

**SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022**

(CBCSS—UG)

Industrial Chemistry

ICH 6B 05 (E1)—MEDICINAL CHEMISTRY AND DRUG DEVELOPMENT

(2019 Admissions)

Time : Two Hours

Maximum : 60 Marks

**Section A (Short Answers)***Answer at least eight questions.**Each question carries 3 marks.**All questions can be attended.**Overall Ceiling 24.*

1. What is Librium ? Give its medicinal use.
2. What are prodrug and soft drug ?
3. Comment on the importance of lipophilicity of drugs ?
4. Mention the importance of discovery of penicillin.
5. Explain Rate theory.
6. What are the advantages of suppositories ?
7. What are Glidants ?
8. What are emulsifying agents ? Give an example.
9. List out the common uses of sorbitol ?
10. What are the different types of pharmaceutical packaging ?
11. Define the term patent.
12. Write any *two* benefits of IPR.

(8 × 3 = 24 marks)

**Turn over**

**Section B (Paragraph)**

*Answer at least five questions.*

*Each question carries 5 marks.*

*All questions can be attended.*

*Overall Ceiling 25.*

13. Write a note on quantitative structure-activity relationship.
14. How is collodion prepared ? Mention its use.
15. Explain moist heat sterilization process.
16. Comment on preservatives and antioxidants in drugs.
17. Write a note on surgical dressing sutures.
18. Write a note on important FDA and WHO schedules.
19. Describe briefly legal aspects of drug development.

(5 × 5 = 25 marks)

**Section C (Essays)**

*Answer any one question.*

*The question carries 11 marks.*

20. Explain the factors affecting modes of drug administration, absorption, metabolism and elimination.
21. Describe various types of solid dosage forms.

(1 × 11 = 11 marks)

**SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022**

(CBCSS-UG)

Industrial Chemistry

ICH 6B 04—ADVANCED AND APPLIED CHEMISTRY

(2019 Admissions)

Time : Two Hours

Maximum : 60 Marks

**Section A***Answer atleast **eight** questions.**Each question carries 3 marks.**All questions can be attended.**Overall ceiling 24.*

1. What is meant by finger print region in IR spectroscopy ?
2. What are quantum dots ? Give examples.
3. Give the structure of endosulfan.
4. Name any *four* non-covalent interactions that forms the basis of molecular recognition.
5. Write down any *two* applications of nano materials in the field of medicine.
6. How are carbon nanotubes synthesized ?
7. What is pasteurization ?
8. Which are the chemicals used in the preparation of cleansing creams ?
9. Predict the structure of the following organic compounds which gives only one signal in its PMR spectra.  
(a)  $C_2H_6O$  ; (b)  $C_4H_8$ .
10. Differentiate between Dis and Con rotations.
11. What is vulcanization ? Mention its advantages.
12. State the isoprene rule ?

(8 × 3 = 24 marks)

**Turn over**

**Section B**

*Answer atleast five questions.*

*Each question carries 5 marks.*

*All questions can be attended.*

*Overall ceiling 25.*

13. Write a note on different programming languages.
14. PMR can be employed as a tool to distinguish alcohol and its isomeric ethers. Rationalize the statement with examples.
15. What are pericyclic reactions? Explain the different types of pericyclic reactions with examples.
16. Explain the mechanism of : (a) Claisen rearrangement and (b) Cope rearrangement.
17. Write down the principle of IR spectroscopy. How will you distinguish inter molecular and intra molecular hydrogen bonding using IR spectroscopy?
18. Discuss the classification of pesticides with examples.
19. What are alkaloids? Discuss the extraction and physiological role of alkaloids.

(5 × 5 = 25 marks)

**Section C**

*Answer any one questions.*

*The question carries 11 marks.*

20. (a) Write down the classification of nanomaterials with examples.  
(b) Compare the following calculations : (i) *Ab initio* methods (ii) molecular mechanics method.
21. (a) Discuss the advantages of microwave assisted synthesis. Write down the microwave assisted Diels-Alder reaction.  
(b) Explain the 12 principles of green chemistry.

