Sept/2021)
10. Define Gram equivalent mass(May/2022)
11. Calculate the oxidation number of underlined elements.a) CO_2 b) H_2SO_4(May/2022)
12. What is meant by limiting reagents?(Sept/2022)
13. Distinguish between Oxidation – Reduction(Apr/2022)
14. Balance the following equations by Oxidation Number Method.(Apr/2022)
i) $KMnO_4 + Na_2SO_3 \rightarrow MnO_2 + Na_2SO_4 + KOH$
ii) $Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO_2 + H_2O$
15. A compound on analysis gave Na = 14.31%, S = 6.22%, O = 69.5%. Calculate the molecular formula of the compound, if all the hydrogen in the compound is present in combination with Oxygen as Water of Crystallisation. (Molecular mass of the compound is 322) (Apr/2022)

UNIT-2

1. State and explain Pauli's Exclusion Principle.(March/2019),(Apr/2022)
2. Write the de-Broglie equation(March/2019)
3. Calculate the orbital angular momentum for 'd' and 'f ' orbital.(June/2019)
4. Define orbital .what are the n and l values for $3P_x$ and $4d_{x^2-y^2}$electron ?(June/2019)
5. Calculate the uncertainty in the position of an electron, if the uncertainity in its velocity is $5.7 \times 10^5 ms^{-1}$
(June/2019)
6. In degenerate orbitals, why do the completely filled and half filled configurations are more stable than
the partially filled configuration ?(Sept/2020)
7. State Heisenberg's Uncertainty Principle.(Sept/2020), (Sept/2022)&(Apr/2022)
8. Calculate the total number of angular nodes and radial nodes present in 3d and 4f orbitals.(Sept/2020)
9. State Aufau principle.(Sept/2021)
10. What is Exchange energy ?(Sept/2021)
11. Write a note on principal quantum number.(Sept/2021)
12. Calculate the maximum number of electrons that can be accommodated in L shell.(May/2022)
13. How many orbitals are possible for n = 4?(May/2022)
14. Write the electronic configuration and orbital diagram for Nitrogen(May/2022)
15. Describe about magnetic quantum number(Sept/2022)
16. Give the electronic configuration of Mn^{2+} and Cr^{3+}(Sept/2022)
17. Write short notes on Principal Quantum number. (June/2023)
18. Define Orbital. (June/2023)
19. Write short note on i) Magnetic Quantum Number ii) Azimuthal Quantum Nuber(June/2023)

UNIT-3

1. Defice – Valency(March/2019)
2. Explain diagonal relationship. (March/2019)
3. State and exlainDobereiner's"Triad"(March/2019)
4. Ionization potential of Nitrogen is greater than that of Oxygen. Explain by giving appropriate reason.(June/2019)
5. Give the general electronic configuration of Lanthanides and Acrinides .(June/2019)
6. Derive Ionic radius using Pauling's method.(Sept/2020),(May/2022)
7. Explain why the electron affinity of Be and N is almost zero .(Sept/2020)
8. Define Elecronegativity. State the trends in the vary the character in group and period.(Sept/2021)
9. Define Atomic radius.(Sept/2021)
10. Explain diagonal relationship.(Sept/2021)&(Apr/2022),
11. Define electron affinity.(May/2022)
12. How will you determine the ionic character in covalent bond using electronegativity values?(May/2022)
13. Compare the ionization energy of Beryllium and Boron(Sept/2022)
14. What are f- block elements?(Sept/2022)
15. State the trends in the variation of electro negativity in group and periods(Sept/2022)
16. State Modern Periodic Law.(Apr/2022)
17. Explain the fact that the second ionization potential is always higher than first ionization potential. (June/2023)
18. Calculate the effective nuclear charge on 4s electron and 3d electron in Scandium. (June/2023)

UNIT-4

1. how is Tritium prepared ?(March/2019)& (June/2023)
2. Complete the following equation. N_2O_2 + ? Na_2SO_4 + H_2O_2(March/2019)
3. What is syngas ? How it is prepared ?(June/2019)
4. Why hydrogen peroxide is stored in plastic containers, not in glass container ?(June/2019)
5. Write the exchange reactions of Deuterium.(Sept/2020)
6. How do you convert para hydrogen into orthohydrogen ?(Sept/2020),(Sept/2021),(Apr/2022)
7. Write the laboratory method of preparation of Hydrogen.(Sept/2020)
8. Mention the three types of covalent hydrides.(May/2022)
9. Give an example for Ionic hydride and covalent hydride(Sept/2022)
10. What are Isotopes? Write the names of Isotopes of Hydrogen(Apr/2022)
11. What are the uses of Heavy water? (June/2023)
12. What is Water – gas shift reaction? (June/2023)

