D 73107 (Pages : 2) Name.....

Reg. No.....

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

(CUCBCSS—UG)

Chemistry

CHE 1B 01—THEORETICAL AND INORGANIC CHEMISTRY—I

Time : Three Hours Maximum : 80 Marks

Section A (One Word Question)

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

1. Hydrogen bomb works in the principle of ————.
2. Write the expression for Heisenberg's uncertainty principle.
3. A verbal or mathematical description of a phenomenon that allows for general predictions is called ————.
4. Define a mole.
5. Name an external indicator for dichromatric titrations.
6. How many significant figures are there in 0.02 ?
7. Atoms with same atomic number, but different mass number are called ————.
8. Who is known as the father of modern chemistry ?
9. In the atomic spectrum of hydrogen, the series comes in ultraviolet region is ————.
10. An alpha-particle is equivalent to ———— atomic nucleus.

(10 × 1 = 10 marks)

Section B (Short Answer Questions)

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

11. Differentiate between oxidation number and valency.
12. Define standard solution.
13. What is meant by hypothesis ?
14. Differentiate between normality and molality.
15. What is the first aid for burn due to bromine ?
16. What is alchemy ?

Turn over

17. 20 ml sodium hydroxide is dissolved in 250 ml of water. Calculate the molarity of the solution.
18. What is Ritz combination principle ?
19. State group displacement law.
20. What are the limitations of Rutherford atom model ?
21. Define mass defect and binding energy.
22. Differentiate between iodimetry and iodometry.

(10 × 2 = 20 marks)

Section C (Paragraph Questions)

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

23. What is meant by primary standard ?
24. Write a brief note on the origin of modern chemistry.
25. What are the advantages of double burette method of titration ?
26. Explain Aston's mass spectrograph.
27. Account Sommerfeld modification of Bohr theory.
28. Illustrate the theory of permanganometric titrations.
29. Write a note on the nuclear reactors in India.
30. Explain Plank's Quantum hypothesis.

(5 × 6 = 30 marks)

Section D (Essay Questions)

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

31. Write a brief note on the different components of a research project.
32. Explain Bohr atomic theory. Derive equations to calculate Bohr radius, velocity and energy of an electron.
33. Illustrate with suitable examples, explain any five applications of radioactivity.
34. Briefly explain the theory of indicators used in acid-base, redox, adsorption and complexometric titrations.

(2 × 10 = 20 marks)

D 12617 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION, NOVEMBER 2021

Chemistry

CHE 1B 01—THEORETICAL AND INORGANIC CHEMISTRY—I

(2021 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 meant by scientific observation ?
2. Name four branches of chemistry.
3. Explain and illustrate term accuracy with regard to analytic result.
4. What is a dessicant ? Give an example.
5. Explain term electron affinity.
6. Explain and draw atomic radius and covalent radius.
7. What are soft acids ?
8. Explain lux flood definition of acid and base.
9. Define dipole moment and what is its expression and unit.
10. Draw the structure of borazine.
11. Explain one use of radioisotopes in medical diagnosis.
12. What is mass defect ?

(8 × 3 = 24 marks)

Section B (Short Essays)

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

13. Explain and discuss criteria for scientific hypothesis.
14. Write short note on lab safety practices.

Turn over

15. What are characteristics that a primary standard should possess ?

16. Discuss basic features of Pauling's scale of electronegativity.

17. Explain Lowry Bronsted theory of acids and bases. Compare relative strength of conjugate acid and base.

18. The masses of $^{40}Ca_{20}$ atom, $^{1}H_{1}$ and $^{0}n_{1}$ are 39.975 amu, 1.0078 and 1,0086 amu. Calculate binding energy per nucleon for Ca atom.

19. State and illustrate group displacement law.

(5 × 5 = 25 marks)

Section C (Essay)

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

20. Define and explain the principle behind use of adsorption indicators.

21. What is Born-Haber cycle ? Discuss with respect to NaCl.

(1 × 11 = 11 marks)

D 13577 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2021

Chemistry

CHE 1B 01—THEORETICAL AND INORGANIC CHEMISTRY—I

(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 meant by scientific theory ?
2. Give two examples each of behavior science and social science.
3. Explain and illustrate term precision with regard to analytic result.
4. What is the correct procedure for diluting a concentrated acid ?
5. Explain term ionization energy.
6. How does electronegativity vary along a period ? Explain its trend in periodic table.
7. What are hard acids ?
8. What is the relation between N/P ratio and nuclear stability ?
9. How will you find out the percentage of ionic character ?
10. Draw the structure of boric acid.
11. How is ^{14}C formed in the atmosphere ? How does it decay ?
12. Explain term isotope with suitable example.

(Ceiling of marks : 20)

Section B (Short Answer)

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

13. What are characteristics of a well-designed scientific experiment ?
14. What are the rules followed by handling chemicals ?

Turn over

15. Distinguish primary and secondary standard as applied to volumetry.

16. Discuss basic features of Pauling's scale of electronegativity.

17. Discuss slater rule and its application.

18. Explain the principle of Astons mass spectrograph.

19. Define and illustrate Usanovich concept of acid and base and its trends in periodic table

(Ceiling of marks : 30)

Section C (Essay)

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

20. (a) Discuss the role and function of redox indicators in dichrometric titration.

    (b) Explain terms permanganometry and dichrometry.

21. Compare the electron affinity and ionization energy of *s* and *p* block elements. Explain the structure of oxides of N and P.

(1 × 10 = 10 marks)

D 32343 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2022

Chemistry

CHE 1B 01—THEORETICAL AND INORGANIC CHEMISTRY—I

(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. Distinguish between primary and secondary data.
2. Specify the major difficulties in the formulation of hypotheses.
3. What do the R and S phrases stand for ?
4. Calculate the normality of oxalic acid solution prepared by dissolving 1.575g in 250 mL.
5. Ionization enthalpies of Be and N are higher than expected. Why ?
6. What is the effective nuclear charge in a polyelectronic atom ?
7. Briefly explain the inert pair effect with an example.
8. State Born Lande equation.
9. What is the Lux-Flood definition of acids and bases ?
10. What are amphoteric oxides ? Suggest a couple of examples.
11. Calculate the decay constant of a radioactive element decayed to its 10 % of initial amount in 10 days.
12. Comment on the stability of the nucleus considering the proton-proton electrostatic repulsion into account.

[Ceiling of marks : 20]

Turn over

Section B (Paragraph)

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

13. Briefly outline the essential components of a research publication ?

14. Explain the double burette method of titration; what are its advantages over burette-pipette titration ?

15. Write a note on the classification of errors.

16. Describe the Pauling and Mulliken scales of electronegativity.

17. Explain the principle behind flame tests shown by alkali metal ions.

18. Write a note on Pearson's HSAB concept.

19. Describe the gaseous diffusion method and thermal diffusion method of separation of isotopes.

(Ceiling of marks : 30)

Section C

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

20. Explain the theory of : (a) Redox ; and (b) Complexometric titrations.

21. (a) Illustrate Born Haber cycle ; and (b) Discuss the use of radioactive isotopes tracers.

(1 × 10 = 10 marks)