D 92378 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. (CUCBCSS—UG) DEGREE [SPECIAL] EXAMINATION, NOVEMBER 2020

Chemistry

CHE 5D 01—ENVIRONMENTAL CHEMISTRY

Time : Two Hours Maximum : 40 Marks

Part A

All questions to be attended.
Each question carries 1 *mark.*

1. Define the term pollution.
2. ———— is the sink of CO_2.
3. Define Threshold Limit Value (TLV).
4. ———— is the commonly employed method for the treatment of biomedical waste.
5. What is the implication of Biological Oxygen Demand ?
6. Give any two sources of thermal pollution.
7. Name the pesticide that was banned production and sale in India after incidents in Kasaragod district of Kerala.
8. Name any two radioactive disposal methods.
9. What is the optimum range of dissolved oxygen in a water body ?
10. ———— is the unit of noise pollution.

(10 × 1 = 10 marks)

Part B

All questions can be attended and overall ceiling.
Answer any **five** *questions.*
Each question carries 2 *marks.*

11. What are the four major segments of environment ?
12. Name any four air pollutants that exist due to anthropogenic activities.
13. How Bio-magnification have led to the destruction of higher tropical level animals like raptors ?
14. What are the ways by which radiative pollution can happen ?

Turn over

15. What were the circumstances that led to Bhopal tragedy in 1984 ?

16. Compare the sources/circumstances of classical (industrial) smog with photochemical smog.

17. Comment the harmful effects of noise pollution.

(5 × 2 = 10 marks)

Part C

All questions can be attended and overall ceiling.
Answer any **two** *questions.*
Each question carries 5 *marks.*

18. What is eutrophication ? What are its main reasons and explain its effects on the environment ?

19. Write and explain the principles of green chemistry.

20. What are the causes, symptoms and drugs used for the treatment of : (a) measles ; and (b) influenza ?

(2 × 5 = 10 marks)

Part D

All questions can be attended and overall ceiling.
Answer any **one** *question.*
The question carries 10 *marks.*

21. Write notes on the following water quality parameters : (a) DO, (b) BOD, (c) COD and (d) Hardness.

22. Briefly explain the circumstances that led to the formation of the following environmental movements : (a) Plachimeda Coca-Cola struggle ; and (b) Save silent valley.

(1 × 10 = 10 marks)

D 92377 (Pages : 3) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE (SPECIAL) EXAMINATION NOVEMBER 2020

(CUCBCSS—UG)

Chemistry

CHE 5B 08—PHYSICAL CHEMISTRY—II

Time : Three Hours Maximum : 80 Marks

Section A

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

1. A catalyst ——— the activation energy of a reaction.
2. The rate constant of a reaction is $5 \times 10^{-5}\ s^{-1}$. The order of the reaction is ——— .
3. Give an example of chemiluminescence.
4. Give one example for surfactant.
5. Give an example of a eutectic system.
6. What is HPLC?
7. R_f value is ———.
8. The number of fundamental vibrational frequencies in CO_2 molecule is ———.
9. When there is a shift of absorption maximum is from longer wavelength to shorter wavelength, it is ——— shift.
10. Define centre of symmetry.

(10 × 1 = 10 marks)

Section B

Answer at least **five** *questions.*
Each question carries 4 *marks.*
All questions can be attended.
Overall Ceiling 20.

11. What is meant by fingerprint region in IR spectroscopy ?
12. What are chromophores and auxochromes ?

13. What is Schoenflies notation ?

14. Write a short note on paper chromatography.

15. Define CST. Give two examples.

16. Sketch the phase diagram for water system.

17. What is Dorn effect ?

18. Explain any two factors affecting adsorption.

19. Give two applications of colloids.

20. Explain photosensitization with an example.

21. State Stark-Einstein law of photochemical equivalence.

22. Define half-life period. Give an expression for it.

(10 × 2 = 20 marks)

Section C

Answer at least **four** *questions.*
Each question carries 7½ marks.
All questions can be attended.
Overall Ceiling 30.

23. What are radiative and non-radiative transitions ? Explain.

24. Discuss in detail the photochemical reaction of hydrogen and bromide.

25. Write a note on the different types of electronic transitions.

26. Discuss on the ESR spectrum of cycloheptatrienyl radical.

27. Discuss the phase diagram of sulphur system with the help of a diagram

28. Explain the group multiplication table for C_{3V} point group.

29. What are parallel reactions, consecutive reactions and chain reactions ? Explain citing one example for each.

30. Give the BET equation for multilayer adsorption. How is it used for surface area measurements ?

(5 × 6 = 30 marks)

Section D

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

31. (a) Briefly outline the main postulates of the collision theory of bimolecular reactions.

    (b) Write a note on gel permeation chromatography.

32. Discuss the phase diagram of lead-silver system. Explain the Pattinson's process of desilverization of lead.

33. Arrive at expressions for the moment of inertia and expression for rotational energy of a rigid diatomic molecule.

34. (a) What is Raman spectroscopy ? Explain Stokes and anti-stokes lines.

