2025/FYUG/ODD/SEM/
CHMSEC–101T/457

FYUG Odd Semester Exam., 2025

CHEMISTRY

(1st Semester)

Course No. : CHMSEC–101T

(Separation and Purification Techniques)

Full Marks : 50
Pass Marks : 20

Time : 2 hours

The figures in the margin indicate full marks for the questions

UNIT—I

1. Answer any *three* from the following : 1×3=3

   (a) Name one metal that can be separated by solvent extraction.

   (b) Write one condition necessary for sublimation to occur.

   (c) Give one example of liquid mixture separated by simple distillation.

   (d) Mention two advantages of counter-current extraction.

2. Answer any *one* from the following :

(a) What is partition coefficient?

(b) What is the role of chelation in solvent extraction?

3. Answer any *one* from the following :

(a) (i) What is the significance of steam distillation?

(ii) Mention three factors affecting the efficiency of solvent extraction.

(b) (i) Write the difference between batch and continuous extraction.

(ii) Describe the principle of crystallization. Why is hot filtration used in crystallization?

UNIT—II

4. Answer any *three* from the following :

(a) Define retention factor (R_f).

(b) Name the stationary phase in paper chromatography.

(c) Which force is mainly responsible in adsorption chromatography?

(d) Which type of adsorption increases with rise in temperature?

(Continue)

5. Answer any *one* from the following : 2

(a) Explain the principle of column chromatography.

(b) Write the difference between adsorption and partition chromatography.

6. Answer any *one* from the following : 5

(a) (i) Differentiate among frontal, elution and displacement methods of chromatogram development. 3

(ii) What is the role of silica gel in thin layer chromatography (TLC)? 2

(b) (i) State three differences between thin layer chromatography and column chromatography. 3

(ii) What are the main components of HPLC system? Give one use of HPLC. 2

UNIT—III

7. Answer any *three* from the following : 1×3=3

(a) Define ion-exchange chromatography.

(b) What is meant by 'resin capacity'?

(Turn Over)

(c) Which property of molecule is used f separation in ion-exchange chroma graphy?

(d) What is the role of buffer in io exchange chromatography?

8. Answer any *one* from the following :

(a) Write the difference between catio exchange and anion exchange resin.

(b) State two factors that affect th efficiency of ion-exchange chromat graphy.

9. Answer any *one* from the following :

(a) (i) Describe the role of resin in ion exchange chromatography.

(ii) Name two commonly used ion exchange resins.

(b) (i) What are the advantages an limitations of ion-exchang chromatography?

(ii) How does pH influence ion exchange chromatography?

UNIT—IV

10. Answer any *three* from the following : 1×3=3

(a) Which ore is used for the extraction of silver?

(b) What is the chemical formula of bauxite?

(c) Which metal is extracted from cinnabar?

(d) Name one ore of zinc.

11. Answer any *one* from the following : 2

(a) State the principle of froth flotation process.

(b) Name two oxide ores and sulphide ores.

12. Answer any *one* from the following : 5

(a) (i) Explain the extraction of iron from haematite using blast furnace. 3

(ii) What is slag and how is it formed? 2

(b) (i) Outline the steps involved for the extraction of alumina (Al_2O_3) from bauxite. 3

(ii) What is the role of carbon monoxide (CO) in blast furnace? 2

UNIT—V

13. Answer any *three* from the following : 1×3

(a) Which reagent is used for detecting amino acids in paper chromatography?

(b) Write the chemical formula of *p*-toluidine.

(c) Name the technique used for separation of *p*-nitrobenzoic acid and *p*-amino-benzoic acid.

(d) Which chromatographic method is most often used to separate sugars?

14. Answer any *one* from the following :

(a) What is the difference between ascending and horizontal paper chromatography?

(b) What is the principle of thin layer chromatography (TLC)?

15. Answer any *one* from the following :

(a) (i) Describe the process separating a mixture of glucose and fructose using ascending paper chromatography.

(ii) Explain why *o*-nitrophenol travels faster than *p*-nitrophenol in thin layer chromatography. 2

(b) (i) Explain why horizontal paper chromatography is more rapid and gives better resolution than ascending method. 3

(ii) Explain the role of H-bonding in the separation of *o*- and *p*-amino phenol by thin layer chromatography. 2

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