



CHEMISTRY

BOOKS - JEEVITH PUBLICATIONS CHEMISTRY (KANNADA ENGLISH)

PUE DEPT. MODEL QUESTION PAPER

Part A

1. State Law of definite proportions.



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2. Name the fundamental particle of an atom that has highest value for its e/m



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3. Write the resonance structures of ozone.



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4. A molecule XY_4 has four bond pairs and 2 lone pairs of electrons for its central atom. Predict the shape of the molecule.



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5. How many valence electrons are present around phosphorous is PCl_5 ?

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6. What is the change in internal energy of a system, if 10 J of heat is supplied to it and 15 J of work is done by it?

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7. H^- is a Lewis base. Give reason.

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8. What is the composition of water gas?

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9. Which alkali metal is the strongest reducing agent?

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10. Draw the staggered conformation of ethane.

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11. Mention one use of Chromatography.

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Part B

1. How many significant figures are in 0.2500 g?

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2. If the mass of one molecule of water is 18 amu, what is the mass of one mole of water molecules?

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3. How does the atomic size vary as you go down a group ?

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4. What are Iso-electronic species? Arrange the following in the increasing order of their ionic radius N^{-3} , Mg^{+2} , Na^{+} and O^{-2} .

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5. Among N, Cu, Rn and U, identify the element that (i) belongs to d-block, (ii) is an actinoid.

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6. State Charles' law.

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7. Give the relationship between molecular mass and density of a gas.

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8. What happens when (i) Sodium hydride is treated with water?

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9. What happens when Hydrogen peroxide is treated with lead sulphide?

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10. What is the repeating unit in Organosilicon polymer? Name the starting (raw) material used in the manufacture of Organosilicon polymer.

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11. How is Ozone layer formed in the stratosphere?

Name a chief chemical that causes its depletion.



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Part C

1. Explain Werner Heisenberg's uncertainty principle (qualitative).



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2. Calculate the wave number of the spectral line of shortest wave length appearing in Given

$$R = 1.09 \times 10^7 m^{-1}$$

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3. (i) Mention two conditions for the linear combination of atomic orbitals.

(ii) Write the electronic configuration of C_2 molecular.

What is its magnetic property?

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4. Define Standard Enthalpy of Vapourisation.

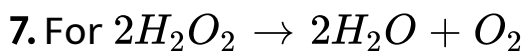
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5. Write thermo chemical equation for vaporization of ethanol

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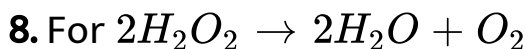
6. Calculate the enthalpy of vapourisation of ethanol, given enthalpies of formation of liquid ethanol and gaseous ethanol as $-277.6J$ and -235.4 kJ respectively.

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What is the oxidation number of Oxygen in (2)?

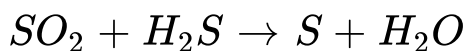
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What type of Redox reaction is it?

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9. Balance the Redox reaction using oxidation number method.





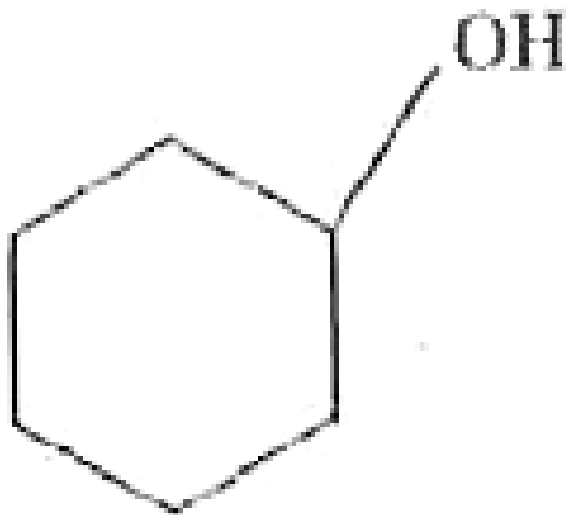
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10. How is sulphur detected using the Sodium fusion extract of the given organic compound?



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11. Give the IUPAC name of



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12. Give equation for each of the following reactions.

Water is dropped on Calcium carbide

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13. Give equation for each of the following reactions.

Hydrogen bromide is added to propene in presence of peroxide



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14. Give equation for each of the following reactions.

Phenol is heated with Zinc dust.



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15. Give equation for each of the following reactions.

Benzene is treated with Chlorine in presence of Ferric

chloride.



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16. Explain the mechanism of nitration of benzene .



