E 9459

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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 Science)

[Prior to 2013 admissions]

Time : Three Hours

Maximum Weight : 25

Section A

Answer all questions.

A bunch of four questions carries a weight of 1.

I. 1 An example of Intensive property is :

    (a) Volume.   (b) Mass.

    (c) Energy.   (d) Pressure.

2 One Lewis base is :

    (a) NH_3.   (b) BF_3.

    (c) $AlCl_3$.   (d) All the above.

3 Weight required to prepare 0.1 N 200 ml Oxalic acid solution is (Equivalent weight of
Oxalic acid = 63).

    (a) 6.3.   (b) 0.63.

    (c) 1.26.   (d) 12.6.

4 A process is said to be adiabatic :

    (a) If the temperature of the system remains constant during each stage of the process.

    (b) If no heat enters or leaves the system during any step of the process.

    (c) If the pressure of the system remains constant during each step of the process.

    (d) None of the above.

II. 5 One sublimating substance is ——————.

6 Mathematical expression for de-Broglie equation is ——————,

7 Electronic configuration of chromium is —————— (At. no. 24).

Turn over

8   High value of PKa signifies that the solution is ———————— acidic.

III. 9   A compound can be precipitated when :

    (a)   Its solubility product exceeds Ionic product.

    (b)   Its Ionic product exceeds solubility product.

    (c)   Ionic product = solubility product.

    (d)   All the above.

10   For a spontaneous process AG = ——————.

11   pH of blood is maintained by the Buffer action of ——————.

12   For $n = 4$, $l = 1$ Magnetic quantum number will be ——————.

IV. 13   Closed system is a system ——————.

14   Entropy is defined as ——————.

15   What do you mean by absolute error ?

16   Indicator used for the titration between oxalic acid and sodium hydroxide solution is ——————.

$(4 \times 1 = 4)$

Section B

Answer any **five** *questions.*
Each carries a weight of 1.

17   Discuss the principle of Recrystallisation. How is it applied in fractional crystallization ?

18   State and explain Paulis exclusion principle. What is its main consequences ?

19   What is R_f value ? Discuss its application in the defection of organic compounds.

20   Distinguish between system and surrounding.

21   Explain solubility product.

22   Differentiate between primary standard and secondary standard giving suitable example for each one.

23   What do you mean by Buffer action ? How will you prepare a Basic Buffer ?

24   What is a reversible reaction ?

$(5 \times 1 = 5)$

Section C

Answer any **four** *questions.*
Each carries a weight of 2.

25   Discuss the principles of fractional distillation and distillation under reduced pressure.

26   How can ion exchange chromatography applied to softening of hard water ?

27 Discuss the principles of Gravimetric analysis taking one example.

28 State and explain Heisenberg's uncertainty principle.

29 Discuss the criteria of spontaneity.

30 One mole of an ideal gas for which $C_V = 3/2$ R is heated reversibly at constant pressure of 1 atm. from 25ºC to 100ºC. Calculate ΔE and ΔH.

$$(4 \times 2 = 8)$$

Section D

*Answer any **two** questions.*
Each carries a weight of 4.

31 State and explain in detail second and third law of thermodynamics.

32 Write briefly on Paper chromatography and thin layer chromatography and their applications.

33 Explain the following in detail :

(a) Photoelectric effect.

(b) Lowry Bronsted concept of acids and bases.

$$(2 \times 4 = 8)$$