Total No. of Printed Pages—7

4 SEM TDC CHMH (CBCS) C 8

2026

(May/June)

CHEMISTRY

(Core)

Paper : C–8

Sibsagar Girls' College Central Library & Information Centre
Date .....

(Inorganic Chemistry)

Full Marks : 53
Pass Marks : 21

Time : 3 hours

The figures in the margin indicate full marks for the questions.

1. Select the correct answer from the following : 1×6=6

(a) Which of the following ligands has the highest crystal field splitting?

(i) NH_3

(ii) NO_2^-

(iii) H_2O

(iv) Cl^-

(b) Which of the following has the highest number of oxidation state?

(i) Mn

(ii) V

(iii) Ni

(iv) Zn

(c) $[Co(NH_3)_6]Cl_3$ complex is

(i) diamagnetic

(ii) paramagnetic

(iii) ferromagnetic

(iv) anti-ferromagnetic

(d) Which of the following is paramagnetic?

(i) Zn^{2+}

(ii) Cu^{2+}

(iii) Au^{+}

(iv) Ag^{2+}

(e) The deficiency of Fe in our body causes

(i) hair loss

(ii) fever

(iii) anaemia

(iv) blindness

(f) Which of the following elements does not belong to lanthanoid series?

(i) Pm

(ii) Tb

(iii) Md

(iv) Yb

UNIT—I

2. Answer the following questions : 2×4=8

(a) Write the IUPAC names of the following : 1+1=2

(i) $Li[AlH_4]$

(ii) $[Pt(NH_3)_4][PdCl_4]$

(b) What is optical isomerism? Why square planar complex does not show optical isomerism? 1+1=2

(c) Define chelating ligand and chelates. Give examples. 2

(d) What is the coordination number of iron in $[Fe(EDTA)]^{-1}$? Why is the complex more stable? 1+1=2

3. Answer any *two* of the following questions : 3×2=6

(a) What are inner- and outer-orbital complexes? Give example of each. 1½×2=3

(b) With the help of VB theory, explain why $[Co(NH_3)_6]^{3+}$ is diamagnetic but $[CoF_6]^{3-}$ is paramagnetic. 3

(c) Explain why $CoCl_3 \cdot 4NH_3$ forms precipitate (ppt) with $AgNO_3$ but $CoCl_3 \cdot 3NH_3$ does not. 3

4. Answer any *two* of the following questions : 4×2=8

(a) Define CFSE and calculate its value for d^5 system in octahedral and tetrahedral field. 1+1½×2=4

(Continued)

(b) Write the difference between the following : 2×2=4

(i) Double salt and Coordination complex

(ii) VBT and CFT

(c) What do you mean by stability of complex ion? Explain the factors which affect the stability of complex ion. 1+3=4

UNIT—II

5. Answer any *three* of the following questions : 3×3=9

(a) Give reason—

(i) why second IE (ionization energy) of Cr and Cu is exceptionally high;

(ii) why Fe^{3+} is more stable than Fe^{2+}. 1½×2=3

(b) How do transition elements act as catalyst? Give two examples of such catalyst which are used in industry. 1+2=3

(c) Name the important oxidation state of Cu. Explain why iodine is liberated when KI is added to solution of Cu^{2+} but chlorine does not liberated when KCl is added to solution of Cu^{2+}. 1+2=3

(d) Write the general electronic configuration of second transitional series. Why does the transitional metal show variable oxidation states and form complexes? 1+2=3

6. Give the preparation and properties of any *two* compounds of the following : 2×2=4

(a) V_2O_5 (vanadium pentoxide)

(b) $KMnO_4$ (potassium permanganate)

(c) $K_2Cr_2O_7$ (potassium dichromate)

UNIT—III

7. Answer any *two* of the following questions : 2×2=4

(a) Write the electronic configurations of the last element of lanthanoid and actinoid series.

(b) Write the similarities of lanthanoids and actinoids.

(c) Why is higher oxidation state of actinoids more stable than lanthanoids?

UNIT—IV

8. Answer any *two* of the following questions : 4×2=8

(a) Define trace and ultra-trace elements and give example. 2+2=4

(b) Describe the toxicity of As and Pb. 2+2=4

(c) Write the functions of myoglobin and haemoglobin. 2+2=4

★★★

Total No. of Printed Pages—7

4 SEM TDC CHMH (CBCS) C 9

2026

(May/June)

CHEMISTRY

(Core)

Paper : C–9

(Organic Chemistry)

Full Marks : 53

Pass Marks : 21

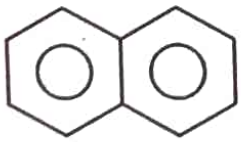
Time : 3 hours

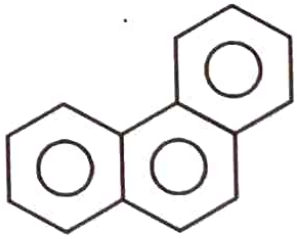
Gms. College Central Library & Information Centre * Sibsagar
Date .....

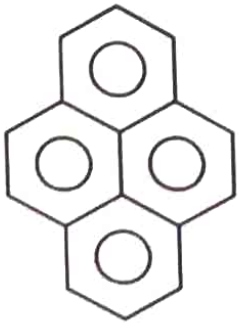
The figures in the margin indicate full marks for the questions.

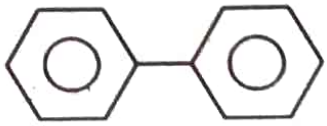
1. Choose the correct answer from the following : 1×4=4

(a) Which one of the following is not a condensed polynuclear hydrocarbon?