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Part D

1. Calculate the mass of Magnesium required to completely react with 250cm^3 of 0.1 M HCl. Atomic mass of $Mg = 24$

Or (Internal choice)

100cm^3 of a solution of HCl completely neutralizes 25cm^3 of 0.1 M NaOH.

Calculate the mass of HCl present in 100cm^3 .

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2. Mention two postulates of Dalton's atomic theory?

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3. What is Empirical formula? Give an example for a compound whose Empirical formula and molecular formula are the same.

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4. Define the terms,

Bond order



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5. Define the terms,

Bond length



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6. Define the terms,

Bond enthalpy





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7. With respect to the formation of Ethane molecule mention.

hybridation of Carbon.



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8. With respect to the formation of Ethane molecule mention.

number of sigma bonds in the molecule.



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9. Write three postulates of Kinetic theory of gases.

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10. Two gases A and B have critical temperatures as 250 and 125 K respectively. Which one of these can be liquefied easily and why?

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11. Calculate the pOH of a solution obtained when 0.05 mol NH_4Cl is added and dissolved in 0.025 M ammonia solution. K_b for ammonia is 1.77×10^{-5}





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12. For the equilibrium $BaCO_3(s) \rightleftharpoons BaO(s) + CO_2(g)$

(i) Write the expression of K_p .



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13. For the equilibrium



What is the effect of increase in pressure on the above equilibrium?



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14. Give reason: Coordination number of Be is 4, but that of Mg is six

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15. Give Reason: Lithium iodide is covalent but potassium iodide is ionic.

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16. Compared the 2nd Ionisation enthalpies and Hydration enthalpies of Alkali and Alkaline earth metals/ions.





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17. What is the chemical formula of plaster of paris?



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18. Name of method by which Halogen present in an organic compound is estimated ? 0.1 g of an organic compound gives 0.08 g of silve bromide, Calculate the percentage of bromite.

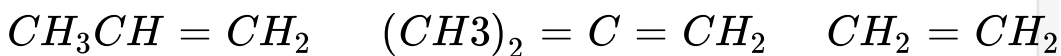
Atomic masses : $Ag = 108$, $Br = 80$



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19. What is the inductive effect?

Which one of the following shows maximum hyper conjugation effect?



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20. State the three postulates of Bohr's theory of hydrogen atom.



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21. Calculate the energy with 5th orbit of hydrogen atom.

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22. Define enthalpy of formation.

Calculate Enthalpy of formation of $C_2H_6(g)$ given the enthalpy of combustion of $C_2H_4(g)$, $C_2H_6(g)$ and $H_2(g)$ as -140 kJ/mol, -1550 kJ/mol and -286 kJ/mol respectively.

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23. State Le-Chatelier's principle.

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24. What is common ion effect? Give an example.

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25. What is the pH of 1M NaCl at 298 K.

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26. What happens to the pH of a solution of Acetic acid when some sodium acetate is dissolved in it? Explain.

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27. Acetic acid has a dissociation constant of 1.8×10^{-5} , Calculate the pH values of the decinormal solution of Acetic acid.

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28. Calculate the ionization constant of 0.05M weak acid if it's degree of dissociation is 0.018





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29. Describe LCAO method for the formation molecular orbitals of Hydrogen. Write the energy level diagram for these orbitals.



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30. Give two difference between bonding molecular orbital and antibonding molecular orbital.



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31. What is the formulae of inorganic benzene? Write the structure of Diborane and explain the nature of bonding in it.

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32. What are Fullerenes? How are they prepared?

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33. Write the principles involved in the estimation of (i) Halogens (ii) Sulphur present in an organic compound.

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34. Name the element estimated by Kjeldhal's method.

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35. Calculate the mole fraction of Ethanol (C_2H_5OH) in the solution containing 20 g of Ethanol and 100 g of water.

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36. How are 2 mole NaOH and 2 Molar NaOH different?

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37. State Gay Lussac's Law.

Calculate the pressure exerted by 4 mole of gas occupying a volume of 1.5m^3 at 100 K. Given $R = 8.314$ J/k/mol.

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38. Draw z vs PO graph for an ideal gas, and CO_2 gas

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39. What is buffer solution? Give one example of acidic buffer solution.



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40. Calculate the solubility of $A_2 \times 3$ pure water.

Assuming that neither kind of ion reacts with water. The

solubility product of $A_2X_3K_{sp} = 1.1 \times 10^{-23}$

Explain with equation.



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41. Give equations for the reactions that occur when

Sodium metal is dropped into water.



