C 2172 **(Pages : 2)** **Name**.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Chemistry

CHE 4C 04—PHYSICAL AND APPLIED CHEMISTRY

Time : Three Hours Maximum : 64 Marks

Section A

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

1. Example for a lyophobic colloid is ————.
2. Electrical property of colloids can be explained by ————.
3. Rate constant of a reaction is 3.5×10^{-3} dm^3 $.mol^{-1}$. s^{-1}. The order of the reaction is ————.
4. Name a CFC pollutant.
5. How many normal modes of vibration may CO_2 molecule have ?
6. Integrated rate equation for a zero order reaction is ————.
7. Example for a thermosetting plastic is ————.
8. ———— is a green house gas.
9. Chemical name of antipyretic drug is ————.
10. What is a Herbicide ?

(10 × 1 = 10 marks)

Section B

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

11. In a first order reaction, it takes 2 minutes to complete 30% of the reaction. Calculate the rate constant for this reaction.
12. State and explain Hardy Schulze rule.
13. Explain the adsorption theory of catalysis.
14. State Beer-Lambert's law and explain its application.

Turn over

15. Define cetane number.

16. What is meant by radioactive pollution.

17. Calculate the energy of radiation that has a wave.

18. Draw the structures of Endosulphan and DDT.

19. Write one example for herbicide and fungicide.

20. What is COD ? Mention its significance.

(7 × 2 = 14 marks)

Section C

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

21 Explain the effect of temperature on rate of reaction.

22. Derive the rate equation for a second order reaction.

23. Explain any *two* methods used for the purification of colloids.

24. How can the two isomers of C_2H_6O be differentiated using NMR spectroscopy.

25. Distinguish between thermoplastics and thermosetting plastics.

26. Write important steps involved in the manufacture of glass.

(4 × 5 = 20 marks)

Section D

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

27. Write notes on :

    a) Chemical shift.

    b) Gold number.

    c) Synthetic fibres.

28. Describe the principle and applications of different chromatographic methods.

29. Explain the effects of water pollution.

30. Write notes on a) Dyes ; and b) Soaps and detergents.

(2 × 10 = 20 marks)

(Library) 08.12.21 AN

C 3519 **(Pages : 2)** **Name**.....

Reg. No.....

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Chemistry

CHE 4C 04—PHYSICAL AND APPLIED CHEMISTRY

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. Why are lyophilic sols more stable than lyophobic sols ?
2. Define Gold number.
3. Write note on green solvent.
4. What is the significance of surface to volume ratio ?
5. What is meant by elution ?
6. Discuss the principle of IR spectroscopy.
7. What is bathochromic shift ?
8. What is COD ?
9. What is greenhouse effect ?
10. What is octane number ?
11. Compare LPG and CNG.
12. How are dyes classified ?

(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. Explain different purification techniques of colloids.
14. What is the principle of UV spectroscopy ?
15. Explain application of nanomaterial's in electronics and robotics.
16. Explain briefly TLC.
17. What are Pollutants ? How are they classified ?
18. Explain briefly different theories of dyes.
19. Define and give an example of antipyretics, analgesics, antibiotics, antacids and antiseptics.

(5 × 5 = 25 marks)

Section C (Essay)

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

20. Discuss briefly different spectroscopic techniques used in the structural determination of organic molecules.
21. What are biodegradable polymers ? Explain application of biodegradable polymers.

(1 × 11 = 11 marks)

C 21263 **(Pages : 2)** **Name.....**

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2022

Chemistry

CHE 4C 04—PHYSICAL AND APPLIED CHEMISTRY

(2014—2018 Admissions)

Time : Three Hours Maximum : 64 Marks

Section A (One Word/Sentence)

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

1. The size range of colloidal particle is ————————.
2. Colloidal solution containing solid as dispersed phase and gas as dispersed medium is called
3. The unit of rate constant for a first order reaction is ————————.
4. In adsorption chromatography, the stationary phase is ————————.
5. The ratio of distance travelled by a component to the distance travelled by the solvent front thin layer chromatography is ————————.
6. Chemical substance used to reduce anxiety and tension is called ————————.
7. Paracetamol is an example for ———————— drug.
8. The minimum energy required for an effective collision which results in a chemical reaction is ————————.
9. Compound responsible for greenhouse effect is ————————.
10. The characteristic stretching frequency of free O--H bond is ————————.

(10 × 1 = 10 marks)

Section B (Short Answer)

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

11. Define gold number and write the importance of gold number
12. The first order reaction is completed by 20 % in 10 minutes. Calculate the time taken for the reaction in minutes for 75 % completion.
13. Write the selection rule for vibrational spectroscopy.
14. Draw the low resolution and high resolution ^{1}H NMR spectra of ethanol.

