

**Q.P. Code – 50826**

**Third Year B.Sc. Degree Examination**

**SEPTEMBER/OCTOBER 2013**

**(Directorate of Distance Education)**

**(DSC 260) Paper III – CHEMISTRY**

*Time : 3 Hours]*

*[Max. Marks : 75/85*

**Instructions to Candidates :**

- 1) *The question paper contains five Sections. Answer all Sections.*
- 2) *Section A contains **one** mark questions and should be answered in the first **two** pages of the main answer book. The questions of Section A answered in any other part of the answer book **will not** be valued.*
- 3) *Write equations and neat diagrams **wherever** necessary.*
- 4) *Section-E is **compulsory** for **85** marks scheme **only**.*

**SECTION – A**

Answer the following questions in a word, a phrase or in a sentence :

**10 × 1 = 10**

1. What are Refractories?
2. Name the metal present in pitch Blende.
3. Define Solvolysis.
4. State second law of thermodynamics.
5. Define molar conductance.
6. What does free energy change signify?
7. Define liquid junction potential.
8. What is an active site of enzyme?
9. Define Zwitter ion.
10. What is mutarotation?

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SECTION – B

Answer any **FIVE** of the following :

**5 × 3 = 15**

11. Give comparative account of water and liquid ammonia as solvents.
12. How is silver recovered from the developed photographic plate?
13. What is meant by electroplating? Describe the electroplating of chromium.
14. Derive an expression for entropy change in an isothermal expansion of an ideal gas.
15. Explain the determination of pH of a solution using Quinhydrone electrode.
16. Explain conversion of Keto-hexose into aldohexose.
17. Explain why detergents are better cleaning agents than soap.

SECTION – C

Answer any **FIVE** of the following :

**5 × 6 = 30**

18. (a) What are Ellingham's diagrams? Discuss the thermal decomposition of HgO with the help of Ellingham's diagram.  
(b) What is the influence of following elements on the properties of steels?
  - (i) Carbon
  - (ii) Tungsten
  - (iii) Chromium

**3 + 3**
19. (a) Describe the extraction of nickel from pentlandite ore.  
(b) Mention any four purpose of making alloys. 

**4 + 2**
20. (a) Derive Gibb's-Helmholtz equation.  
(b) Calculate the entropy change in the isothermal reversible expansion at 5 moles of an ideal gas from volume of 10 lts. to a volume of 100 lts. at 300 K. 

**4 + 2**
21. (a) What are fuel cells? Describe the construction and working of H<sub>2</sub>-O<sub>2</sub> fuel cells.  
(b) What is work function and what is its significance. 

**4 + 2**

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22. (a) Elucidate the structure of nicotine. 3 + 3  
(b) Explain the synthesis of citral from methyl heptenone.
23. (a) Explain manufacture of soap by hot process. 3 + 3  
(b) Explain the mechanism of enzyme catalysis.
24. (a) What are vitamins? How are they classified? Give two examples for each class. 3 + 3  
(b) Explain Debye–Huckel theory for strong electrolytes.

SECTION – D

Answer any **TWO** of the following :

**2 × 10 = 20**

25. (a) Discuss the solvent action of water and liquid ammonia with respect to  
(i) Acid-base neutralisation  
(ii) Complex formation  
(b) Explain the relation between ionic conductance and transport number.  
(c) How will you synthesise glycine from formaldehyde? Name the synthesis. 4 + 3 + 3
26. (a) Derive Clausius–Clapeyron equation. 4 + 3 + 3  
(b) What are abrasives? How are they classified? Give examples.  
(c) Discuss the factors affecting the activity of an enzyme.
27. (a) What is peptide bond? Discuss the carbobenzoxy method of synthesis of peptides. 4 + 3 + 3  
(b) Describe the extraction of manganese from pyrolucite ore.  
(c) Explain the principles involved in the conductometric titration of HCl verses NaOH.

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SECTION – E

Answer any **ONE** of the following :

**1 × 10 = 10**

**(Compulsory question for 85 marks scheme only)**

28. (a) Elucidate the open chain structure of D(+) Glucose.  
(b) Explain the construction and working of calomel electrode.  
(c) Mention any four purpose of making electroplating. **5 + 3 + 2**
29. (a) Explain the determination of transport number of silver ion in silver nitrate solution by Hiffort's method using unattackable electrodes.  
(b) Explain epimerisation with an example.  
(c) Explain any three properties of refractories. **4 + 3 + 3**
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