Reg. No……..……... Name……..…….. **U 129**

# BSc DEGREE EXAMINATION OCTOBER 2015

SEMESTER – 1: CHEMISTRY (COMPLEMENTARY)

COURSE: U1CPCHE1: BASIC THEORETICAL AND ANALYTICAL CHEMISTRY

***(Supplementary / Improvement)***

Time: Three Hours Max. Marks: 60

## Section A

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

1. Name a metal which shows photoelectric effect.
2. From which element Hund's rule of maximum multiplicity starts?
3. Calculate the change in internal energy of a system which absorbs 100 J of heat and does 215J of work.
4. Name one example for a basic buffer.
5. What is the pH of 0.01M HCl solution?
6. Name one indicator used in the titration of HCl against $K_2CO_3$.
7. What is the condition for spontaneity with respect to $\Delta G$value?
8. Give an example of a substance used in TLC. (8 × 1 = 8)

## Section B

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

9. Calculate the pH of a solution obtained by mixing equal volumes of solutions with pH=4 and pH=6.
10. What is common ion effect? Give one example.
11. Briefly explain Third law of thermodynamics.
12. Predict the sign of $\Delta S$in the following processes: (a) Dissolution of glucose in water (b) HCl added to $AgNO_3$ solution to form AgCl precipitate.
13. Calculate the uncertainty in the velocity of an electron if the uncertainty in position is 100 pm (mass of the electron is 9.1 X $10^{-31}$ Kg)
14. Distinguish between accuracy and precision.
15. Define $R_f$ value. What is its significance?
16. State and explain Aufbau principle (2 × 6 = 12)

## Section C

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

17. Distinguish column chromatography and HPLC.
18. Briefly explain Second law of thermodynamics and its applications.
19. Draw the shape of d orbitals.
20. Briefly explain the theory of complexometric titrations.
21. The solubility product of silver chloride is $1.2 \times 10^{-10}$ at 298K. Calculate the solubility of AgCl at 298K.
22. What are redox titrations? Give examples. (5 × 4 = 20)

## Section D

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

23. (a) What are the common errors in quantitative analysis? Briefly explain the methods to minimize them.
    (b) Explain the various separation techniques used in analytical chemistry. (6 + 4)
24. (a) Compare Arrhenius, Lowry-Bronsted and Lewis concept of acids.
    (b) Explain briefly various types of quantum numbers. (5 + 5)
25. (a) Discuss the various enthalpies of Fusion, Vapourisation and Sublimation with examples.
    (b) Briefly explain the gravimetric method of analysis of a metal. (5 + 5)
26. (a) What are buffer solutions. Give the theory of working of an acidic buffer.
    (b) Explain briefly Ion-exchange and gas chromatographic techniques. (4 + 6)

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