

BSc BEd Sem I Exam 2020

Subject- Chemistry

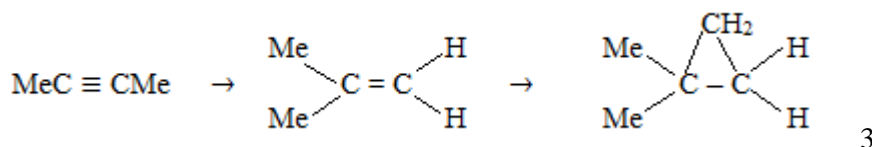
Course-CC1

FM-50

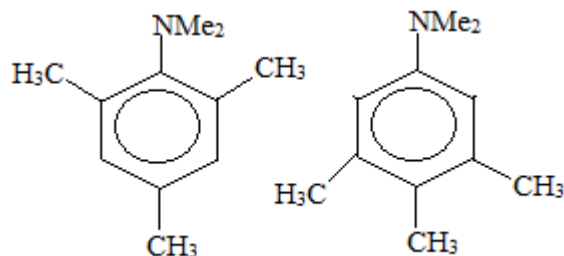
Time: 2 hrs

Answer any 10 of the following questions. (5×10=50)

1. A) Pauli exclusion principle gives the measure of maximum capacity of an orbital to accommodate the electrons – justify. 3
B) Write the possible arrangements of the electrons in p^3 configuration and the arrangements with maximum exchange energy. 2
2. A) Calculate Pauling's electronegativity of chlorine from the following data: Bond energy (Kcal mol⁻¹): H₂ (104); Cl₂ (57); HCl (102), Pauling's electronegativity of H is 2.2. 3
B) On the basis of Slater's rule show that when Fe²⁺ is reduced, electrons enter in the 3d orbital rather than the 4s orbital. 2
3. A) Sn(II) is a fairly strong reducing agent which is readily oxidised to Sn(IV), but Pb(IV) is a powerful oxidizing agent which is easily reduced to Pb(II). Explain. 3
B) Explain the significance of magnetic quantum number. 2
4. A) Explain the variation of colour and solubility of halides of silver in the light of Fajan's rule. 3
B) Account for the type of defects in NaCl and AgCl crystals. 2
5. A) Indicate the hybridization of the central atom and predict the shapes of the following using VSEPR theory: XeF₅⁻, IO₂F₂⁻, TeCl₄²⁻ 3
B) Which one is longer and why? – Cl – O bond length in ClO₂⁺ and ClO₂⁻ 2
6. A) Using MO theory, explain relative stability and magnetic character of: N₂, N₂⁺, N₂⁻, N₂²⁻ 3
B) Establish the Born – Haber cycle for the formation of MgS (s) starting from Mg (s) and S₈ (s). 2
7. A) Give the appropriate reagents to carry out the following transformations. Explain your answer.

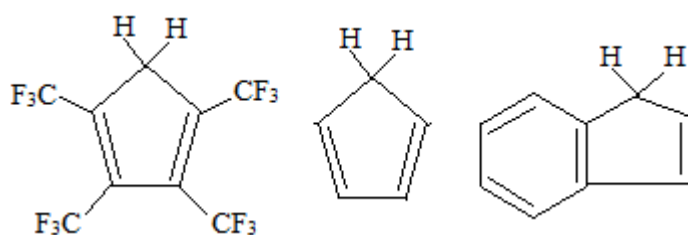


- B) Which has higher C – N bond length in between the following compounds : 2

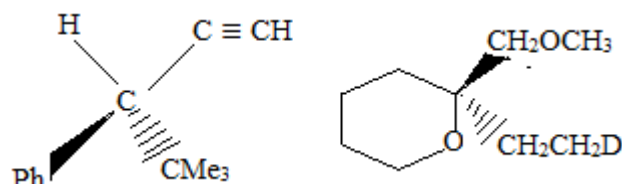


8. A) Predict major and minor products with stereochemistry, when maleic acid is treated with Br₂ in CCl₄. Give mechanism. 3
B) [A] on ozonolysis gives nonane-2,8-dione. What is [A]? 2
9. A) Define carbene. What happens when singlet and triplet carbene are separately treated with 2-butene. Give explanation. 3
B) Among the hydrohalides HBr is most appropriate for hydrohalogenation of alkenes. Explain. 2

10. A) Arrange the following compounds in order of decreasing acidity and explain. 3



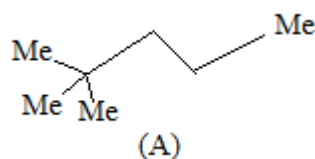
B) Designate R/S descriptor of the following compounds (indicate priority sequence). 2



11. A) Draw as directed: 3

- (i) (R) – 2-bromobutane (Gauche form in newmann projection)
- (ii) Erythro – 3-amino – 2-butanol (Anti form of sawhorse representation)

B) Apply corey-House method to synthesize compound (A) using two suitable substrates having four carbon and three carbon units respectively. Give argument for your choice. 2



12. A) How would you carry out the following conversions: 3

- i) 1 – butene \rightarrow 1,3 – butadiene
- ii) Acetylene \rightarrow $\text{HO}_2\text{C} - \text{C} \equiv \text{C} - \text{CO}_2\text{H}$

B) Comments on the stereogenicity of C-3 of the following structure: 2