    (b) Write a note on photosynthesis.

(2 × 10 = 20 marks)

D 92376 (Pages : 4) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE (SPECIAL) EXAMINATION NOVEMBER 2020

(CUCBCSS—UG)

Chemistry

CHE 5B 07—ORGANIC CHEMISTRY—II

Time : Three Hours Maximum : 80 Marks

Section A

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

1. ——— is used as fire extinguisher under the name pyrene.
2. Phenolphthalein is produced on heating ——— and conc. H_2SO_4 with phenol.
3. Name the reactive intermediate formed in the conversion of phenol into salicylaldehyde in Riemer-Tieman reaction.
4. In 18-crown 6, the number of carbon atoms and oxygen atoms are ——— and respectively
5. Name a heterocyclic compound which undergoes Diels-Alder reaction.
6. Draw the keto-enol tautomers of ethylacetoacetate.
7. Aniline is less basic than ethylamine. Why ?
8. Borsche's reagent is ———.
9. CH_3COOH can be halogenated in the presence of red P and Cl_2, but HCOOH cannot. Why ?
10. Draw the structure of benzyne intermediate.

(10 × 1 = 10 marks)

Section B

Answer at least **five** *questions.*
Each question carries 4 *marks.*
All questions can be attended.
Overall Ceiling 20.

11. Benzyl chloride is more reactive than chlorobenzene. Explain.
12. In the reaction of 2-bromo butane with alcoholic KOH, what is the major product obtained ? Explain.

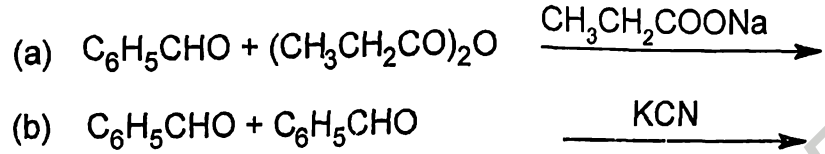
Turn over

13. An organic compound A reacts with methyl magnesium iodide to form an addition product, which on hydrolysis forms the compound B. Compound B gives blue colour salt in Victor Meyer's test. Identify the compounds A and B.

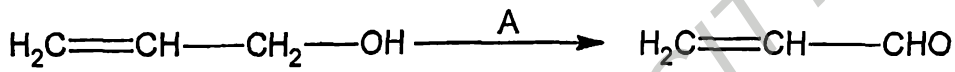
14. Among ortho, meta and para - nitro phenols, which is more acidic and why ?

15. Write down the products obtained when *t*-Butyl methyl ether heated with HI.

16. Complete the following reactions indicating against each the name of the reaction.



17. Identify the most suitable reagent A for the following conversion and explain.



18. Write down four differences between nucleophilic substitution reactions S_N1 and S_N2.

19. What are the products obtained when CH_3MgBr reacts with water and with ethyl bromide ?

20. What is Etard's reaction ?

21. Write down the mechanism of decarboxylation reaction.

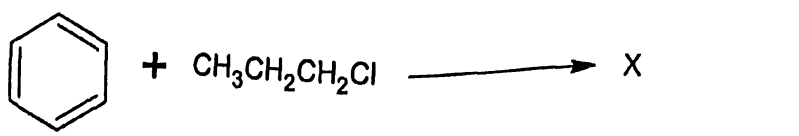
22. How is benzene diazonium chloride prepared ? Give one application.

(5 × 4 = 20 marks)

Section C

Answer at least **four** *questions.*
Each question carries 7½ *marks.*
All questions can be attended.
Overall Ceiling 30.

23. Identify X, Y and Z in the following reaction :



24. Write a note on MPV reduction and Oppenauer oxidation.

25. Explain Hofmann's elimination with mechanism.

26. Write down any two reagents for the conversion of acetone into *n*-propane and identify the corresponding reactions.

27. Write a detailed account of electrophilic substitution reactions of aniline.

28. How is Indole prepared ? What is the product obtained when pyridine undergoes Chichibabin reaction ?

29. Describe the mechanism of : (a) Cannizzaro reaction ; and (b) Kolbe electrolysis.

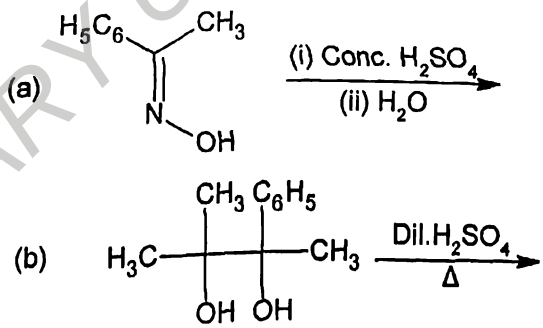
30. Give the importance of : (a) Haloform reaction ; and (b) Lucas test.

(4 × 7½ = 30 marks)

Section D

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

31. Predict the product and identify the reaction. Depict the mechanism.



32. Explain the following reactions with mechanism : (a) Claisen rearrangement ; (b) Claisen condensation ; and (c) Aldol condensation.