(1 × 11 = 11 marks)

## SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Industrial Chemistry

ICH 6B 03—INORGANIC CHEMISTRY—III

(2019 Admissions)

Time : Two Hours

Maximum : 60 Marks

## Section A (Short Answers)

*Answer atleast eight questions.**Each question carries 3 marks.**All questions can be attended.**Overall Ceiling 24.*

1. Second and third row transition elements resemble each other more closely than first and second rows. Why ?
2. Give the spin only formula for calculating the magnetic moment of transition ions.
3. Compare the relative complex formation tendencies of lanthanides and actinides.
4. During the determination of Fe using flame AAS, large concentration of sulphate ion should be avoided. Why ?
5. Name the following:  $K_4[Fe(CN)_6]$  and  $[Pt(NH_3)_2Cl_4]$ .
6. Why is  $Ni(CO)_4$ , a monomer, but the analogous cobalt carbonyl a dimer ?
7. What is an ambidentate ligand ? Give one example.
8. What is Wilkinson's catalyst ? Draw the structure.
9. Acetylation of one of the rings in Ferrocene deactivates the ring and to some extent the second ring as well. Why ?
10. Define the term hapticity, with any one example.
11. How does the structure and magnetic behaviour of Haemoglobin change when it binds to  $O_2$  ?
12. Write the expression for stability constant of a complex. How is it related to dissociation constant of the complex ?

(8 × 3 = 24 marks)

Turn over

**Section B (Paragraph)**

*Answer atleast five questions.*

*Each question carries 5 marks.*

*All questions can be attended.*

*Overall Ceiling 25.*

13. Describes the principle and working of AFM.
14. What is lanthanide contraction? Explain the consequences.
15. What are the factors that affect stability of metal complexes ?
16. Discuss the mechanism of oxygen transport in blood.
17. Give an account of Na<sup>+</sup>/K<sup>+</sup> pump in biological systems.
18. Compare the workings of TGA and DSC.
19. Write a short note on Jahn-Teller distortion and its consequence.

(5 × 5 = 25 marks)

**Section C (Essay)**

*Answer any one question.*

*Each question carries 11 marks.*

20. (a) Discuss the structure and significance of cis-platin.  
(b) Explain the nature of bonding in metal carbonyls.
21. (a) Describe the splitting of d-orbitals in tetrahedral and octahedral fields according to CFT.  
(b) Comment on the magnetic properties of lanthanides.

(1 × 11 = 11 marks)

**SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022**

(CBCSS—UG)

Industrial Chemistry

ICH 6B 02—INDUSTRIAL CHEMISTRY—II

(2019 Admissions)

Time : Two Hours

Maximum : 60 Marks

**Section A (Short Answers)***Answer at least eight questions.**Each question carries 3 marks.**All questions can be attended.**Overall Ceiling 24.*

1. Define degree of polymerisation.
2. Define average molecular weight of polymers.
3. Give the structure of : (i) Nylon ; and (ii) Bakelite.
4. Name any *two* artificial dyes.
5. Draw the structure of phenolphthalein.
6. What are hard soaps and soft soaps ?
7. Define TFM of soap.
8. What are biodegradable detergents ?
9. What are beta blockers? Give any one example.
10. Give example for any *one* anti-viral drug.
11. What are antipyretics ? Give one example.
12. Name any *two* artificial sweeteners.

(8 × 3 = 24 marks)

**Section B (Paragraph)**

*Answer at least five questions.*

*Each question carries 5 marks.*

*All questions can be attended.*

*Overall Ceiling 25.*

13. How can we classify dyes ? Give examples for each.
14. Give the preparation and structure of fluorescein and methyl orange.
15. Explain the cleansing action of soap.
16. Give the method of preparation and the mode of action of : (i) Paracetamol ; and (ii) Mefenamic acid.
17. Write notes on the classification of surface coatings.
18. Differentiate between thinners and fillers used in paint technology.
19. Write notes on methyl dopa.

(5 × 5 = 25 marks)

**Section C (Essay)**

*Answer any one question.*

*The question carries 11 marks.*

20. Differentiate between chain growth and step growth polymerisation with examples and mechanism.
21. Give examples and the mode of action of : (i) Leavening agents ; and (ii) Emulsifying agents ; (iii) Baking powder ; and (iv) Preservatives in food.

(1 × 11 = 11 marks)



## SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2022

## Industrial Chemistry

## IC 6B 04—ADVANCED AND APPLIED CHEMISTRY

(2014 to 2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

## Section A

*Answer all questions.**Each question carries 1 mark.*

1. Define atom economy.
2. Give an example for a one dimensional nanomaterial.
3. Sketch the splitting pattern of d orbitals in tetragonal complexes.
4. Give an example for an inert complex.
5. Calculate the EAN of the metal in the following complex  $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$ .
6. Give the structure of DDT.
7. Name any *two* permitted food colors.
8. Give an example for a pesticide.
9. What is a Rodenticide ?
10. The number of PMR signals shown by acetaldehyde is \_\_\_\_\_.

(10 × 1 = 10 marks)

## Section B

*Answer any ten questions.**Each question carries 2 marks.*

11. What is meant by finger print region in IR spectroscopy ?
12. What are quantum dots ? Give examples.
13. Give the structure of endosulfan.
14. Mention any *two* advantages of microwave assisted synthesis.

