C 20096 **(Pages : 2)** **Name.....**

Reg. No.....

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

Chemistry

CHE 6B 12—ADVANCED AND APPLIED CHEMISTRY

(2014 to 2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A (One word)

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

1. Monomer of teflon is ————————.
2. An example for a thermoplastic is ————————.
3. FACT is located at ————————.
4. The percentage by volume of iso-octane in the iso-octane-heptane mixture that matches the fuel being tested in a standard test engine is called ————————.
5. Give an example for an anti-knocking compound.
6. An example for a prodrug is ————————.
7. Give an example for a tranquilizer.
8. Draw the structure of BHC.
9. Write an example for an insecticide.
10. ———————— is an example for an auxochrome.

(10 × 1 = 10 marks)

Section B (Short Answer)

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

11. Explain the significance of quantum dots.
12. What are fullerens ?
13. What is green chemistry ?
14. Write notes on self assembly.
15. Explain the term combinatorial chemistry.

Turn over

16. What is a computer programme ? Give an example.
17. Explain condensation polymerization using a suitable example.
18. What is PLA ?
19. Write the composition of talcum powder.
20. What are Antiseptics ? Give one example.
21. What are rodenticides ? Give one example.
22. Based on the concept of chromophore - auxochrome theory, arrange the following compounds in the increasing order of colour intensity. naphthalene, nitro-naphthol and nitro naphthalene.

(10 × 2 = 20 marks)

Section C (Paragraph)

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

23. Explain different carbon nanostructures.
24. Write a note on green organic synthesis using Diel's-Alder reaction as example.
25. Discuss different types of non-covalent interactions in supramolecular chemistry.
26. Give an account of combinatorial synthesis.
27. Explain the synthesis and applications of bakelite.
28. What are biodegradable polymers ? Give examples
29. Discuss the classification of drugs based on their mode of action using suitable examples.
30. Discuss the preparation and use of indigo.

(5 × 6 = 30 marks)

Section D (Essay)

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

31. Give an account of the applications of nanomaterials in various fields.
32. Explain the twelve principles of green chemistry.
33. a) Discuss the classification of soaps.
    b) Explain the cleansing action of soap.
34. Explain the classification of dyes based on their structure and mode of application using suitable examples.

(2 × 10 = 20 marks)

C 20542 **(Pages : 2)** **Name.....**

Reg. No.....

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS–UG)

Chemistry

CHE 6B 12—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 zeta potential ?
2. Explain the uses of nano-materials.
3. Why melting point of nano-material decrease when particle size decrease ?
4. What is the principle of green chemistry ?
5. Explain the importance of combinatorial synthesis.
6. Explain the term global minimum in computational chemistry.
7. Name one Nitrogenous and Potash fertilizer.
8. What are Propellants ?
9. Describe the term prodrugs with example.
10. Define octane number.
11. What are BHA and BHT ? Mention their important applications.
12. How will you synthesize Rosaniline ?

(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. Give an account of the stability of colloids.
14. Explain different host-guest interaction in supra molecules.
15. What are the software used in computational chemistry ?
16. Explain the term PHBV and PGA. Discuss its significance and applications.
17. Explain the strengthening of glass.
18. What are the major fractions in petroleum refining ?
19. Explain the theory of colour and constitution.

(5 × 5 = 25 marks)

Section C

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

20. Write short notes on :
    (a) Applications of combinatorial synthesis.
    (b) Computational chemistry as a tool and its scope.
    (c) Ziegler-Natta catalyst.
21. Write short notes on :
    (a) Travancore Cochin Chemicals Ltd.
    (b) Preparations of paracetamol and aspirin.
    (c) Artificial ripening of fruits.

(1 × 11 = 11 marks)

C 40083 **(Pages : 3)** **Name.....**

Reg. No.....

SIXTH SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION, MARCH 2023

Chemistry

CHE 6B 12—ADVANCED AND APPLIED CHEMISTRY

(2017–2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

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

1. Define chemical shift.
2. Which are the chemicals used in the preparation of cleansing creams ?
3. Give two examples for zero dimensional nanomaterials.
4. Who put forward the 12 Key Principles of Green Chemistry ?
5. Name an operating system.
6. Calculate EAN of copper (Z = 29) in $[Cu(NH_3)_4]^{2+}$.
7. What do you mean by a spectrochemical series ?
8. Give the structure of BHC.
9. Give any two permitted food color.
10. Calculate the CFSE value for the complex $[Co(Cl)_4]^{2-}$.

