



15. Describe Mond's process of extracting Nickel from its ore.
16. Write a short note on chelating ligands and chelates.
17. What is aromaticity ? Discuss the Huckel's theory of aromaticity.
18. Define conformation. Give the Sawhorse and Newmann representations of ethane and discuss their relative stability. **(Weightage 4×2=8)**

SECTION – D

Answer **any 2** questions. **Each** carries a weightage of **4**.

19. a) What is meant by shielding and deshielding of protons ? Why is tetramethyl silane used as a reference used in NMR ?
b) Discuss some important applications of organometallic compounds.
20. State the valence bond theory of co-ordination complexes. Discuss the geometry and magnetic behaviour of hexamine cobalt (III) ion on the basis of this theory.
21. Write short notes on :
a) racemisation
b) resolution
c) asymmetric synthesis
d) optical activity of diphenyls. **(Weightage 2×4=8)**



Reg. No. :

Name :

III Semester B.Sc. Degree (CCSS – Supple./Imp.)
Examination, November 2015
(2013 and Earlier Admission)
COMPLEMENTARY COURSE IN CHEMISTRY
3C05 CHE : Chemistry for Physical Sciences

Time : 3 Hours

Max. Weightage : 25

SECTION – A

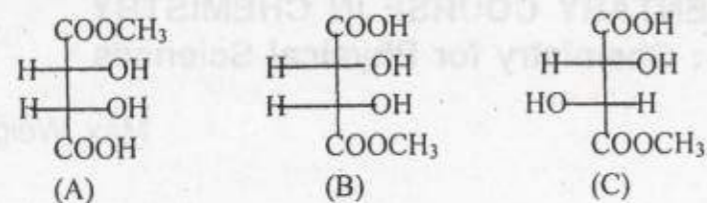
Answer **all** questions. **Each** bunch of **four** questions carries a weightage of **1**.
Choose the correct answer.

1. i) A system which can exchange mass as well as energy with the surroundings
a) Open b) Closed c) Isolated d) None of these
- ii) In which of the following instances does entropy decrease ?
a) Crystallisation of sucrose b) Dissolving sucrose
c) Melting of ice d) Burning of camphor
- iii) The most abundant metal in the earth's crust
a) Aluminium b) Oxygen c) Iron d) Titanium
- iv) The process employed for refining Aluminium
a) Baeyer's process b) Hoopé's process
c) Serpek's process d) Hall's process
2. i) What is the oxidation number of Fe in $[\text{Fe}(\text{CN})_6]^{3-}$?
a) 3 b) 2 c) 1 d) 0
- ii) Which of the following is a neutral ligand ?
a) Chloro b) Pyridine c) Nitrosylium d) Cyano



- iii) The hybridisation of carbon in acetylene is
 a) sp^3 b) sp^2 c) sp d) sp^3d
- iv) Which of the following is not a nucleophile?
 a) CN^- b) H_2O c) BF_3 d) NH_3

3. i) The correct statements about the compounds A, B and C is



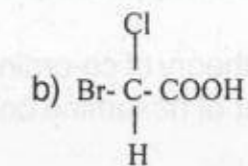
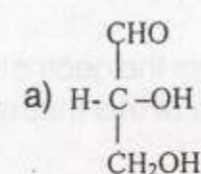
- a) A and B are identical b) A and B are diastereoisomers
 c) A and C are enantiomers d) A and B are enantiomers
- ii) Which of the following compounds will exhibit geometrical isomerism?
 a) 2-butene b) propene c) ethene d) 1-butene
- iii) The process of separation of racemic mixture is called _____
 a) Racemisation b) Asymmetric synthesis
 c) Resolution d) Racemic modification
- iv) Which among these compounds does not exhibit optical isomerism?
 a) $CH_3CHBrCOOH$ b) CH_2ClCH_2COOH
 c) $CH_3CHOHCOOC_2H_5$ d) $CH_3CHOHCOOH$
4. i) Which among the following is a σ bonded organometallic compound?
 a) Grignard reagent b) Ferrocene
 c) Zeise's salt d) Dibenzenechromium
- ii) Which among these organometallic compounds possess both σ and Π character?
 a) Diethyl zinc b) Trimethyl aluminium
 c) Tetraethyl lead d) Iron pentacarbonyl
- iii) Pick a nucleus that does not show nuclear magnetic resonance.
 a) 1H b) ^{12}C c) ^{13}C d) ^{19}F
- iv) Identify the spectra that correspond to the radio frequency region.
 a) Microwave b) NMR c) IR d) UV (4x1=4)



SECTION - B

Answer **any 5** questions. **Each** carries a weightage of **1**.

5. Define force constant. How is it related to vibrational frequency?
6. A gas expands by a volume of ΔV against a constant pressure P . What is the work done by the system?
7. Name two biologically important co-ordination compounds.
8. Why is dichloroacetic acid stronger than chloroacetic acid?
9. What is hyperconjugation?
10. Assign R or S configuration to each of the following:



11. Distinguish between *meso* and *racemic* forms of tartaric acid.
12. What are Grignard reagents? Starting from methyl magnesium bromide, how will you prepare
 1) ethanol
 2) acetic acid? (Weightage 5x1=5)

SECTION - C

Answer **any 4** questions. **Each** carries a weightage of **2**.

13. What are Stoke's and anti-Stoke's lines in Raman Spectrum?
14. State the first law of thermodynamics. A gas expands against a constant pressure of 1 atm from a volume of 5L to 10L. During the process, the system absorbs 400 joules of heat from the surroundings. Calculate the change in the internal energy of the system. (Given 1L atm = 101.3 J).