33. Give an account of the following :

    (a) Basicity of Guanidine.

    (b) Application of Phenolphthalein.

    (c) Chemistry behind explosions.

34. What are the reduction products of nitrobenzene : (i) In acidic medium ; (ii) In alkaline medium ; and (iii) In neutral medium ?

(2 × 10 = 20 marks)

D 92375 (Pages : 3) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE [SPECIAL] EXAMINATION NOVEMBER 2020

(CUCBCSS—UG)

Chemistry

CHE 5B 06—INORGANIC CHEMISTRY—III

Time : Three Hours Maximum : 80 Marks

Section A (One Word)

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

1. In inorganic qualitative analysis, group ———— cations are precipitated as their chlorides.
2. The agreement between observed value and true value is ————.
3. What is the hybridization of carbon in graphite ?
4. Name the alkali metal which is radioactive ?
5. A non-ionizing solvent is ————.
6. Smaller ash particles are called ————.
7. Increase in concentration of ———— in atmosphere causes greenhouse effect.
8. The compound responsible for Bhopal tragedy is ————.
9. Noble gas used in treatment of cancer.
10. Name two oxides of sulphur.

(10 × 1 = 10 marks)

Section B (Short Answers)

Answer at least **five** *questions.*
Each question carries 4 *marks.*
All questions can be attended.
Overall Ceiling 20.

11. How is fluoride eliminated as an interfering radical in qualitative analysis ?
12. Define Co-precipitation.

Turn over

13. Lithium resembles magnesium. Why ?

14. What is the difference between ortho and para hydrogen ?

15. Differentiate protic and aprotic solvents with example.

16. What is levelling effect ?

17. Name any two major air pollutants ?

18. What is London smog ?

19. Differentiate non-degradable and degradable wastes.

20. Discuss the structure and properties of S_4N_4.

21. What are interhalogen compounds ?

22. What is Borazine ? Explain its structure.

(5 × 4 = 20 marks)

Section C (Paragraphs)

Answer at least **four** *questions.*
Each question carries 7.5 marks.
All questions can be attended.
Overall Ceiling 30.

23. Explain term microanalysis with suitable example and mention the advantages.

24. Brief about the preparation and properties of $BeCl_2$.

25. Discuss about the allotropes of carbon, its structure and hybridisation.

26. Discuss general characteristics of alkali metals in liquid ammonia and properties of the solution.

27. Write note on acid rain.

28. What measures can be taken to control air pollution ?

29. How are noble gases isolated and separated ?

30. Give the structure and acidic strength of oxy and peroxy acids of sulphur.

(4 × 7.5 = 30 marks)

Section D (Essays)

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

31. What are alkaline earth metals ? Discuss the properties of alkaline earth metals.

32. Write notes on (a) Thermal pollution ; (b) DO ; (c) BOD ; (d) COD ; and (e) Eutrophication.

33. Discuss different methods of solid waste management.

34. (a) Give the structure and acidic strength of oxyacids of chlorine.

    (b) Give preparation, structure and any *two* uses of ozone.

(2 × 10 = 20 marks)

D 10127 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS–UG)

Chemistry

CHE 5B 06—INORGANIC CHEMISTRY – III

Time : Three Hours Maximum : 80 Marks

Section A

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

1. Give two examples each of Ionic and Covalent Hydrides.
2. What are polyhalides? Give an example.
3. Define Accuracy.
4. Name two green house gases.
5. Draw the structure of Diborane.
6. What is levelling effect?
7. Name any two uses of Boric acid.
8. Draw the structure of SO_2.
9. What are Fullerenes?
10. Name two Lewis acids.

(10 × 1 = 10 marks)

Section B

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

11. Differentiate between Ortho and Para Hydrogen.
12. Discuss briefly Amorphous Carbon.
13. Discuss solubility product with examples.
14. Discuss the uses of phosphates in analysis and industry.
15. Write S.N. on anomalous properties of Oxygen.
16. Compare the Lewis acidity of Boron halides.
17. Write S.N. on Alternate refrigerants.
18. Write S.N. on uses of Ozone.
19. How is Hydrogen peroxide prepared?

20. How is Nitric acid manufactured?
21. Write S.N. on Hazardous waste.
22. Discuss briefly COD.

(10 × 2 = 20 marks)

Section C

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

23. Write S.N. on classification of errors. How are errors minimized?
24. Discuss in detail anomalous properties of Fluorine.
25. Write S.N. on acid rain.
26. Discuss the separation of nobles gases by charcoal adsorption method.
27. Discuss properties of Phosphazenes.
28. Discuss the diagonal relationship between Beryllium and Aluminium.
29. What are the adverse effects caused by toxic metals in water?
30. Write S.N. on thermal stability and solubility of carbonates.

(5 × 6 = 30 marks)

Section D

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

31. (a) Discuss in detail co-precipitation and post-precipitation.
    (b) Write S.N. on uses of Noble gases.