UNIT-5

1. Explain why $Ca(OH)_2$ is used in white washing .(March/2019)
2. Among the alkaline earth metals BeO is insoluble in water but other oxides are soluble Why?(March/2019)
3. Discuss the similarities between Beryllium and Aluminium.(June/2019),(Sept/2021)& (June/2023)
4. Among the alkali metal halides, which is covalent ?explain with reason .(June/2019)
5. Why blue colour appears during the dissolution of alkali metals in liquid ammonia ?(June/2019)
6. How is bleaching powder prepared ?(Sept/2020)
7. Write the uses of Magnesium.(Sept/2020)
8. What are the reasons for the anomalous properties of Beryllium?(May/2022)
9. Give any three properties of Berllium that are different from other elements of the group.(May/2022)
10. Discuss the similarities between Lithium and Magnesium(Sept/2022)
11. Mention the uses of Plaster of Paris(Apr/2022)
12. Give the uses of Calcium.(Apr/2022)
13. Write the uses of sodium bicarbonate. (June/2023)

UNIT-6

1. What are Ideal gases ?(March/2019)
2. State Diffusion Law(March/2019)
3. What is Inversion temperature ?(June/2019)
4. Derive Ideal gas equation. (June/2019),(Apr/2022)
5. What is Boyle's temperature ? What happens to real gases above and below the Boyle's temperature ?(June/2019)
6. Name the different methods of liquefaction of gases.(Sept/2020)
7. Write the mathematical formula for compressibility factor 'Z'.(Sept/2020)
8. Inside a certain automobile engine the volume of air in a cylinder is 0.375 dm^3, when the pressure is 1.05 atm. When the gas is compressed to a volume of 0.125 dm^3 at the same temperature, what is the pressure of the compressed air ?(Sept/2021)
9. State Dalton Law ofpartial pressures.(May/2022)
10. Write the formula to calculate the molar mass of a solute from relative lowering of vapour pressure values.(May/2022)
11. Distinguish between diffusion and effusion (Sept/2022)& (June/2023)
12. Derive the values of Critical Constants in terms of Vander Waals constants.(Apr/2022)
13. Mention the three methods used for liquefaction of gases. (June/2023)
14. A sample of gas 15^0C at 1 atm has a volume of 2.58 dm^3. When the temperature is raised to 38^0C at 1 atm , does the volume of the gas increase? If so, calculate the final Volume. (June/2023)
15. State Joule – Thomson effect. (June/2023)

UNIT-7

1. State the Third law of Thermodynamics.(March/2019)
2. Calculate the entropy change during the melting of one mole of ice into water at 0^0C . Enthalpy of fusion of ice is $6008 Jmol^{-1}$(March/2019)
3. $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$ Calculate the standard entropy change for the above reaction, given the standard entropies of $CO_{2(g)}$, $C_{(s)}$ and $O_{2(g)}$ are 213.6, 5.740 and 205 JK^{-1} respectively.(March/2019)
4. Define molar heat capacity. Give its unit .(June/2019)
5. How do you measure heat changes at constant pressure ?(June/2019)
6. State Zeroth Law of Thermodynamics.(Sept/2020)
7. Distinguish between extensive and intensive property .(Sept/2020)
8. Derive the relation between enthalpy H and internal energy U for an ideal gas.(Sept/2020)&(June/2023)
9. Calculate the entropy change during the melting of one mole of ice into water at 0^0C and 1 atm pressure.
Enthalpy of fusion of ice is 6008 $Jmol^{-1}$.(Sept/2020)
10. Give any three characteristics of Gibbs free energy .(Sept/2021)& (Sept/2022)
11. Define Hess's Law of constant heat summation .(Sept/2021)
12. State the First Law of Thermodynamics.(Sept/2021)
13. What are the conditions for the spontaneity of a process ?(Sept/2021)&(May/2022)
14. Explain sign convention of heat.(May/2022)
15. Explain the characteristics of internal energy.(May/2022)
16. What is Path function? Give two examples(Sept/2022)
17. If an automobile engine burns petrol at a temperature of 1089 K and if the surrounding temperature is
294 K. calculate its maximum possible efficiency.(Sept/2022)
18. Define Entropy. Give its unit.(Sept/2022)
19. Calculate the entropy change during the melting of one mole of ice into water at 0^0C and 1atm pressure.
Enthalpy of Fusion of ice is 6008 J mol^{-1}(Apr/2022)
20. What are State and Path Functions? Give two examples.(Apr/2022)
21. State the various statements of Second law of Thermodynamics(Apr/2022)
22. Explain intensive properties with two example. (June/2023)

