

JUNE 2008 1

Roll No. ....

Total No. of Pages : 2

BT-2/J08

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Chemistry (2005 onwards)

Paper : CH-101E

Time—Three Hours]

[Maximum Marks—100

- Note :— (i) Attempt **five** questions in all, selecting at least **one** question from each unit.  
(ii) All questions carry equal marks.

### UNIT-I

1. (a) Define entropy. Write its unit and physical significance. 5  
(b) Derive Gibb's Helmholtz equation. 8  
(c) Five moles of an ideal gas expand isothermally and reversibly at  $27^{\circ}\text{C}$  from an initial volume of  $5\text{ dm}^3$  to  $50\text{ dm}^3$  against a pressure that is greatly reduced. Calculate  $\Delta G$  and  $\Delta S$  for the process ( $R = 8.314\text{ J/K/mol}$ ). 7
2. (a) Define following terms used in phase equilibria with examples :  
Phase, Component, Degree of Freedom, Eutectic, Freezing Point. 10  
(b) With the help of neat, clean and labelled diagram discuss the phase diagram of sulphur system. 10

### UNIT-II

3. (a) Define alkaline and non alkaline hardness. 3  
(b) Write a note on Calgen conditioning. 5  
(c) 100 ml of water sample required 4 ml of  $\frac{N}{50}\text{ H}_2\text{SO}_4$  for neutralization to phenolphthalein end point. Another 16 ml of same acid was needed for further titration to methyl orange end point. Determine the type and amount of alkalinity. 5  
(d) Write the formation and method of prevention of scales in boiler. 7

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4. (a) Explain the ion-exchange method of purifying the water with regeneration. 10  
(b) Define following :  
Break point chlorination, Desalination, Hardness, Sedimentation, Disinfection.  $5 \times 2 = 10$

### UNIT-III

5. (a) Explain different methods used for prevention of corrosion of metals. 10  
(b) What is meant by corrosion ? 2  
(c) Discuss the factor influencing corrosion. 5  
(d) Explain stress corrosion. 3
6. (a) What are lubricants ? Discuss their important function. 3  
(b) How consistency and drop point values of lubricants are determined ? 7  
(c) Define lubrication and explain fluid film lubrication. 7  
(d) Define viscosity and saponification value. 3

### UNIT-IV

7. (a) Define conductometric titration and write its advantage. 5  
(b) What is flame photometry ? Describe its application and drawbacks. 10  
(c) Explain differential thermal analysis technique. 5
8. (a) Differentiate isotactic and syndiotactic polymer. 4  
(b) Why can not thermosetting plastics reshaped and reused ? 4  
(c) Define composites and write its application over polymer. 4  
(d) Write preparation, properties and uses of P.V.C. 8

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