(5 + 5 = 10 marks)

32. (a) Compare the Ionization energy and metallic character of alkali and alkaline earth metals.
    (b) Write S.N. on preparation, properties and uses of Borazine and Boron Nitride.

(6 + 4 = 10 marks)

33. (a) Write S.N. on structure and applications of Silicones and Silicates.
    (b) Write S.N. on impacts of medical waste and their disposal.

(6 + 4 = 10 marks)

34. (a) Write S.N. on Minamata disaster and Chernobyl accident.
    (b) Write S.N. on Eutrophication.
    (c) Discuss the applications of solubility product and common ion effect in the precipitation of cations.

(4 + 2 + 4 = 10 marks)

[2 × 10 = 20 marks]

D 10128 (Pages : 3) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS–UG)

Chemistry

CHE 5B 07—ORGANIC CHEMISTRY – II

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. Reaction of potassium-t-butoxide with methyl iodide gives _____.
2. Structure of Pyridine is represented as _____.
3. Dibenzyl Ether reacts with Phenyl Li, followed by acid hydrolysis to form benzyl phenyl carbinol. This reaction is known as _____.
4. The number of structural isomers of alcohols with molecular formula C_3H_7OH is _____.
5. Luca's test is used to determine the type of _____.
6. Oxidation of alkenes with pertrifluoro acetic acid forms _____.
7. The appearance of Silver mirror in Tollen's test indicate the presence of _____.
8. Hinsberg reagent is _____.
9. Nitrobenzene when reduced with Zn + NaOH gives _____.
10. Carbyl amine test is a diagnostic test for _____.

(10 × 1 = 10 marks)

Part B

Answer any **ten** *questions.*

Each question carries 2 *marks.*

1. Explain why an Alkyl halide is more reactive than Vinyl chloride.
2. How is methyl magnesium iodide is prepared? Give one use of Grignard reagent.
3. Explain why phenol is more acidic than ethyl alcohol.
4. Explain Claisen rearrangement with mechanism.
5. Give an account on the mechanism of aldol condensation.
6. Discuss the structure of Cabonylate anion.

7. How is oxalic acid is prepared?
8. How do you account for acetyl chloride has lower boiling point than acetic acid?
9. Explain the role of inductive effect of alkyl group on the strength of basicity of amines.
10. How will you distinguish between 1°, 2° and 3° amines.
11. Explain the preparation methyl orange.
12. Write the mechanism of Claisen condensation.

(10 × 2 = 20 marks)

Part C

Answer any **five** *questions.*

Each question carries 6 *marks.*

1. Give the mechanism, stereochemistry and kinetics of SN^1 and SN^2 reactions for the hydrolysis of alkyl halide.
2. (a) Explain Riemer-Tiemann reaction.
   (b) Write a note on Kolbe's reaction.
3. Discuss Wolff-Krishner reduction and MPV reduction.
4. (a) Explain HVZ reaction.
   (b) Explain Blanc's rule.
5. Explain the properties of pyridine ; furan and indole.
6. (a) What is Zaytseff rule? Explain.
   (b) Differentiate between substitution and Elimination reaction.
7. (a) Explain the uses and health effects of CCl_4.
   (b) Explain the uses of Chloroform.
8. Discuss Canizarro reaction and explain probable mechanism in this reaction. What are the products when a mixture containing fermaldehyde and benzaldehyde is subjected to this reaction?

(5 × 6 = 30 marks)

Part D

Answer any **two** *questions.*

Each question carries 10 *marks.*

1. What is ring substitution in aromatic amines? Write the following ring substitution of aromatic amines :

   (a) Halogenation ; (b) Sulphonation ; (c) Nitration.

2. (a) What is nitro air tautomerism?

   (b) Write mechanism and stereochemistry of Hoffman elimination of amines.

   (c) What happens when acetaldehyde treated with diluted NaOH?

3. (a) What is glacial acetic acid?

   (b) How do you use benzene diazomum chloride to prepare (i) Phenel ; (ii) Bromobenzene ; (iii) Diphenyl ; (iv) P-hydroxy a 30 benzene.

   (c) Explain Beckmann rearrangement with mechanism.

4. (a) How is urea prepared? Discuss its important reactions.

   (b) How is phenol manufactured for coaltar and how is it purified.

   (c) Write a note on Perkin's reaction.

(2 × 10 = 20 marks)

D 10129 (Pages : 3) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS—UG)

Chemistry

CHE 5B 08—PHYSICAL CHEMISTRY—II

Time : Three Hours Maximum : 80 Marks

Section A (One Word)

Answer **all** *questions.*

Each question carries 1 *mark.*

1. The unit for rate constant for a first order reaction is ———.
2. The point group of water molecule (H_2O) is ———.
3. How many numbers of signals would be expected in ^{13}C NMR spectra of Glycol and ethanol ?
4. In a reaction if the concentration of reactant A is tripled, the rate of reaction becomes twenty seven times. What is the order of the reaction ?
5. The selection rule for rotational spectroscopy considering atoms as rigid rotor is ———.
6. As per Stark-Einstein law, the number of photons absorbed for a molecule to react is ———.
7. In adsorption, if the concentration of a substance in the interface is high, it is called – ———.
8. In a single - component condensed system, if degree of freedom is zero, maximum number of phases that can co-exist is ———.
9. Fluorescence arises from the ——— vibrational level of the first excited electronic state to one of the vibrational levels in the electronic ground state.
10. The ratio of distance travelled by a substance to distance travelled by a solvent front in thin layer chromatography is ———.