UNIT-8

1. Define – Le – Chatelier principle .(March/2019)&(Apr/2022)
2. Write the Balanced chemical equation for the K_c = CaO_{s} $[CO_{2(g)}]$----- $CaCO_{3(s)}$ (March/2019)
3. What is the effect of added inert gas on the reaction at equilibrium ?(June/2019)
4. What is the relation between Kp and Kc ? Give one example for which Kp is equal to Kc..(June/2019), (Sept/2021)
5. Explain Homogeneous and Heterogeneous equilibria(Sept/2020)&(Sept/2021)
6. Define reaction quotient (Q)(Sept/2020),(Sept/2022) & (June/2023)
7. Give a balanced chemical equation for the equilibrium reaction for which the equilibrium constant is given by expression $K_c = [NH_3]_4 [O_2]_5 [NO]_4 [H_2O]_6$ (May/2022)
8. The equilibrium concentrations of NH_3, N_2 and H_2 are 1.8×10^{-2}M, 1.2×10^{-2}M and 3×10^{-2}M resperctively. Calculate the equilibrium constant for the formation of NH_3, N_2 and H_2.(May/2022)
9. At particular temperature $K_c = 4 \times 10^{-2}$ for the reaction $H_2S_{(g)} \rightleftharpoons H_{2(g)} + \frac{1}{2}S_{2(g)}$ Calculate Kc for each of the following reactions. i) $2H_2S_{(g)} \rightleftharpoons 2H_{2(g)} + S_{2(g)}$ ii) $3H_2S_{(g)} \rightleftharpoons 3H_{2(g)} +$
10. Derive Kc and Kp for synthesis of Ammonia(Sept/2022)
11. State law of mass action.(Apr/2022)
12. Write Kp and Kc for the reaction $2CO_{(g)} \rightleftharpoons CO_{2(g)} + C_{(s)}$ (June/2023)

UNIT-9

1. State term 'Isotonic solution'(March/2019) &(May/2022)
2. NH_3 and HCl do not obey Henry's law. Why ?(March/2019)
3. What is vapour pressure of a liquid ?what is relative lowering of vapour pressure ?(June/2019)
4. Draw and explain the graph obtained by plotting solubility versus temperature for calcium chloride.(June/2019)
5. What is the mass of glucose($C_6H_{12}O_6$) in it one litre solution which is isotonic with 6gl^{-1} of urea (NH_2CONH_2)?(June/2019)
6. Calculate the mole fraction of methanol and water when 0.5 mole of methanol is mixed with 1.5 moles of water.(Sept/2020)
7. What is Van't Hoff factor 'i' ?(Sept/2020)
8. What is Molal depression constant ?(Sept/2021)
9. What are Ideal solutions ? Give example.(Sept/2021)
10. How will you determine the molar mass of a solute from osmotic pressure ?(Sept/2021)
11. How will you determine the molar mass of solute from elevation of boiling point?(May/2022)
12. 50g of tap water contains 20mg of dissolved solids. What is the TDS value in ppm?(Sept/2022)
13. What are the conditions when a solution tends to behave like an ideal solution?(Sept/2022)
14. Define Osmotic pressure(Apr/2022)
15. What are limitation of Henry's Law?(Apr/2022)
16. Define Molality. (June/2023)
17. Write the four colligative properties. (June/2023)