(10 × 1 = 10 marks)

Section B

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

11. Write the IUPAC names of (a) K_4 $[Ni(CN)_4]$; (b) $(NH_4)_2$ $[Pt(SCN)_6]$.
12. How does VBT account for the fact that $[Ni(CN)_4]^{2-}$ is diamagnetic and square planar ?
13. Suggest a green method for the synthesis of nanomaterials.
14. What is top- down synthesis in nanoscience ?
15. What are high and low spin complexes ?
16. Calculate the absorption maximum for $(CH_3)_2C=CH-CO-CH_3$.

Turn over

17. Give the importance and medical uses of coconut water
18. What is meant by shielding and de shielding of protons ?
19. Mention any two advantages of microwave assisted synthesis.
20. 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.
21. Distinguish between linear and nonlinear regression.
22. What happens to the melting point when the particle size of a material approaches to the nanoscale range ?

(10 × 2 = 20 marks)

Section C

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

23. Compare abinitio methods and molecular mechanics.
24. Draw and discuss the high-resolution proton NMR spectrum of ethyl bromide?
25. Compare VBT and MOT.
26. Give the sequence of energy levels of d orbitals in square planar and tetrahedral field.
27. What are Quantum dots ? Mention any two applications.
28. Explain briefly the twelve principles of green chemistry.
29. Discuss the classification of pesticides with examples.
30. Give the preparation of silver nanoparticles and mention its applications.

(5 × 6 = 30 marks)

Section D

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

31. (a) Write down the classification of nanomaterials with examples.
    (b) What is combinational synthesis ? Discuss its applications.
32. (a) Give the microwave assisted synthesis of Diels-Alder reaction.
    (b) Discuss the primary and secondary structure of protein.

33. (a) Write a note on the common food adulterants used in various food materials and the methods used to identify them.

(b) Predict the structure of an organic compound with molecular formula $C_3H_6O_2$ whose PMR data is given below :

(i) A triplet (0.9) 3H. (ii) A singlet (8.00) 1H.

(iii) A quartet (2.3) 2H.

34. Write a note on crystal field theory. How does this theory account for the color and magnetic properties of co-ordination compounds ?

(2 × 10 = 20 marks)

C 40517 **(Pages : 2)** **Name.....**

Reg. No.....

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2023

(CBCSS—UG)

Chemistry

CHE 6B 12—ADVANCED AND APPLIED CHEMISTRY

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

Section A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. What are the types of Carbon nano tubes ?
2. What are the types of Colloids ?
3. What is meant by electrical double layer in colloids ?
4. Why green chemistry is needed ?
5. Explain the green synthesis of Ibuprofen ?
6. Name two software used in computational chemistry.
7. What is Glass ?
8. What are Propellants ?
9. Define cetane number.
10. Define Saponification.
11. Define artificial sweetners with examples.
12. How will you synthesize Rosaniline ?

(Ceiling 20)

Turn over

Section B (Paragraph)

Answer **all** *questions.*
Each question carries 5 *marks.*
Answer questions upto 30 *marks.*
Each question carries 5 marks.

13. Distinguish between the bottom up and top down methods of nano scale synthesis.

14. Explain the application of combinatorial synthesis.

15. Distinguish between molecular mechanics method and electronic structure method in computational chemistry.

16. Explain the synthesis and applications of :

    (a) PAN ; and

    (b) PMMA.

17. Write a short note on fertilizers.

18. Explain the cleansing action of soap.

19. Write short notes on permitted and non-permitted food colours.

(Ceiling 30)

Section C (Essay)

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

20. Write short notes on :

    (a) Green aspects of Diels-Alder reaction.

    (b) Computational chemistry as a tool and its scope.

    (c) Differentiate between Nylon 6 and Nylon 66. (4 + 3 + 3 = 10 marks)

21. Write short notes on :

    (a) Cement.

    (b) Antiseptic and disinfectants.

    (c) Food preservative. (3 + 4 + 3 = 10 marks)

[1 × 10 = 10 marks]

D 100083 (Pages : 3) Name.....

Reg. No.....

