D 113896 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2024

Chemistry

CHE 1C 01—GENERAL CHEMISTRY

(2019—2023 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A (Short answers)

Answer questions up to 20 *marks.*

Each question carries 2 *marks.*

1. Define accuracy and precision.
2. Calculate the number of molecules in 5.6 L of CO2 gas at STP.
3. Write any *two* advantages of microanalysis.
4. What are redox indicators ? Give example.
5. What are the limitations of Bohr's atom model ?
6. Give a short note on mass defect and binding energy.
7. Discuss the choice of a suitable indicator for weak acid - strong base titration.
8. What are the modes of decay of radioisotopes ?
9. Distinguish isobars and isotones with suitable examples.
10. What are the difference between haemoglobin and myoglobin ?
11. Briefly explain the importance of cobalt in biological system.
12. Name two zinc containing enzyme and their uses.

[Ceiling of marks : 20]

Turn over

Section B (Paragraph)

Answer questions up to 30 *marks.*

Each question carries 5 *marks.*

13. Explain double burette method of titration. What are the advantages ?

14. (a) Explain group displacement law.

    (b) Give an account on Radioactive tracers and Rock dating.

15. What are quantum numbers ? How are they significant ?

16. Define lattice energy. Explain the Born-Haber cycle for NaCl.

17. Explain the biochemistry of iron.

18. Explain the structure and mechanism of action of Na-K pump.

19. What is nuclear fission. Explain the principle of atom bomb.

[Ceiling of marks : 30]

Section C (Essay)

Answer any **one** *questions.*

The question carries 10 *marks.*

20. (a) Explain the geometry of NH_3 and NH_4^+ using VSEPR theory. (3 marks)

    (b) Sketch the MO diagram of O_2 molecule and compare the bond order of O_2, O_2^+ and O_2^-. (4 marks)

    (c) Explain hydrogen bonding. (3 marks)

21. (a) Discuss the principle of complexometric titration. (5 marks)

    (b) Discuss how the principle of common ion effect and solubility product find application in the separation of Group II and Group IV cations. (5 marks)

[1 × 10 = 10 marks]

D 53646 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2023

Chemistry

CHE 1C 01—GENERAL CHEMISTRY

(2019—2023 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answers)

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

1. Distinguish between acidimetry and alkalimetry.
2. Define atomic mass and molecular mass.
3. Differentiate oxidation and reduction.
4. What are the advantages of micro analysis ?
5. If you are supplied with 2M H_2SO_4 solution how much of it should be diluted with water to form 20 litres of 0.5M solution.
6. What role does zinc ion play in the action of carboxy peptidase A ?
7. Write a note on chlorophyll.
8. Discuss Heisenberg's uncertainty principle.
9. Differentiate between intermolecular and intramolecular hydrogen bonding.
10. Explain the principle of hydrogen bomb.
11. Explain the terms mass defect and binding energy.
12. State group displacement law.

(Ceiling of marks : 20)

Turn over

Section B (Paragraph)

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

13. Discuss the principle of complexometric titrations.
14. Explain the bond order and magnetic behavior of C_2 molecule on the basis of MOT.
15. How can you apply Born-Haber cycle to calculate lattice energy ? Explain using NaCl as example.
16. Discuss the biochemistry of Iron.
17. Mention the role of Cobalt in living beings.
18. Discuss the applications of radioisotopes.
19. Explain the term nuclear fusion with suitable examples. Why are fusion reactions called thermonuclear reactions.

(Ceiling of marks : 30)

Section C (Essay)

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

20. (a) Discuss briefly the method of expressing concentration.
    (b) Discuss double burette method. What are its advantages
21. (a) What are Quantum numbers. Discuss the significance of each quantum number.
    (b) Use VSEPR model to predict the geometry of BF_3, H_2O, PCl_5, ClF_3 and NH_3.

(1 × 10 = 10 marks)

D 32344 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2022

Chemistry

CHE 1C 01—GENERAL CHEMISTRY

(2019—2022 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answers)

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

1. Define oxidation and reduction in terms of oxidation number.
2. What are redox titrations ? Give an example.
3. What is meant by microanalysis ? Mention two examples.
4. What substances are called secondary standard in titrimetry ?
5. Define Lattice energy.
6. Name two organic compounds which shows H-bonding.
7. What are nuclear forces and its different types ?
8. Explain term isotopes with suitable with suitable example.
9. What is meant by radioactive tracer ?
10. Name two trace elements in biochemistry.
11. What are metalloenzymes ?
12. Name two zinc containing enzymes.