UNIT-10

1. What is called Bond Length ? Name the techniques through which the length of a bond van be determined.(March/2019)
2. Both C_2H_2 and CO_2 have the same structure .explain why ? (March/2019)
3. Write structure of the following compounds a) NH_3 b) BF_3 (March/2019)
4. Linear form of Carbondioxide molecule has two polar bonds. Yet the molecule has Zero dipole moment.
Why ?(June/2019)
5. Draw the M.O diagram for Oxygen molecule. Calculate its bond order and magnetic
character.(June/2019)
6. Calculate the formal charge on carbon and oxygen for the following structure (June/2019)
7. Write the shape and molecular geometry for BF_3.(Sept/2020)
8. What is Hybridisation ? Mention the type of hybridization found in CH_4 .(Sept/2020)
9. Give the shapes of molecules predicted by VSEPR Theory. a) $BeCl_2$ b) NH_3 c) H_2O(Sept/2021)
10. Define Bond order.(Sept/2021)
11. What are the salient features of VB Theory ?(Sept/2021)
12. Explain the formation of H_2 molecule using MO Theory .(Sept/2021)
13. Describe the formation of HF molecule by orbital overlap(May/2022)
14. Define a) Bond length b) Bond angle c) Bond enthalpy(May/2022)
15. Mention the shape of the following molecules based on VSEPR theory(Sept/2022)
16. i) BF_3 ii) BrF_3 iii) PCl_5 iv) SF_6 v) IF_7
17. Discuss the formation of O_2 molecule using MO theory.(Sept/2022)
18. Draw the Lewis structure for :i) H_2O ii) HNO_3(Apr/2022)
19. Explain the salient features of Molecular Orbital theory.(Apr/2022)
20. Define i) Sigma bond ii) pi bond (June/2023)
21. Discuss the formation of N_2 molecule using MO Theory. (June/2023)

UNIT-11

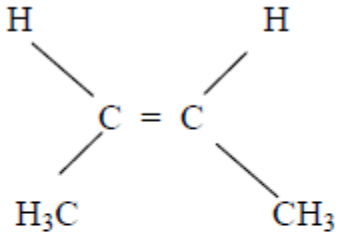
1. Describe the reaction involved in the detection of Nitrogen in an organic compound by Lassaigne method.(Mar/2019)

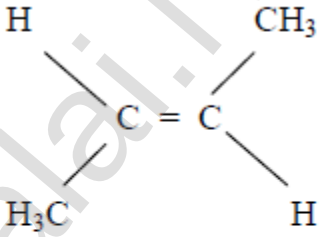
2. Which is the suitable method for detection of Nitrogen present in food and fertilizers ?(Mar/2019)

3. Give the structural formula for the following compounds.(Mar/2019)

a) m-dinitrobenzene b) p-dichlorobenzene c) 1,3,5-trimethyl benzene

4. Identify the cis and trans isomers for the following compounds.**(Mar/2019)**





5. Write the **IUPAC** name for the following compounds.**(Mar/2019)**

A) $CH_3 - CH(CH_3) - CH_2 - CH_3$

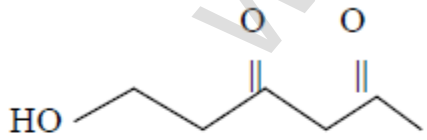
B) $H_3C - C(CH_3)_2 - CH_3$

6. How do you detect the presence of Nitrogen and sulphur together in an organic compound ?(June/2019)

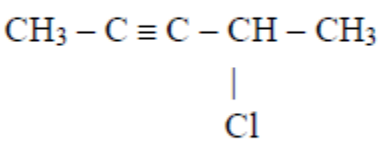
7. Explain a suitable method for purifying and separating liquids present in a mixture having very close boiling point .(June/2019)

8. Write the IUPAC names of the following compounds.(June/2019)

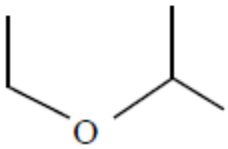
a)



b)



c)



9. Explain the purification of solid organic compound.(Sept/2020)
10. Which element exhibits maximum catenation and why ? (Sept/2020)
11. Give the general formula for the following class of organic compounds.
a) Alkanes b) Alkenes c) Alkynes (Sept/2021)
12. What is meant by Homologous series ?(Sept/2021)
13. Give the structure for the following compounds,
1) 3-methylpentane 2) 2-methyl-2-ol 3) Propanone.(Sept/2021)
14. What is meant by optical isomerism ?(May/2022)
15. Give the IUPAC names of the following compounds.(May/2022)& (June/2023)

i) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - \underset{\displaystyle Br}{\underset{|}{CH}} - CH_3$

