

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 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 Kohlrausch'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.

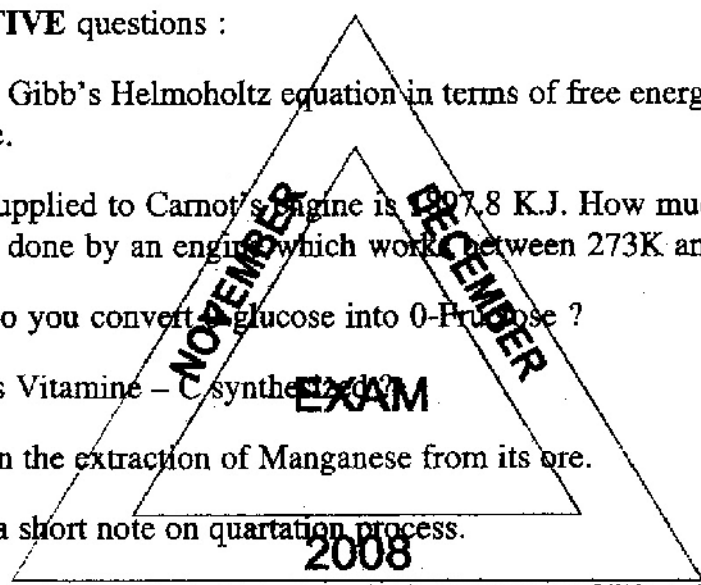


- 14) What is Ellingham's diagram ? Write the typical Ellingham's diagram and explain.
- 15) Explain the synthesis of citral from Methyl heptenone.
- 16) Write the cell diagram for the Weston cadmium cell and the cell reactions.
- 17) Four moles of an ideal gas expands isothermally from  $1 \text{ dm}^3$  to  $10 \text{ dm}^3$  at  $25^\circ\text{C}$ . Calculate the change in free energy of the gas ( $R = 8.314 \text{ Jk}^{-1}\text{mole}^{-1}$ ).

## SECTION - C

III. Answer any FIVE questions :

(5×6=30)

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- 18) a) Derive Gibb's Helmholtz equation in terms of free energy and enthalpy change. 4
  - b) Heat supplied to Carnot's engine is 997.8 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  $\alpha$ -glucose into  $\beta$ -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  $\alpha$ -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  $8 \text{ dm}^3$  to  $80 \text{ dm}^3$  at  $30^\circ\text{C}$ . 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  $2.5 \times 10^3$  ohms. Cell constant is  $1.15 \text{ cm}^{-1}$ . 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. 2008 5
- b) Explain the Extraction of Uranium from pitch blends. 5