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Roll No. ....

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BT-1/DX-8026

CH-101E: Chemistry

Time : 3 Hours

Maximum Marks : 100

**Note:** (i) Attempt Five questions in all, Selecting at least One questions from each section.

(ii) All questions carry equal marks.

**UNIT-I**

Q-1 (a) Explain second Law of Thermodynamics. State the term Entropy.

(b) Gibbs free energy of a reaction at 27°C and 37°C are -29.0 K Cal and -30.0 K Cal, respectively. Determine its  $\Delta H$  and  $\Delta S$  in this temperature range.

10x2

Q-2 (a) Draw a well labelled neat diagram only of Sulphur System.

(b) Discuss the Pattinson's process with the help of Ag-Pb system.

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(c) Explain Super cooled water.

8,8,4

**UNIT-2**

Q-3 (a) A sample of water contains 16.8 mg/L of  $Mg(HCO_3)_2$ , 19.0 mg/L of  $MgCl_2$ , 24.0 mg/L of  $MgSO_4$  and 22.2 mg/L of  $CaCl_2$ . Calculate the total hardness of water in terms of  $CaCO_3$  equivalent.

(b) Explain the various types of alkalinities present in water sample. How these are determined volumetrically. Write down various reactions involved in it.

8,12

Q-4 (a) Explain the following:

(i) Water softening by Lime-Soda process.

(ii) Reverse osmosis and dialysis.

(iii) Disinfection of water by Chlorination.

8,8,4

**UNIT-3**

Q-5 (a) How material selection and design can prevent corrosion?

(b) Explain the mechanism of Galvanic corrosion and differential aeration corrosion.

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(c) Why silver and copper do not under go corrosion like iron in moist atmosphere. 7,7,6

Q-6 (a) Define pour point, flash & fire point, Viscosity Index and mention their significance.

(b) Write note on the following:  
Drop point & Consistency Value and Saponification value. 12,8

UNIT-4

Q-7 Write notes on the following:

(a) Copolymerisation.

(b) PVC.

(c) Urea-Formaldehyde resin.

(d) PVA. 5x4

Q-8 (a) What is meant by Thermal Analysis? Explain the functioning of DTA using block diagram.

(b) Explain Flame photometry. 12,8