

5M/CHE-302 Syllabus-2023

2025

(Nov-Dec)

FYUP : 5th Semester Examination

MAJOR

CHEMISTRY

(Chemistry—V)

CHE-302

(Part-A : Theory)

Marks : 56

Time : 3 hours

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

UNIT—I

(Inorganic)

(Marks : 19)

1. (a) What is superphosphate of lime?
Write down the preparation of superphosphate from phosphatic rock along with chemical equations. $1+1\frac{1}{2}=2\frac{1}{2}$
- (b) What is the role of gypsum? Give the chemical reaction for the formation of sulphoaluminate. $1+1=2$

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(Turn Over)

(2)

- (c) What are mixed fertilizers? Give example. $1\frac{1}{2}$
- (d) Mention the major constituents of paints. Write the chemical formulae of the following pigments : $1+\frac{1}{2}+\frac{1}{2}=2$
- (i) Prussian blue
- (ii) Lithopone

OR

2. (a) What are the raw materials required for the manufacture of cement? 2
- (b) Discuss the manufacture of ammonia by Haber process and manufacture of urea from ammonia. $1\frac{1}{2}+1\frac{1}{2}=3$
- (c) Write down the chemical reactions involved in the preparation of chrome yellow. 2
- (d) Name one naturally occurring yellow pigment. 1
3. (a) What are the major water pollutants? Mention the physical characteristic of wastewater. $1+2=3$
- (b) What are the particle sizes of heavy particulate matters and nano-particulate matters? 1

(3)

- (c) What are fluorocarbons? How does it effect the ozone layer? Give the chemical equations for the depletion of ozone layer. $1+1+1=3$
- (d) Discuss the role of phosphates in eutrophication. 2
- (e) Write a short note on menace of plastic pollution. 2

OR

4. (a) Explain why CO_2 is called a greenhouse gas. How does it effect global warming? What are the methods to control CO_2 emission? $1+1+1=3$
- (b) Write down stepwise chemical reactions involved in the formation of nitric acid rain. 2
- (c) Mention the toxic effect of lead compounds. 2
- (d) How does surfactant alkyl benzene sulfonate (ABS) interfere with waste treatment processes? 2
- (e) What is meant by BOD or biological oxygen demand? How does eutrophication effect BOD? $1+1=2$

(4)

UNIT—II

(Organic)

(Marks : 19)

5. (a) Define the terms 'antipyretic' and 'antibacterial'. Give one example each. 3
- (b) Give a method for the preparation of Paracetamol. 2
- (c) Draw the structure of barbituric acid. 1

OR

6. (a) Write the synthesis and use of Aspirin. 3
- (b) Define the following terms and give one example each : 3
- (i) Analgesic
- (ii) Tranquillizer
7. (a) Give one example each with structure for azo dye and triphenylmethane dye. 2
- (b) Define the term 'chromophore'. Indicate the chromophoric group in the structure of phenolphthalein. 2
- (c) Give a method of preparation of methyl orange. Explain by giving appropriate structure how it acts as an indicator in acid-base titration. 2+1=3

(5)

OR

8. (a) Give a method of synthesis of phenolphthalein. Write the structure of phenolphthalein in neutral and alkaline solutions. 3
- (b) Mention the types of dyes based on their structures. 2
- (c) Draw the structures of Bismarck brown and malachite green. 2
9. (a) What are drying and non-drying oils? 2
- (b) What is the advantage of detergents over soaps? 2
- (c) Give one general method of preparation of soaps from fats. 1
- (d) Write a note on RM value. 1

OR

10. (a) What are iodine value and saponification value of fats and oils? 2
- (b) Discuss the cleansing action of soaps. 2
- (c) Why are animal fats solid and vegetable oils liquid? 1
- (d) How will you convert oil into a fat? 1

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(Turn Over)

(6)

UNIT—III

(Physical)

(Marks : 18)

11. (a) State the phase rule. Apply it to water system at its triple point. 1+1=2
- (b) Draw and explain the phase diagram of sulphur. Highlight the features of different allotropic forms. 4
- (c) How many phases are present in the following systems? 2
- (i) A mixture of N_2 , H_2 and O_2
- (ii) A saturated solution of sodium chloride in contact with excess solid NaCl
- (d) Define upper critical solution temperature. Describe a system having an upper critical solution temperature. 1+2=3
- (e) Derive the Nernst distribution law. How can it be applied in solvent extraction? 3+2=5
- (f) Write a note on steam distillation. 2

(7)

OR

12. (a) Describe the phase diagram of KI-H₂O system. 3
- (b) Define the following : 1×3=3
- (i) Phase
 - (ii) Components
 - (iii) Degrees of freedom
- (c) What is incongruent melting point?
Give one example of a system having incongruent melting point. 1+1=2
- (d) Explain azeotropes with suitable examples. 3
- (e) Discuss the phase diagram of CO₂ system. 3
- (f) What are partially miscible liquids?
Discuss the partial miscibility of nicotine-water system with a labelled diagram. 1+3=4

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