ii) $CH_3 - O - CH_3$

iii) $CH_3 - CH_2 - \underset{\displaystyle OH}{\underset{|}{CH}} - CHO$

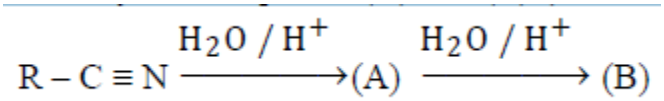
iv) $CH_2 = CH - CH = CH_2$

v) $CH_3 - C \equiv C - \underset{\displaystyle Cl}{\underset{|}{CH}} - CH_3$

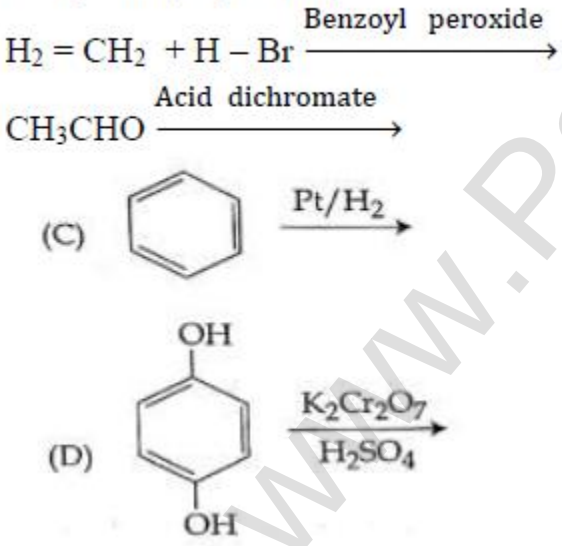
16. Give an example for each of the following type of organic compounds.(Sept/2022)
i) Non-benzoid aromatic compound
ii) Aromatic heterocyclic compound
iii) Carbocyclic compound
17. Describe any two types of constitutional isomers.(Sept/2022)
18. Write the structural formula for the following compounds.(Apr/2022)
i) m-dinitro benzene ii) p-dichloro benzene iii) 1,3,5-trimethyl benzene
19. Give any three characteristics of Organic compounds(Apr/2022)
20. Find the functional group of the following compounds (Apr/2022)
a) Acetaldehyde b) Oxalic acid c) Dimethyl ether d) Methyl amine
21. Describe the classification of organic compounds based on their structure (June/2023)

UNIT-12

1. *Explain with example the Positive Mesomeric Effect.(March/2019)*
2. *What are Nucleophiles and Electrophiles ? Give one example each(March/2019)*
3. *Identify the compound (A) and (B).(March/2019)*



4. *The bond length between all the four carbon atoms is same in 1.3 –butadiene .Explain with reason. (June/2019) .*
5. *Explain about Inductive effect.(June/2019)&(Apr/2022)*
6. *Write the no bond resonance structure shown by propene.(Sept/2020)*
7. Complete :**(Sept/2020)**



8. *What is Resonance ?(Sept/2021)*
9. *Give any three differences between Nucleophiles and Electrophiles.(May/2022)*
10. *Describe Fajan's Rule.(Sept/2022)& (June/2023)*
11. *Write short notes on Hyper Conjugation.(Sept/2022)*

UNIT-13

1. .How is Alkane prepared from Grignard reagent ?(March/2019)
2. How will you get the following products with the given reactants ?(March/2019)

A) Acetylene Benzene
B) Phenol Benzene
C) Benzene Toluene

3. Write any two different components you get during fractional distillation of Coal Tar at any two different temperatures.(March/2019)
4. The simple Aromatic Hydrocarbon compound (A) reacts with Bromine to five (B). Compound (A) reacts with Raney Ni and gives (C). identify (A), (B) and (C).(March/2019)
5. What happens when acetylene undergoes Ozonolysis ?(June/2019)
6. What is polymerization ?Explain the two types of polymerization reaction of acetylene .(June/2019)
7. What do you mean by conformation ?explain about staggered conformation in ethane.(June/2019)
8. An organic compound (A) of molecular formulaC2H6O on heating with conc H2SO4 gives compound (B). (B) on treating with cold dilute alkaline KMnO4 gives compound (C). Identify (A), (B) and (C).and explain the reactions.(June/2019)
9. Explain the different types of polymerization in ethyne.(Sept/2020)
10. Explain Geometrical isomerism in 2-butene.(Sept/2020)
11. Write Birch reduction.(Sept/2020)&(Sept/2022)
12. Complete the following :(Sept/2021)

a) $CH_3 - CH = CH_2 + H_2Pt$
b) $CH_3MgCl + H_2O$

13. Suggest a simple chemical test to distinguish propane and propene.(Sept/2021)
14. How does Huckel rule help to decide the aromatic character of a compound ?(Sept/2021)& (June/2023)