Turn over

15. What is Soap ? Mention the difference between hard and soft soap.
16. Differentiate between thermo plastic and thermosetting plastic.
17. Write the advantages and disadvantages of detergents over soap.
18. Briefly discuss the composition of talcum powder.
19. What do you mean by green house effect ?
20. Derive the integrated rate expression for first order reaction.

(7 × 2 = 14 marks)

Section C (Paragraph)

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

21. Discuss the origin of charge on colloidal particle.
22. Write the Arrhenius equation and explain the terms. The rate constant of a reaction at two temperatures 273 K and 303 K are $2.46 \times 10^{-5}\ S^{-1}$ and $1.63 \times 10^{-4}\ S^{-1}$. Calculate the activation energy of the reaction.
23. Explain the different types of electronic transitions.
24. Outline the structure and applications of Dacron polymer.
25. Give the sources and effects of the pollutant CO.
26. Write the composition and health effects of hair dye.

(4 × 5 = 20 marks)

Section D (Essay)

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

27. (a) Write any *five* applications of colloids.
    (b) What is the principle of TLC ? How does it work ?
28. (a) Describe the collision theory of reaction rate.
    (b) Explain how the temperature can affect the rate of a chemical reaction.
29. (a) Write the different steps involved in the manufacture of glass.
    (b) Explain the different type of glasses and mention their uses.
30. Write the source, effect and control measures of thermal pollution.

(2 × 10 = 20 marks)

C 21517 **(Pages : 2)** **Name.....**

Reg. No.....

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION, APRIL 2022

Chemistry

CHE 4C 04—PHYSICAL AND APPLIED CHEMISTRY

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answer)

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

1. Define Hardy-Schulz law.
2. What is critical micelle temperature ?
3. Define green chemistry.
4. Give two applications of nanomaterial in catalysis.
5. What is the principle of chromatography ?
6. Give the structure and monomer unit of neoprene.
7. What is the condition for a molecule to be microwave active ?
8. Define finger print region.
9. How is water purified for drinking purpose ?
10. Define pollutant and pollution.
11. What is Buna-N ?
12. Give any *two* examples of natural food preservatives and artificial sweeteners.

(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. Give an account of applications of colloids.

14. Explain the preparation of nanoparticles in detail.

15. Mention advantages and limitations of adsorption chromatography.

16. Give an account on biodegradable polymers.

17. What is greenhouse effect ? Explain its consequences and control measures.

18. Define and give an example of antibiotics, antipyretics and analgesics.

19. Calculate following for radiation of wavelength 200 nm : wavenumber. frequency, energy per photon and energy per mol.

(5 × 5 = 25 marks)

Section C (Essay)

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

20. (a) What is the principle of NMR spectroscopy ?

    (b) How will you differentiate the two isomers C_2H_6O using NMR spectroscopy ?

21. (a) Explain terms (a) Chromophore ; and (b) Auxochrome.

    (b) Discuss various theories of colour and constitution.

(1 × 11 = 11 marks)

D 103032 **(Pages : 2)** **Name.....**

Reg. No.....

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2024

Chemistry

CHE 4C 04—PHYSICAL AND APPLIED CHEMISTRY

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answers)

Answer questions up to 20 *marks.*
Each question carries 2 *marks.*

1. Distinguish between true solutions and colloidal solutions.
2. What are lyophilic colloids ? Give an example.
3. Explain 1D nanomaterials with an example.
4. What is R_f value ? How is it used in the identification of a compound ?
5. Name any *one* biodegradable polymer and write its application.
6. Give any *two* applications of nanomaterials in medicine.
7. Which are the monomers of Buna-S and Bakelite.
8. Write any *two* examples each for artificial sweeteners and permitted food colours.
9. Define octane number and cetane number.
10. What is eutrophication ?
11. What are chromophores and auxochromes ?
12. What is greenhouse effect ? Name any *two* greenhouse gases.

[Ceiling of marks : 20]

Turn over

Section B (Paragraph)

Answer questions up to 30 *marks.*
Each question carries 5 *marks*

13. Explain briefly the cleaning action of soap.

14. Differentiate between thermoplastics and thermosetting plastics.

15. What is meant by green chemistry ? Describe the principles of green chemistry.

16. Describe the principle and applications of gas chromatography.

17. Briefly explain UV-Visible spectroscopy.

18. Write a short note on the causes and effects of water pollution.

19. Explain any two methods for purification of colloids.

[Ceiling of marks : 30]

Section C (Essay)

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

20. (i) Discuss the principle of NMR spectroscopy.

    (ii) Draw the NMR spectrum of ethanol and explain.

21. Briefly explain the manufacture of cement.

(1 × 10 = 10 marks)