(10 × 1 = 10 marks)

Section B (Short Answer)

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

11. What is molecularity of a reaction ? Order higher than three is very rare ? Why ?
12. Draw the miscibility temperature verses percentage composition graph for phenol water system and define CST.
13. Absolute ethanol cannot be prepared by simple distillation of ethanol water mixture. Why ?
14. How does the percent transmittance of a solution vary with : (a) Increasing concentration ; and (b) Increasing path length ?
15. What are the Stokes lines and antistokes lines ?
16. What is Chemiluminescence ? Write an example.
17. How force constant is related to bond length and bond order ?
18. What is TMS ? Why is it used as a standard reference in NMR spectroscopy ?
19. List all the symmetry operations for trans–1, 2-dichloroethylene of C2h symmetry.
20. Write the important characteristics of enzyme catalysis.
21. Write the principle of gel permeation chromatography.
22. Distinguish proper and improper axis of rotation.

(10 × 2 = 20 marks)

Section C (Paragraph)

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

23. Derive an expression for rate constant of a first order reaction. If a first-order reaction is 29.6% complete after 18.4 seconds, how long will it take to complete four half-life periods ?
24. How does IR spectroscopy differ from Raman spectroscopy ?
25. Explain Freundlich adsorption isotherm. What are its limitations ?
26. Explain the principle of fractional distillation using temperature composition diagrams.

27. Briefly explain Donnan membrane equilibrium.

28. Discuss the working principle of gas chromatography.

29. How will you determine the bond length from rotational spectral data ?

30. What is multiplication table in molecular symmetry ? Construct the multiplication table for C3v point group.

(5 × 6 = 30 marks)

Section D (Essay)

Answer any **two** *questions.*

Each question carries 10 *marks.*

31. Differentiate order and molecularity of a reaction and briefly discuss the different methods used for the determination of order of a reaction.

32. (a) What are surfactants, explain its role in daily life ?

(b) Briefly explain the phase diagram of water.

33. (a) Explain the importance of Frank-Condon principle in the electronic transitions.

(b) How the concept of Simple harmonic oscillator is used for the explanation of ir spectra.

34. (a) Briefly explain the principle of thin layer chromatography and explain its importance as a supplementary system in column chromatography.

(b) With the help of Jablonski diagram explain Fluorescence and Phosphorescence.

(2 × 10 = 20 marks)

D 10130 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS—UG)

Chemistry

CHE 5D 01—ENVIRONMENTAL CHEMISTRY

Time : Two Hours Maximum : 40 Marks

Section A

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

1. Name the lowermost layer of atmosphere.
2. Name one water-borne diseases.
3. BOD stands for ————.
4. ———— is a greenhouse gas.
5. Name one air pollution control measures.
6. Which layer of atmosphere contains ozone layer ?
7. Name a CFC pollutant.
8. Name the disaster caused by toxicity of mercury.
9. Define particulates.
10. Name an environmental movement.

(10 × 1 = 10 marks)

Section B

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

11. What is meant by bioaccumulation ?
12. What is greenhouse effect ?
13. Differentiate between biodegradable and hazardous waste.
14. How are pollutants classified ?
15. Mention the major regions of atmosphere.
16. Mention the cause and drugs used for the treatment of tuberculosis.
17. What are the types of water pollutants ?

(5 × 2 = 10 marks)

Turn over

Section C

Answer any **two** *questions.*
Each question carries 5 *marks.*

18. Write a note on air pollution control measures.

19. Explain thermal pollution with reference to their source, effects and control measure.

20. Write a note on air-borne diseases.

(2 × 5 = 10 marks)

Section D

Answer any **one** *question.*
The question carries 10 *marks.*

21. a) Write a detailed note on solid waste management.

    b) Explain in detail about hydrological cycle.

(5 + 5 = 10 marks)

22. a) Write a note on endosulfan disaster in Kerala.

    b) Write a note on water treatment methods.

(5 + 5 = 10 marks)

[1 × 10 = 10 marks]

D 10131 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS—UG)

Chemistry

CHE 5D 02—CHEMISTRY IN DAILY LIFE

Time : Two Hours Maximum : 40 Marks

Section A

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

1. What is meant by pharmacophore ?
2. Give an example for Insecticides.
3. ———— is a biodegradable polymer.
4. Name an analgesic.
5. PMMA stands for ————.
6. What are NPK fertilizers ?
7. What is meant by detergents ?
8. Element used in vulcanized rubber ————.
9. What are antioxidants ?
10. Adulterant used in milk ————.

