DSC – 260 (CHEM – UG)

Third Year B.Sc. Degree Examination, November 2008
CHEMISTRY
Directorate of Distance Education Course (Paper – III)

Time : 3 Hours Max. Marks : 75

*Note : 1) This paper consists of **four** Sections. Answer **all** Sections.*
*2) Write equations and neat diagrams **wherever** necessary.*

SECTION – A

I. Answer the following questions in **a** word, **a** phrase or **a** sentence : **(10×1=10)**

1) What is spontaneous process ?
2) What are enzymes ?
3) State second law of thermodynamics.
4) Mention two examples of monosaccharides.
5) Define ionic mobility.
6) What is meant by saponification value of oils ?
7) What is concentration cell ?
8) How is gluconic acid obtained from glucose ?
9) Give the composition of Pentlandite.
10) What is the influence of carbon on the properties of steel ?

SECTION – B

II. Answer **any FIVE** questions : **(5×3=15)**

11) Explain the application of Kohlrauch's law in determining the equivalent conductance at infinite dilution of a weak electrolyte.

12) How are refractories classified ? Give one example for each class.

13) Explain in brief the manufacture of soap by hot process.

P.T.O.

14) What is Ellingham's diagram ? Write the typical Ellingham's diagram and explain.

15) Explain the synthesis of citral from Methyl heptenone.

16) Write the cell diagram for the Weston cadmium cell and the cell reactions.

17) Four moles of an ideal gas expands isothermally from 1 dm^3 to 10 dm^3 at 25°C. Calculate the change in free energy of the gas (R = 8.314$Jk^{-1}mole^{-1}$).

SECTION – C

III. Answer **any FIVE** questions : **(5×6=30)**

18) a) Derive Gibb's Helmoholtz equation in terms of free energy and enthalpy change. **4**

b) Heat supplied to Carnot's Engine is 927.8 K.J. How much useful work can be done by an engine which works between 273K and 373K ? **2**

19) a) How do you convert α-glucose into β-Fructose ? **4**

b) How is Vitamine – C synthesized ? **2**

20) a) Explain the extraction of Manganese from its ore. **4**

b) Write a short note on quartation process. **2**

21) a) What are Zwitter ions ? Explain the importance of Vitamines. **4**

b) How do you synthesise the α-amino acids by phthalimide method ? **2**

22) a) Explain the determination of pH of a solution using glass electrode. **4**

b) Calculate the entropy change accompanying the reversible isothermal expansion of 5 mole of an ideal gas from 8 dm^3 to 80 dm^3 at 30°C. **2**

23) a) What are abrasives ? How are they classified ? Give an example to each. 4

b) Calculate the equivalent conductance 0.1N solution of a salt whose resistance is found to be 2.5×10^3 ohms. Cell constant is 1.15 cm^{-1}. 2

24) a) What is electroplating ? Describe the electroplating of nickel. 4

b) How is silver recovered from the developed photographic plate ? 2

SECTION – D

IV. Answer **any TWO** questions : **(2×10=20)**

25) a) Elucidate the open chain structure of glucose. 5

b) Elucidate the structure of Nicotine. 5

26) a) Derive Clausius-Clapeyron equation. 5

b) Discuss the curve obtained in conductometric titration of a strong acid with a strong base. 5

27) a) Compare the solvent properties of water and liquid ammonia with respect to

i) Solvolysis

ii) Acid-base neutralisation. 5

b) Explain the Extraction of Uranium from pitch blends. 5