E 9701 (Pages : 2) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, NOVEMBER 2014

First Semester

Complementary Course—Chemistry

BASIC THEORETICAL AND ANALYTICAL CHEMISTRY

(Common for Physical Sciences, Life Sciences, Geology and Family and Community Sciences)

[2013 Admission onwards]

Time : Three Hours Maximum : 60 Marks

Part A

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

1. ———— can be explained by particle nature of radiation.
2. Maximum number of electrons in an orbital is two, this is given by ———— Principle.
3. Higher value of Pka indicates that the acid is ———— acidic.
4. Mathematical expression of First law of Thermodynamics is ————.
5. Molality can be defined as ————.
6. ———— is a primary standard substance.
7. Indicator used for the titration between HCl and Na_2CO_3 is ————.
8. For Softening of Hard water ———— Chromatography is used.

(8 × 1 = 8)

Part B

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

9. Differentiate between Accuracy and Precision.
10. State and explain Hersenberg's uncertainty principle.
11. Explain the terms (i) system and surrounding ; (ii) State function.
12. Give the statement of the second law of Thermodynamics in terms of heat and work and explain its significance.
13. State and explain Lowry Bronsted concept of acids and Bases ? What are conjugate pair ?
14. Explain Absolute and relative errors.
15. Discuss the principles of solvent extraction.
16. Distinguish between molarity and Normality.

Turn over

17. Distinguish between orbit and orbital.

18. Write one redox titration and explain the principles involved in it using chemical equations.

(6 × 2 = 12)

Part C

Answer any **four** *questions.*
Each question carries 4 *marks.*

19. Explain Photoelectric effect.

20. Explain the terms common ion effect and solubility product. Discuss their applications in qualitative cation analysis.

21. Discuss the criteria required for a spontaneous process.

22. Discuss the principles of Gravimetric analysis.

23. Calculate the pH of 10^{-9} M solution of HCl.

24. How are errors classified ? What are the different techniques used for minimization of errors.

(4 × 4 = 16)

Part D

Answer any **two** *questions.*
Each question carries 12 *marks.*

25. (a) What are quantum numbers. Discuss the different quantum numbers in detail.

    (b) Sketch the shape of d orbital.

26. Write briefly on :

    (a) Paper chromatography.

    (b) High performance liquid chromatography.

27. Write briefly on different types of distillation techniques and their applications in detail.

28. (a) Discuss the physical significance of free energy.

    (b) State and explain III law of Thermodynamics.

    (c) A gas is provided with 300 joule heat at STP, so that its volume increases from 2 litre to 3 litre at 1 atm. Calculate the change in its internal energy.

(2 × 12 = 24)