(10 × 1 = 10 marks)

Section B

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

11. Write a note on applications of biodegradable polymers.
12. Define antiseptics. Give one example.
13. Define cetane number.
14. Distinguish between natural and synthetic fertilizers.
15. What are conducting polymers ? Give an example.
16. Explain the harmful effects of hair dye.
17. What are artificial sweeteners ? Give one example.

(5 × 2 = 10 marks)

Turn over

Section C

Answer any **two** *questions.*
Each question carries 5 *marks.*

18. What are plastic identification codes ? Mention the application of polythene and polypropene.
19. What is meant by nanotechnology ? Give its applications.
20. Define modern food habits. Discuss the harmful effects of modern food habits.

(2 × 5 = 10 marks)

Section D

Answer any **one** *question.*
The question carries 10 *marks.*

21. a) Discuss the classification of dye based on their mode of application.
    b) Explain the advantage and disadvantage of detergents.
    c) What are the essential nutrients for plants ?

(5 + 4 + 1 = 10 marks)

22. a) What are biodegradable plastics ? Mention the applications of PGA, PLA and PBHV ?
    b) What are food adulterants ? Mention the adulterant used in milk, tea and coffee powder.

(5 + 5 = 10 marks)

[1 × 10 = 10 marks]

D 10132 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS—UG)

Chemistry

CHE 5D 03—FOOD SCIENCE AND MEDICINAL CHEMISTRY

Time : Two Hours Maximum : 40 Marks

Section A

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

1. Name one adulterant present in turmeric powder.
2. Give one example of artificial food preservative.
3. Write the chemical name of 'Ajinomoto'.
4. Name the disease caused by the over usage of alcohol.
5. The composition of soda water is ————————.
6. The deficiency of Vitamin B causes ————————.
7. Name a nucleic acid.
8. Write the name of the method used for the extraction of essential oils.
9. Give the name of one antipyretic drug.
10. ———————— is a biodegradable polymer used in capsule covers.

(10 × 1 = 10 marks)

Section B

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

11. What are the harmful effects of materials used for the packaging of food ?
12. Differentiate between fast food and junk food.
13. Write a short note on permitted and non-permitted food colours with examples.

14. What are Hormones ? How they are classified.

15. Write the source and any one medicinal use of lemongrass oil and sandal wood oil.

16. What are Tranquilizers ? Give one example.

17. Define Pharmacognosy.

(5 × 2 = 10 marks)

Section C

Answer any **two** *questions.*
Each question carries 5 *marks.*

18. List out the common adulterants present in milk and milk products. Discuss the methods to identify it.

19. Write a short note on traditional Kerala foods and their advantages.

20. Briefly discuss the medical applications of nanomaterials.

(2 × 5 = 10 marks)

Section D

Answer any **one** *question.*
The question carries 10 *marks.*

21. Explain the causes, symptoms and drugs used for the treatment of influenza, tuberculosis, bronchial asthma, kidney stone and diabetes.

22. Write a brief account on the major constituents and medicinal uses of any five Indian medicinal plants.

(1 × 10 = 10 marks)

D 10133 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS—UG)

Industrial Chemistry

IC 5B 01—INDUSTRIAL CHEMISTRY—I

Time : Three Hours Maximum : 80 Marks

Section A

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

1. What are the three basic components of energy balance ?
2. Define the streamline flow of fluids.
3. What is the chemical constitution of molecular sieves ?
4. Why do polymers have a glass transition temperature ?
5. How are soaps manufactured by the semi-boiled process ?
6. Give two examples for commonly used food preservatives.
7. What are the stationary and mobile phases in paper chromatography ?
8. Which are the electrostatic methods commonly used in effluent treatment ?
9. What are the chemical constituents used in varnish ?
10. What are metal complex dyes ?

(10 × 1 = 10 marks)

Section B (Short Answer)

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

11. List out the commonly used conventional fuels.
12. What is the chemical composition and uses of NASICON ?
13. Distinguish between Newtonian and non-Newtonian liquids.
14. What causes viscoelasticity in polymers ?
15. Explain the use of additives and fillers in soap manufacturing.

Turn over

16. Which are the common ingredients used in lipsticks ?
17. Explain the use of viscosity builders in the food industry.
18. List out the major colouring agents used in food processing.
19. What is the working principle of X-ray fluorescence spectroscopy ?
20. How do anaerobic effluent treatment differ from aerobic treatment ?
21. Distinguish between varnishes and lacquers.
22. What are fluorescent brightening agents used in paint formulations ?

(10 × 2 = 20 marks)

Section C (Paragraph)

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

23. (a) Describe the basic concepts of ISO.
    (b) Explain Reynold's number.
24. Explain the industrial importance of alumina, clay and mica.
25. Describe the classification of polymers.
26. Write a note on the composition and making of deodorants and talcum powder.
27. Write a short essay on food adulteration.
28. Explain the working principle and use of AAS and flame photometry.
29. Write a brief note on the importance of waste recycling and solid waste management.
30. Discuss the applications of natural dyes in the cotton textile industry.

