

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

- (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°C from an initial volume of 5 dm<sup>3</sup> to 50 dm<sup>3</sup> against a pressure that is greatly reduced. Calculate  $\Delta G$  and  $\Delta S$  for the process ( $R = 8.314 \text{ J/K/mol}$ ). 7
- (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

- (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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Contd.

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- (a) Explain the ion-exchange method of purifying the water with regeneration. 10  
(b) Define following :  
Break point chlorination, Desalination, Hardness, Sedimentation, Disinfection. 5x2=10

UNIT-III

- (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
- (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

- (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
- (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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