SACRED HEART COLLEGE (AUTONOMOUS)
THEVARA, KOCHI -13
(Affiliated to Mahatma Gandhi University, Kottayam)

Reg. No. ....

Name..............................

B. SC. DEGREE EXAMINATION – NOVEMBER 2014
FIRST SEMESTER CHEMISTRY (COMPLEMENTARY)
COURSE: U1CPCHE1: BASIC THEORETICAL AND ANALYTICAL CHEMISTRY

Time: 3 hrs   Max. Marks: 60

Part A

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

1. The concept of wave nature of matter was proposed by ………..

2. Give the expression for the frequency of the line in the Balmer series.

3. At equilibrium ΔG = …………

4. For pure water at $25^{o}C$ $[H^{+}]$ = ………..

5. Define Lewis acid.

6. Name one external indicator.

7. Solution of a substance with ………… is called a standard solution.

8. In adsorption chromatography the stationary phase is ………………   8 x 1 = 8 marks

Part B

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

9. State and explain the Heisenberg Uncertainty principle.

10. How the matter waves are differ from the electromagnetic waves?

11. Water acts as a Bronsted acid as well as a Bronsted base. Illustrate with an example.

12. What is meant by ionic product of water?

13. State and explain Aufbau principle.

14. Distinguish between accuracy and precision.

15. Mention any four characteristics of entropy.

16. What are the main advantages of HPLC?   6 x 2 = 12 marks

Part C

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

17. What is common ion effect? Mention two of its applications.

18. Write a note on de Broglie's wave theory of particles.

19. What are redox titrations? Give examples.

20. What are the important limitations of first law of thermodynamics?

21. Write a note on R_f value in chromatography.

22. What is solubility product? Mention its applications.

$$4 \times 5 = 20 \text{ marks}$$

Part D

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

23. a) Explain about quantum numbers and their significance   (6)

    b) State and explain second law of thermodynamics   (4)

24. Write short notes on

    a) Gas chromatography   (5)

    b) Ion exchange chromatography   (5)

25. a) Briefly discuss about the various separation techniques used in

      analytical chemistry   (6)

    b) Sketch the shape of *s*, *p* and *d* orbitals   (4)

26. a) What are buffer solutions? How do they function? Explain with examples   (6)

    b) The solubility of $PbSO_4$ in water is 0.038 g L^{-1} at 25°C. Calculate its solubility product

      at the same temperature   (4)

$$10 \times 2 = 20 \text{ marks}$$

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