SIXTH SEMESTER U.G. (CUCBCSS—UG) DEGREE EXAMINATION MARCH 2024

Chemistry

CHE 6B 12—ADVANCED AND APPLIED CHEMISTRY

(2018 Admissions only)

Time : Three Hours Maximum : 80 Marks

Section A (One word)

Answer **all** *questions.*

Each question carries 1 *mark.*

1. What are quantum dots ?
2. How nano particles are classified based on dimension ?
3. What are greener solvents ?
4. Who is the father of green chemistry ?
5. What is molecular modelling ?
6. Which programming language is used in computational chemistry ?
7. What is PLA ?
8. What are refractory materials ?
9. Explain the composition of shaving creams.
10. Give examples of artificial sweeteners.

(10 × 1 = 10 marks)

Section B (Short Answer)

Answer any **ten** *questions.*

Each question carries 2 *marks.*

11. What are fullerenes ?
12. What is atom economy ? How it is calculated ?

Turn over

13. Write notes on microwave assisted reactions.

14. What is meant by the term 'green synthesis' ?

15. What is R^2 in linear regression ? What is a good R^2 value for regression ?

16. How bakelite is synthesised ? Mention its applications.

17. Write the composition of cement.

18. How rocket propellants are classified ?

19. What are herbicides ? Give examples.

20. What are antihistamines ?

21. Explain the health effects of hair dye.

22. What are the common food adulterants in chilly powder ?

(10 × 2 = 20 marks)

Section C (Paragraph)

Answer any **five** *questions.*

Each question carries 6 *marks.*

23. Discuss briefly carbon nanotubes and grapheme.

24. Explain the host-guest interactions in supramolecules.

25. Write notes on the types of non covalent interactions in supramolecules.

26. Explain the preparation, properties and applications of Kevlar.

27. What are refractory materials ? Explain using examples.

28. Explain the preparation of paracetamol.

29. Discuss the preparation and uses of Indigo.

30. Write notes on the composition and health effects of chocolates and soft drinks.

(5 × 6 = 30 marks)

Section D (Essay)

Answer any **two** *questions.*

Each question carries 10 *marks.*

31 Explain the raw materials, chemistry involved in the preparation and uses of :

(a) Titanium dioxide pigment from ilmenite.

(b) Caustic soda and chlorine.

32. Explain the twelve principles of green chemistry.

33. Briefly explain the steps involved in glass manufacturing.

34. Give the definition and health effects of :

(a) Fast foods.

(b) Instant foods.

(c) Dehydrated foods.

(d) Junk foods.

(2 × 10 = 20 marks)

D 100526 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER U.G. (CBCSS—UG) DEGREE EXAMINATION MARCH 2024

Chemistry

CHE 6B 12—ADVANCED 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. What is meant by Brownian motion ?
2. Mention any *two* differences regarding the nature of image obtained in SEM and TEM.
3. What are Green Solvents ? Give two examples.
4. List out the different types of supramolecular interactions ?
5. What is GAMESS ? Give its expansion.
6. Define saddle point.
7. What are thermoplastics ? Give two examples.
8. Name the catalyst used in Zeigler Natta polymerisation. What advantage does it offer over conventional polymerisation ?
9. What are hybrid rocket propellants ?
10. What is meant by generic name of a drug ? Substantiate with an example.
11. What is TFM with reference to soaps ? Why is it important ?
12. Give two examples for artificial sweeteners. Compare their activity with that of sugar.

(Ceiling of marks : 20)

Turn over

Section B (Paragraph)

Answer questions up to 30 *marks.*

Each question carries 5 *marks.*

13. Explain Top-down and Bottom-up approaches in nanomaterial synthesis.

14. Explain molecular recognition in supramolecular chemistry giving due importance to its applications.

15. Describe geometry optimisation.

16. Explain tacticity of polymers. How does it affect polymer properties?

17. TiO_2 is a popular white pigment. How is TiO_2 prepared from Ilmenite by sulphate process ?

18. Define octane number and cetane number. Why are they important ?

19. Describe the classification of dyes based on their mode of application.

(Ceiling of marks : 30)

Section C (Essay)

Answer any **one** *questions.*

The question carries 10 *marks.*

20. (a) Explain the Green Synthesis of Ibuprofen.

    (b) What are the different types of glasses based on composition? Mention the use of each.

21. (a) Pesticides play a crucial role in farming. Write notes on the different types of pesticides and discuss on their pros and cons.

    (b) Write a note on antioxidants citing examples of natural and synthetic antioxidants.

(1 × 10 = 10 marks)