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42. Give equations for the reactions that occur when Magnesium metal is heated in air.



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43. Give equations for the reactions that occur when Sodium peroxide dissolves in water.



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44. What happens when limited amount of CO₂ gas is passed into milk of lime?

Give equation.





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45. Between $-NO_2$ and $-Br$, which one of these is a meta directing group?

Write equation for the conversion of Benzene into p-Bromonitrobenzene.



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46. State anti Markovnikoff's rule and explain with an example.



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1. For the Element with atomic number 24:

(i) Write the electron configuration

(ii) Write the value of u and l for its electron in the valence shell.

(iii) How many unpaired electrons are present in it?



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2. What is photo electric effect ? Does the effect support particle nature or wave nature of light?



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3. What is a spontaneous process?

For the equilibrium $A + 2B \rightleftharpoons C$

ΔH is $+400\text{kJ}$ and ΔS is $+200\text{JK}^{-1}$

Calculate the temperature above the reaction becomes spontaneous?



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4. For $Cl_2 \rightarrow 2Cl$ Assign the signs for ΔG and ΔS .



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5. Calculate the solubility of Ag_2CrO_4 in 0.1M

$AgNO_3$ K_{sp} of $Ag_2CrO_4 = 1 \times 10^{-12}$

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6. An aqueous solution of sodium acetate has pH greater than 7. Explain with equation.

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7. Give reasons: The stability of +3 oxidation state of 13 group elements decreases down the group.

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8. Give reasons: Boron is used as control rods in nuclear reactors.

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9. Give reason: Graphite is soft and slippery.

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10. Complete the following equation :



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11. Give two tests to distinguish between alkanes and alkenes.

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12. Naphthalene is an aromatic compound justify the statement using Huckel rule.

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13. Draw cis and trans structures of $CHBr = CHBr$

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1. What is the SI unit of density?

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2. How do isotopes of a element differ from one another?

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3. What are representative elements?

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4. Between Co and CO_2 , which diffuses faster?

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5. Give a chemical reaction for which $\Delta H = \Delta U$

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6. Give the relation between K_p and K_c for the be
equilibrium $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

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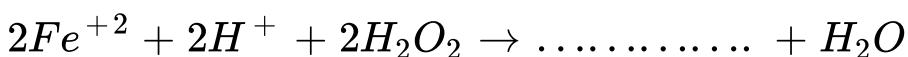
7. What is the chemical used in Clarke's process to remove temporary hardness of water?

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8. Write the General outer electronic configuration of s-block elements.

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9. Complete the following equation



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10. Suggest a suitable method to separate sugar and salt from an aqueous solution containing them.

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11. Trans-2 Butene has higher melting point than cis-2-butene, why?

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1. Name the quantum number that specifies : Size of an orbital

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2. Name the quantum number that specifies : Shape of an orbital

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3. Distinguish between a sigma and a pi bond.

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4. Mention of causes for the deviation of real gas from ideal behaviour.

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5. Why do group 1 metals have lower first ionisation Enthalpy than corresponding group 2 metals.

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6. Justify the position of Hydrogen in the periodic table.

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7. What happens when formic acid is heated with Cone. H_2SO_4 ? Give the equation.

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8. What is meant by Biochemical Oxygen Demand (BOD)? What is its significant?

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Part C

1. A compound contains 4.07% hydrogen, 24.27% Carbon and 71.65%, Chlorine. Its molar mass is 98.96.

Calculate its Empirical and Molecular formulae.

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2. Explain the formation of methane molecule on the basis of hybridization.

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3. Between O_2 and O_2^- which one has higher bond order?

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4. What is Oxidation Number? What is the oxidation Number of Cl in $KClO_3$?

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5. Write separate equations for the oxidation and reduction reactions occurring in the following redox reaction. $2Fe + 2HCl \rightarrow 2FeCl_2 + H_2$

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6. What are Isothermal and Adiabatic process?

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7. State the II law of Thermodynamics. Give the equation that relates Gibbs energy with Entropy and Enthalpy of a system?

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8. Giving justification, categorise the following species as Nucleophile or Electrophile .

(i) SO_3 (ii) C_2H_5O

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9. Mention the differences between Fractional distillation and Steam Distillation.

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10. Write the IUPAC names of the following compounds.

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11. Explain position isomerism with example.

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12. Given equations for the reactions that occurs when Ehyene is treated with Baeyer's reagent.

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13. Given equations for the reactions that occurs when Eenthyene is treated with sodium metal in the ratio 1:2.

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14. Explain Friedel -Craft's acylation with an example.

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