Section B (Short Essay)

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

13. What are metal ion indicators ? Explain their function with a suitable example.
14. A moving body with mass 0.1 mg. has wavelength of 3.312×10^{-29} m. Calculate its kinetic energy.

Turn over

15. Give the shapes of following molecule on basis of VSEPR theory : (a) $BeCl_2$: (b) BF_3 ; (c) $SnCl_2$.

16. State and illustrate group displacement law.

17. Calculate age of Uranium mineral that contain 0.2 g. of ^{206}Pb per gram of ^{238}U. $t_{1/2}$ of Uranium is 4.5×10^9 years.

18. Write short note on role of chlorophylls in photosynthesis.

19. What structural changes do occur when haemoglobin carries oxygen and when it detaches oxygen ?

Section C (Essay)

Answer any **one** *question.*

The question carries 10 *marks.*

20. Describe low solubility product principle and common ion effect as applied in qualitative inorganic analysis.

21. (a) What are the postulates of Bohr atomic theory ?

    (b) How is the spectrum explained on basis of Bohr theory ?

D 13578 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER (CBCSS-UG) DEGREE EXAMINATION
NOVEMBER 2021

Chemistry

CHE 1C 01—GENERAL CHEMISTRY

(2019—2020 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answers)

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

1. What is primary standard in volumetric analysis ? Give an example
2. Calculate the velocity of beam of electrons if they display de Broglie wavelength of 20 A^0.
3. What is the shape and bond angle of IF_7 molecule ?
4. What are dipole-dipole forces ? Give an example.
5. What is called as breeder reactor ?
6. Explain term mass defect.
7. Explain one use of radioisotopes in medical diagonosis.
8. Name a metalloporphyrin and metal present in it.
9. Give names of two iron storing proteins.
10. Name two elements considered as bulk elements in biochemistry.
11. What is the role of chlorophyll in photosynthesis ?
12. What is the role of haemoglobin in transport of O_2 ?

(Ceiling of Marks : 20)

Section B (Short answer)

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

13. Explain term microanalysis with suitable example and mention the advantages.
14. What are complexometric titrations ? Explain with reference to EDTA titration with its structure.

Turn over

15. Draw and explain Born-Haber cycle of NaCl.

16. How does the concept of hybridization explain geometry of acetylene molecule ?

17. Write short note on nuclear exchange forces.

18. Calculate age of uranium mineral that contains 0.2g of ^{206}Pb per gram of ^{238}U. Half-life of $^{238}U = 4.5 \times 10^9$ years.

19. Discuss photosynthesis.

(Ceiling of Marks : 30)

Section C (Essay)

Answer any **one**.

The question carries 10 *marks.*

20. Discuss theory of acid-base indicators.

21. (a) Discuss Limitations of Bohr atom model.

    (b) State and explain Heisenberg's uncertainty principle. What is its significance in our daily life ?

    (c) Calculate uncertainty in velocity of particle of mass 1×10^{-6} Kg whose uncertainty in position is 9.54 A^0.

(1 × 10 = 10 marks)

D 12618 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2021

Chemistry

CHE 1C 01—GENERAL CHEMISTRY

(2021 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. What is meant by microanalysis ? Give two examples.
2. Calculate the momentum of a particle which has de Broglie wavelength of 0.2 nm.
   [$h = 6.6 \times 10^{-34}$ Js]
3. Mention shapes of : (i) XeF_2 molecule ; and (ii) SF_6 molecule.
4. Write all possible values of 1 if $n = 4$.
5. Draw structure of porphine.
6. What are π-mesons ?
7. Explain term nuclear chain reaction.
8. What is meant by radioactive tracer ?
9. Name two iron containing enzyme.
10. Name a vitamin known to contain metal. What is the metal ?
11. Name two trace elements in biochemistry.
12. What is called metal activated enzyme ? Give an example.

(8 × 3 = 24 marks)

Turn over

Section B

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

13. Distinguish primary and secondary as applied to volumetry with example.
14. Explain function of complexometric indicators.
15. Explain shapes of SO_4^{2-} and NH_4^+on basis of VSEPR theory.
16. Distinguish between bonding and antibonding molecular orbitals.
17. State and illustrate group displacement law.
18. $^{14}C/^{12}C$ ratio in a piece of wood is 12 % that of atmosphere. Calculate the age of wood. Half life of ^{14}C = 5760 years.
19. What structural changes do occur when haemoglobin carries O_2 and when it detaches ?