(i) 

(ii) 

(iii) 

(iv) 

(b) Which of the following is not a five-membered ring?

(i) Pyridine

(ii) Pyrrole

(iii) Furan

(iv) Thiophene

(c) Which one is used in malaria treatment?

(i) Nicotine

(ii) Hygrine

(iii) Quinine

(iv) Morphine

(d) Isoprene is

(i) 1-methyl-butadiene

(ii) 2-methyl-butadiene

(iii) 1-ethyl-butadiene

(iv) 2-ethyl-butadiene

2. Answer any *four* questions from the following : 2×4=8

(a) Methylamine is a stronger base than aniline. Explain.

(b) Write one method for preparation of benzene diazonium bromide.

(c) What are the natural sources of morphine and hygrine? 1+1=2

(d) Pyrrole exhibits aromatic character. Explain.

(e) What happens when anthracene is treated with H_2SO_4 and X_2 / CS_2? (X = Cl) 1+1=2

UNIT—I

3. Answer any *three* questions from the following : 3×3=9

(a) How would you distinguish among 1°, 2° and 3° amines with the help of Hinsberg reagent? 3

(b) Write short notes on the following : 1½×2=3

(i) Carbylamine reaction

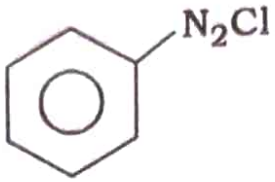
(ii) Gabriel phthalimide synthesis

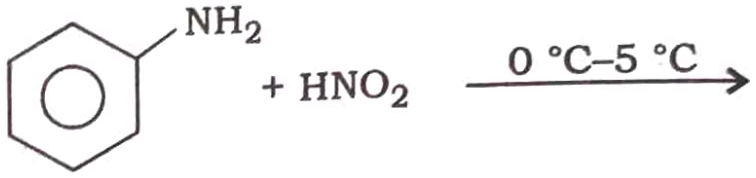
(c) Discuss the synthesis of the following : $1\frac{1}{2}\times2=3$

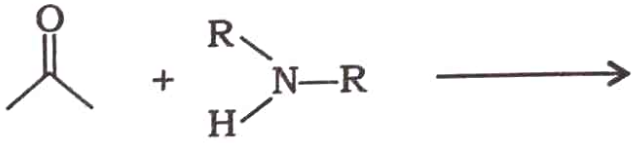
(i) Aniline from benzene

(ii) Aniline from nitrobenzene

(d) Complete the following reactions : $1\times3=3$

(i) 

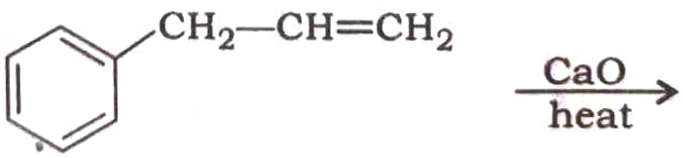
(ii) 

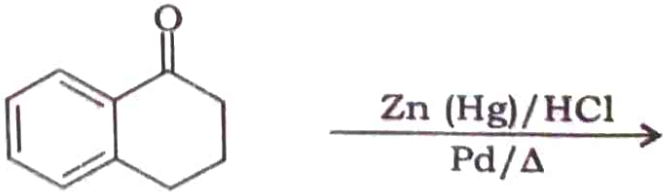
(iii) 

UNIT—II

4. Answer any *three* questions from the following : $3\times3=9$

(a) Complete the following reactions : $1\times3=3$

(i) 

(ii) 

(iii) 

(Continued)

(b) How will you convert the following? 1½×2=3

(i) Naphthalene to α-chloro-naphthalene

(ii) Phthalic anhydride to anthracene

(c) Explain electrophilic substitution of naphthalene occurs at C–1. 3

(d) Write the methods of preparation of the following : 1+1+1=3

(i) α-naphthol

(ii) 1,4-naphthoquinone

(iii) Phenanthrene

UNIT—III

5. (a) Write short notes on any *two* of the following : 2×2=4

(i) Hantzsch synthesis

(ii) Paal-Knorr synthesis

(iii) Fischer indole synthesis

(b) Convert furan to furoic acid. 2

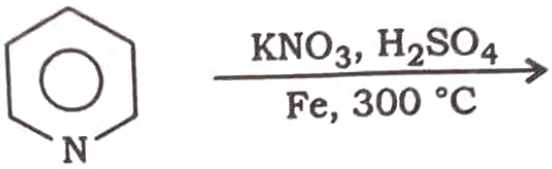
(c) Out of pyrrole and thiophene, which one is more aromatic? Explain. 2

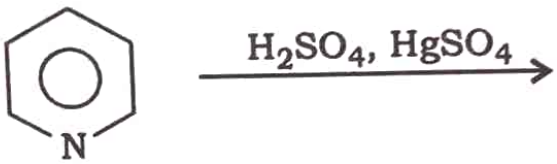
(d) Answer the following questions : 2×2=4

(i) Give Skraup synthesis of quinoline.

(ii) Write one method for the preparation of pyridine.

(e) Complete any *one* of the following reactions : 1

(i) 

(ii) 

UNIT—IV

6. (a) What are alkaloids? Give the medicinal uses of cocaine and reserpine. 1+½+½=2

(b) Write one method of synthesis of nicotine or quinine. 3

Or

Write a short note on Hofmann exhaustive methylation method with example.

UNIT—V

7. What are terpenes? Classify terpenes with example. State special isoprene rule. Draw the structure of neral. 1+2+1+1=5

Or

Outline the synthesis of citral. What are the geometrical isomers of citral? 3+2=5

★★★