B.Sc. DEGREE EXAMINATION NOVEMBER 2016.

First Semester

CHEMISTRY (OPTIONAL)

(New Syllabus)

Time : Three hours   Maximum : 80 marks

All Sections are compulsory.

Answer **ALL** questions in the same answer book.

Draw neat diagrams and give equations wherever necessary.

I.   Answer any **TEN** of the following :   (10 × 2 = 20)

1.   Write all the quantum numbers for the electrons of Sodium atom.

2.   Discuss the significance of φ^2 function.

3.   The electron affinity of noble elements are zero. Why?

4.   Define oxidation number. Calculate the oxidation number of iron in $K_4Fe(CN)_6$.

5.   Write the IUPAC name

(a)

(b) $Cl-CH_2-CH_2-\underset{\underset{Br}{|}}{CH}-\underset{\underset{CH_3}{|}}{CH}-COOH$
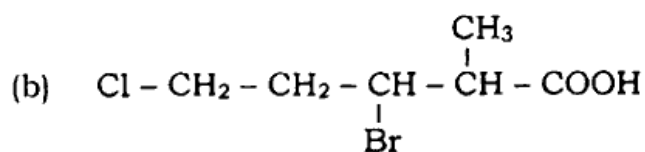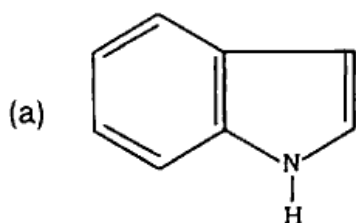
6.   Give one example each for a carbonyl functional group and ester functional group.

7.   Define Steric effect.

8.   Give reason chloroform is polar but carbon tetra chloride is non-polar.

9.   Define critical pressure.

10.   Define vapour pressure of liquid.

11.   Define parachor and give its equation.

12.   Define viscosity of a liquid.

II. Answer any **SIX** of the following : (6 × 5 = 30)

13. Explain theory of redox indicator with reference to diphenyl amine.

14. Explain the lux flood concept of acids and bases.

15. Derive de-Broglies equation and explain wave length of matter and momentum of the particle.

16. Assign E and Z notations for the following examples using CIP rules.
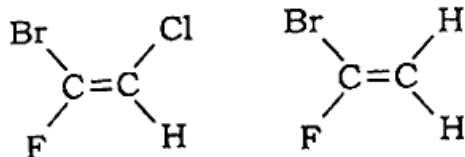
17. Differentiate nucleophilicity and basisity with suitable example.

18. Define electrophile. Give one reaction of electrophilic addition.

19. Describe Andrews experiments on liquification of gases.

20. How is refractive index of a liquid determined by using Abb's refrectometer?

21. Explain the principle involved in purification of organic liquid by solvent extraction method.

III. Answer the following :

22. (a) Define ionization energy and explain the factors effecting the ionization energy. (5)

    (b) What are standard solutions? Give requirements of primary standard solutions. (5)

Or

23. (a) Explain the rules governing the electronic configuration. (5)

    (b) Write the rules for the computing oxidation number. (5)

IV. Answer the following :

24. (a) What are carbocations? Explain the stability of carbocations. (5)

    (b) How do you determine configurations of cis-trans isomers? (5)

Or

25. (a) Define nucleophile. Explain SN² reaction with suitable example. (5)

    (b) Write the mechanism of Pinacol-Pinacolone rearrangement. (5)

Answer the following :

6. (a) How is reduced equation of the state derived from Vander Waal's equation? State the law of corresponding state. (5)

(b) Calculate the critical constant of Oxygen given that Vander Waal's constantans

$a = 0.1378\ Nm^2/mol^2,\ b = 3.18 \times 10^{-5}\ m^3/mol$ and $R = 8.314\ J/K/mol.$ (5)

Or

7. (a) Explain the determination of surface tension by drop number method. (5)

(b) Derive an expression for the Nernst's distribution law and mention its two limitations. (5)