Turn over

15. Write down any *two* applications of nanomaterials in the field of catalysis.
16. How are carbon Nano tubes synthesized ?
17. How does valence bond theory account for the fact that  $[\text{Ni}(\text{CN})_4]^{2-}$  is diamagnetic and square planar ?
18. What are the factors influencing stability of a co-ordination compound ?
19. Predict the structure of the following organic compounds which give only one signal in its PMR spectra, (a)  $\text{C}_2\text{H}_6\text{O}$  ; and (b)  $\text{C}_4\text{H}_8$ .
20. Differentiate between linear and non-linear regression.
21. What are Depilatories ?
22. What is chemical shift ?

(10 × 2 = 20 marks)

### Section C

*Answer any five questions.*

*Each question carries 6 marks.*

23. Write a note on different programming languages.
24. Write a note on semi empirical methods used for molecular geometry optimization.
25. What are the limitations of VBT ?
26. Discuss the theoretical basis of the 18-electron rule.
27. Write down the principle of IR spectroscopy. How will you distinguish inter molecular and intra molecular hydrogen bonding using IR spectroscopy ?
28. Explain molecular recognition with suitable examples.
29. Which are the chemicals used in hair dye and perfume. Discuss their harmful effects.
30. Discuss the possible applications of nanoparticles in biology.

(5 × 6 = 30 marks)

**Section D**

*Answer any two questions.*

*Each question carries 10 marks.*

31. Compare and Contrast VBT and MOT.
32. (a) Write a note on the common food adulterants used in various food materials and the methods used to identify them.
- (b) Explain the spin-spin coupling in NMR spectroscopy.
33. (a) Give the green synthesis of ibuprofen.
- (b) Discuss the microwave assisted Williamson's synthesis.
34. What are carbon nanotubes ? Discuss its synthesis and properties.

(2 × 10 = 20 marks)

**SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2022**

Industrial Chemistry

IC 6B 03—INORGANIC CHEMISTRY—III

(2014 to 2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

**Section A (One Word)**

*Answer all questions.  
Each question carries 1 mark.*

1. Define thermal pollution.
2. Differentiate between precision and accuracy.
3. Write down the auto-ionization of liquid SO<sub>2</sub>.
4. Among the hydrides of nitrogen, which one have the highest bond angle ?
5. The group II cations are precipitated as their \_\_\_\_\_
6. What is the hybridization of iodine in ICl<sub>3</sub> ?
7. Name the compound responsible for Bhopal tragedy.
8. What do you mean by leveling effect ?
9. How does fluoride in a mixture eliminated ?
10. What are pseudo halogens ?

(10 × 1 = 10 marks)

**Section B (Short Answer)**

*Answer any ten questions.  
Each question carries 2 marks.*

11. Write the order of density of alkali metals.
12. Give any four diagonal relationships between lithium and magnesium.
13. Compare the Lewis acidity of boron halides.
14. Differentiate between BOD and COD.
15. Give the preparation of plaster of Paris.
16. Give any one method for the preparation of borazine. How does it differ from benzene in chemical reactions ?

**Turn over**

17. Comment on the position of hydrogen in the periodic table.
18. Compare the acidic strength of oxy acids of chlorine. Justify your answer.
19. What are the uses of noble gases ?
20. Discuss the properties and structure of  $S_4N_4$ .
21. Describe the anomalous properties of fluorine.
22. How will you prepare hydrochloric acid ?

(10 × 2 = 20 marks)

### Section C (Paragraph)

*Answer any five questions.  
Each question carries 6 marks.*

23. Discuss the depletion of ozone layer.
24. What are the main sources of water pollution?
25. Describe the structure and applications of silicates.
26. Describe how the solubility product principle and common ion effect are applied in inorganic qualitative analysis.
27. Discuss the following properties, taking carbon family as example (a) ionization energy (b) inert pair effect (c) melting point.
28. Discuss the causes, consequences and control of photochemical smog.
29. Explain the charcoal adsorption method for the separation of noble gases.
30. Write a note on the duties and responsibilities of Pollution Control Board.

(5 × 6 = 30 marks)

### Section D (Essay)

*Answer any two questions.  
Each question carries 10 marks.*

31. (a) Name any two toxic metals seen in water and explain their harmful effects.  
(b) What is radioactive pollution ? How is it controlled ?
32. Write a note on structure of oxides, fluorides and oxyfluorides of xenon.
33. Discuss the preparation, properties and uses of sulphuric acid.
34. Explain the different stages involved in the solid waste management.

(2 × 10 = 20 marks)