15. Write the reaction for conversion of acetylene to benzene.(Sept/2021)
16. How will you convert ethyl chloride to ethane ?(May/2022)
17. What happens when ethylene is passed through cold dilute alkaline potassium permanganate ?
(May/2022)
18. How will you prepare the following compounds from benzene?(May/2022)
i) Nitrobenzene ii) Benzene sulphonic acid iii) BHC
19. How will you prepare ethane by Kolbe's electrolytic method?(Sept/2022)
20. An organic compound (A) C2H4decolurises bromine water. (A) on reaction with chlorine gives (B). (A)
reacts with HBr to give (C) . Identify (A), (B) and (C).Explain the reactions. (Sept/2022)
21. Explain the structure of Benzene (Apr/2022)
22. Complete the reaction(June/2023)

i) $CaC_2 \xrightarrow{+H_2O}$ ii) How is DDT prepared?

UNIT-14

1. Write a note on Williamson's synthesis(March/2019)
2. Among the following compounds, o-dichloro benzene and p-dichloro benzene, which has higher melting point ? Explain with reason.(June/2019)
3. A simple aromatic hydrocarbon (A) reacts with chlorine to give compound (B). compound (B) reacts with ammonia to give compound (C) which undergoes carbylamines reaction. Identify (A), (B) and (C) and explain the reaction(June/2019)
4. Give the structure and uses of DDT.(Sept/2020)
5. Write any three strategies to control environmental pollution.(Sept/2020)
6. Write short notes on Swarts reaction.(Sept/2021)
7. Simplest alkene (A) reacts with HBr to form compound (B). compound (B) reacts with ammonia to form compound (C) of molecular formula, C3H7N. Compound (C) undergoes carbylamines test. Identify (A), (B) and (C). and write the reactions.(Sept/2021)
8. Complete the following reactions :(May/2022)

i) $C_6H_5Cl + 2NH_3 \xrightarrow{250^0C\ /\ 5\ atm}$

ii) $C_6H_5Cl + 2Na + Cl - C_6H_5 \xrightarrow{Ether\ /\ \Delta}$

9. Simplest alkene (A) reacts with HCl to form compound (B). compound (B) reacts with ammonia to form compound (C) of molecular formula C2H7N, compound (C) undergoes carbylamines test. Identify (A),(B) and (C) (May/2022)

10. Mention any two methods of preparation of Haloalkanes from Alcohols.(Sept/2022)

11. Starting from CH3MgI, how will you prepare the following ?(Sept/2022)

12. i) Acetaldehyde ii) Acetone iii) Methane

13. Write short notes on Friedel Craft's reaction(Apr/2022)

14. An Organic compound (A) with molecular formula C2H5Cl reacts with aqueous KOH and gives
compound (B) and with alcoholic KOH gives compound (C). Identify (A),(B) and (C).(Apr/2022)

15. Starting from CH3MgI how will you prepare the following?(Apr/2022)

16. a) Ethyl alcohol b) Acetaldehyde c) Ethyl methyl ether

17. What happens when acetyl chloride is treated with excess of CH3MgI ? (June/2023)

18. Complete the following(June/2023)

$$CH_3 - CH_2 - OH \xrightarrow{\text{Conc } H_2SO_4 \text{ /430 } -440 \text{ K}} A \xrightarrow{\text{HBr / Benzoyl Peroxide}} B$$

UNIT-15

1. Define Acid rain(March/2019)
2. What is Green Chemistry ?(June/2019)& (June/2023)
3. Write notes on the adverse effect caused by Ozone depletion.(June/2019)
4. What is green house effect ?name the gases that cause green house effect.(Sept/2020)
5. Write any three strategies to control environmental pollution.(Sept/2020)
6. What are Particulate Pollutants? Give example(Apr/2022)
7. What is Eutrophication? (Apr/2022)
8. Which is considered to be earth's protective umbrella? Why? (June/2023)
9. Differentiate BOD and COD (June/2023)