(5 × 6 = 30 marks)

Section D (Essay)

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

31. (a) Describe the unit process and unit operations.
    (b) Explain the types of heat exchangers. (5 + 5 = 10 marks)
32. Discuss the manufacture and use of PF resins.
33. Write an essay on the use of chromatography techniques in purification of compounds.
34. Explain the classifications of dyes based on the nature of dyeing.

(2 × 10 = 20 marks)

D 10589 **(Pages : 2)** **Name**.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS—UG)

Industrial Chemistry

ICH 5B 01—INDUSTRIAL CHEMISTRY—I

(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 are zeolites used for ?
2. How do molecular sieves work ?
3. Explain the structure of sheet silicates.
4. What are the benefits of glass annealing ?
5. What are glass ceramics ? Give some examples.
6. How can we prepare plaster of paris from gypsum ?
7. List out the major raw materials used for cement production.
8. Comment on the advantages of wet process over dry process in cement manufacture.
9. What is Wilkinson's catalyst ? Give the application.
10. What are fungicides and rodenticides used for ?
11. How do we classify fertilizers as natural and artificial ?
12. What is the calorific value of a fuel ?

(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 brief notes on borides and carbides.
14. Explain the chemical constitution of zeolites and NASICON.
15. What are the steps involved in glass manufacturing ?
16. Explain the various types of Portland cement.
17. Explain the difference between homogeneous and heterogeneous catalysis with suitable examples.
18. Discuss the effects of pollution by fertilizers.
19. Briefly outline the fractional distillation of crude oil.

(5 × 5 = 25 marks)

Section C (Essay)

Answer any **one** *question.*
The question carries 11 *marks.*

20. (a) Briefly discuss the chemical and physical properties of glass.
    (b) Comment on the importance of inhibitors and promoters in catalysis with suitable examples.

(5½ + 5½ = 11 marks)

21. (a) Write a note on major classification of fertilizers.
    (b) Explain Bergius and Fischer Tropsch processes. (5½ + 5½ = 11 marks)

[1 × 11 = 11 marks]

D 10587 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS—UG)

Chemistry

CHE 5D 02—CHEMISTRY IN DAILY LIFE

(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. Write a note on plastic recycling.
2. Give any two applications of PGA.
3. Explain the specificity of enzyme action.
4. What are hormones ? Give examples of sex hormones.
5. Name any two commonly used antioxidants.
6. What are junk foods ?
7. Discuss the drawbacks of excessive use of fertilizers.
8. Name the major chemicals present in tooth paste.
9. Why soaps do not lather in hard water ?
10. What are antihistamines ? Give an example.
11. Explain the advantages of using solar energy over fossil fuels.
12. Define calorific value of a fuel.

(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. Explain the characteristics of a good fuel.
14. Discuss the functions of RNA and DNA.

15. Write a note on deficiency diseases of vitamins.

16. Discuss the chemicals used as food preservatives.

17. List the advantages and disadvantages of organic fertilizers.

18. Differentiate between antiseptics and disinfectants with examples.

19. Explain the role of flavour enhancers in foods with suitable examples.

(5 × 5 = 25 marks)

Section C (Essay)

Answer any **one** *question.*
The question carries 11 *marks.*

20. Discuss the classification of polymers with examples based on : a) origin, b) structure, c) synthesis d) molecular forces.

21. a) Explain the cleansing action of soap.

    b) Briefly describe the side effects of using cosmetics.

(1 × 11 = 11 marks)

D 10586 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS—UG)

Chemistry

CHE 5D 01—ENVIRONMENTAL CHEMISTRY

(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 non persistent pollutant ?
2. What is the role of atmosphere in photosynthesis ?
3. Name some gaseous air pollutants.
4. What are the sources of oxides of nitrogen in the atmosphere ?
5. Write a short note on the contamination of ground water by agricultural activities.
6. What is itai - itai disease ?
7. Mention two methods for reducing the contamination of water with lead.
8. What is Eutrophication ?
9. The dangers posed by soil pollution are due to increase in population. Comment.
10. List the harmful effects of soil pollution.
11. Give two examples of green solvents.
12. What is atom economy ?

(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. Write a note on the air pollution in Delhi.
14. Explain the effects of acid rain.
15. Briefly describe the pollution due to plastics.
16. Endosulphan destroyed the biodiversity of certain villages in Kerala. Justify.
17. Explain the important segments of environment.
18. Discuss the role of zoning and green belt in controlling air pollution.
19. Explain the applications of green chemistry.

(5 × 5 = 25 marks)

Section C (Essays)

Answer any **one** *question.*
The question carries 11 *marks.*

20. Discuss the different water quality parameters.
21. Briefly explain the use of a) Gravitational settling chamber ; b) Catalytic converters ; and c) Cottrell's precipitator in controlling pollution.