(5 × 5 = 25 marks)

Section C

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

20. (a) Briefly explain principles of solubility product and common ion effect in separation of cations in qualitative analysis ; (b) A solution contains Cu^{2+} and Ba^{2+}. How would you separate ions and identify them.
21. What are quantum numbers ? Discuss the significance of each quantum number.

(1 × 11 = 11 marks)

D 93910 (Pages : 2) Name.....

Reg. No.....Acc. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION, NOVEMBER 2020

Chemistry

CHE 1C 01—GENERAL CHEMISTRY—I

(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. Define molarity of a solution.
2. What is meant by standard solution ?
3. Mention two advantages of microanalysis.
4. What is meant by common ion effect ?
5. State and explain Pauli's exclusion principle.
6. What is the shape of IF_7 molecule ?
7. What are isotones ? Give an example.
8. What is nuclear fission ? Name two nuclei fissionable by thermal neutrons.
9. Mention any *two* applications of radioisotopes in medicine.
10. What are and how many types of essential elements are there ?
11. Name two metal ion that are needed in relatively large quantities for biochemical process.
12. Mention difference between haemoglobin and myoglobin.

(8 × 3 = 24 marks)

Turn over

Section B

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

13. Explain application of solubility product in group separation of cations.

14. Calculate the wavelength of particle of mass 6.6×10^{-17}kg moving with a kinetic energy 7.425×10^{-13} kg. m^2 s^{-2}.

15. Define lattice energy. How does it affect solubility of ionic substance ?

16. The amount of ^{14}C present in an old piece of wood is found to be one-sixth of that present in fresh piece of wood. Calculate age of wood if $t_{1/2}$ of carbon is 5668 years.

17. Explain nuclear fusion with example. Why fusion reactions are called thermonuclear reactions ?

18. Write name and functions of three zinc containing enzymes.

19. Explain sodium-potassium pump.

(5 × 5 = 25 marks)

Section C

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

20. Discuss various theories and limitations of acids and bases.

21. What are the postulates of molecular orbital theory ? Construct energy level diagram for the electrons in oxygen molecule and account for its paramagnetic behavior.

(1 × 11 = 11 marks)

D 73261 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER B.A./B.Sc. DEGREE EXAMINATION, NOVEMBER 2019

(CBCSS—UG)

Chemistry

CHE 1C 01—GENERAL CHEMISTRY

(2019 Admissions)

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 a standard solution?
2. Calculate the momentum of a particle which has de Broglie wavelength of 2.5×10^{-10} m. [$h = 6.6 \times 10^{-34}$Js]
3. Define lattice energy of ionic compound. What does it indicate ?
4. State Hunds rule of maximum multiplicity
5. What are nuclear forces ? What are the different types ?
6. What are isotones ? Give an example.
7. Write nuclear equation for (i) emission of an α-particle from Th-232 ; (ii) emission of β-particle from Ra-228.
8. What are metalloenzymes ? Give an example.
9. What is the oxidation state and coordination number of Fe in haemoglobin ?
10. Name two zinc containing enzyme.
11. Explain hybridization and shape of ethylene.
12. Briefly explain the term photosynthesis.

(Ceiling of marks : 20)

Turn over

Section B (Short Answer)

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

13. Distinguish between accuracy and precision.

14. Discuss the principles of iodimetric and iodometric titrations.

15. Molecular nitrogen is diamagnetic while molecular oxygen is paramagnetic. Explain this on the basis of MOT.

16. Discuss the difference between sigma and pi bond.

17. Explain the difference between nuclear fission and nuclear fusion.

18. A wooden fossil shows ^{14}C activity which is 60% of the activity found in fresh piece of wood. Calculate the age of sample. Half life of ^{14}C = 5770 years.

19. Briefly outline the role of haemoglobin in transport of oxygen and carbondioxide.

(Ceiling of marks : 30)

Section C (Essay)

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

20. (a) Explain the action of diphenyl amine as a redox indicator.

    (b) Which indicator can be used for titration of (i) Oxalic acid Vs KOH ? (ii) Na_2CO_3 *Vs* H_2SO_4 ? Explain

21. What are the different types of hybridization involving *s*, *p* and *d* orbitals ? Explain and give one example for each.

(1 × 10 = 10 marks)