(1 × 11 = 11 marks)

D 10585 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS—UG)

Chemistry

CHE 5B 08—PHYSICAL 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 temper coefficient of a chemical reaction.
2. What is meant by steady-state approximation ?
3. Give the mathematical expression for Freundlich adsorption isotherm and explain the terms.
4. Discuss briefly the theory of homogeneous catalysis.
5. What is triple point ? What are its characteristics ?
6. What is the maximum number of phases possible for two component systems ?
7. What are condensed systems ? Give the phase rule for condensed systems.
8. What do you mean by finger print region in IR spectra ?
9. State and explain mutual exclusion principle.
10. What is Frank-Condon principle ?
11. How many ESR signals are given by methyl radical ?
12. State Stark-Einstein's law of photochemical equivalence.

(8 × 3 = 24 marks)

Turn over

Section B (Short Answers)

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. Derive integrated rate equation for zero order kinetics. What are the features of zero order kinetics ?

14. A first order reaction is 20% complete in 15 minutes at 40°C and in 3 minutes at 60°C. Calculate the activation energy for the reaction.

15. How will you determine the order of a reaction using half life method ?

16. Explain any *five* applications of adsorption.

17. What is chemical shift ? Why TMS is used as a standard in NMR spectra ?

18. What is Photosensitization ? Explain with suitable examples.

19. With the help of Jablonsky diagram, explain fluorescence phenomena.

(5 × 5 = 25 marks)

Section C (Essay)

Answer any **one** *question.*
The question carries 11 *marks.*

20. a) State distribution law ? What are its characteristics ?

    b) Derive distribution law and briefly explain any *two* applications.

21. Discuss in detail the vibrational spectra of anharmonic oscillator.

(1 × 11 = 11 marks)

D 10584 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS—UG)

Chemistry

CHE 5B 07—ORGANIC CHEMISTRY—II

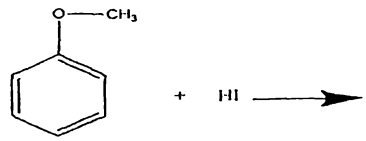
(2019 Admissions)

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. Which is more acidic, propanol or isopropanol ? Why ?
2. An alkoxide is a stronger base than hydroxide ion. Justify.
3. How will you convert phenol to salicylaldehyde ?
4. What is PTC ? Give examples.
5. Complete the reaction :



6. Suggest reactions for the conversion of ethyl magnesium chloride to 1-propanol.
7. What products are formed when CH_3MgI is treated with ethanol?
8. What is urotropine ? How it is prepared ?
9. What is Etard's reaction ?
10. Which is more acidic, acetic acid or chloroacetic acid ? Why ?
11. What is Hofmann's Bromamide degradation ? Explain with examples.
12. Pyridine undergoes nucleophilic substitution reaction easily. Why ?

(8 × 3 = 24 marks)

Turn over

Section B (Short Answers)

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. How will you prepare phenolphthalein ? Explain its colour change with pH.
14. Explain oximercuration-demercuration reaction for the preparation of alcohols.
15. What is Claisen rearrangement ? Explain its mechanism.
16. What is Tollen's reagent ? How it is used to test the presence of aldehydes ?
17. How will you convert acetic acid to acetaldehyde and acetic acid to acetone ?
18. What is Hofmann's elimination ? Explain with suitable examples.
19. Write notes on Fischer Indole synthesis.

(5 × 5 = 25 marks)

Section C (Essays)

Answer any **one** *question.*
The question carries 11 *marks.*

20. How will you separate a mixture of 1°, 2°, and 3° amines ?
21. Write notes on : Kolbe's electrolysis ; HVZ reaction ; Reformatsky reaction ; and Chichibabin reaction.

(1 × 11 = 11 marks)

D 10583 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS—UG)

Chemistry

CHE 5B 06—INORGANIC CHEMISTRY—III

(2019 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

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

1. Name the second group cations. How are they precipitated ?
2. Explain the term co-precipitation and post precipitation.
3. How are XeF_2 and XeF_4 prepared ? Give their structures.
4. What are pseudohalogens ? Give examples.
5. What is the structure and hybridisation of IF_5.
6. Alkali metal in liquid ammonia are coloured. Why ?
7. Define ionizing solvent.
8. Discuss structure of $(SN)_x$.
9. What are phosphazenes ?
10. Mention two measures to control air pollution.
11. Triple R is important term in managing waste. Justify
12. What are different types of e-wastes ?

(8 × 3 = 24 marks)

Section B

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. Explain the term microanalysis with suitable examples and mention the advantages.
14. Discuss the use of Ellingham diagram in extraction of elements. Using the Ellingham diagram of oxides, determine whether aluminium can be used to reduce MgO.
15. Explain the structure and hybridization of ClF_3 and ICl_3.
16. How are noble gases isolated and separated ?
17. How silicones are prepared ? Discuss their structure and uses.
18. How can we prevent thermal and radioactive pollution ?
19. Discuss the challenges in managing solid wastes.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries 11 *marks.*

20. How is nickel extracted from its ore ?
21. How is quality of drinking water assessed ? Define three water quality parameters.

(1 × 11 = 11 marks)