

Seat No.	
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S - 1395

SHIVAJI UNIVERSITY, KOLHAPUR

Subject : ENGINEERING CHEMISTRY (New Course)

Code : 59183

First Year Engineering - SEM - I

Day and Date : Wednesday 18-12-2013

Time : 10.00 a.m. to 01.00 p.m.

Total Marks : 100

Note : 1) Figures to right indicate full marks.

- 2) Question no. 4 from **Section I** and Question no. 8 from **Section II** are **compulsory**
- 3) Attempt **Any Two** remaining questions from **Section I** and **Any Two** remaining questions from **Section II**.
- 4) Draw neat labeled diagrams wherever necessary.
- 5) Use of non programmable calculator is allowed.

SECTION - I

- Q.1**
- a) Give principle, construction and working of Glass electrode. 05
 - b) Explain preparation, properties & applications of Phenol formaldehyde plastic. 05
 - c) Explain the following terms 06
 - i) Caustic embrittlement
 - ii) Priming
 - iii) Foaming
- Q.2**
- a) Explain Ion exchange process for softening of water. 08
 - b) The water sample on analysis was found to contain following impurities in mg/lit. 08
 - 1) $\text{Ca}(\text{HCO}_3)_2$ - 10.5
 - 2) $\text{Mg}(\text{HCO}_3)_2$ - 11.5
 - 3) CaSO_4 - 18.5
 - 4) MgCl_2 - 20.5Calculate temporary, permanent & total hardness of water sample in ppm.

- Q.3** a) Compare thermoplastics with thermosetting plastics. 06
b) Explain the Single Beam Spectrophotometer with schematic representation. 05
c) Give composition, properties and uses of GRP. 05
- Q.4** Write notes on **any four**. 18
- a) Reverse Osmosis
 - b) Conducting polymers
 - c) Dissolved oxygen
 - d) Beer-Lambert's law
 - e) Advantages & disadvantages of instrumental methods
 - f) Alkalinity
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SECTION - II

- Q.5** a) A sample of coal containing 91% C, 5% H and 3% ash. When this coal was tested in laboratory for its calorific value in Bomb calorimeter, the following data were obtained. 08
- Weight of coal burnt = 0.95gm
 - Weight of water taken = 700gm
 - Water equivalence of apparatus = 2000gm
 - Rise in temp. = 2.48°C
 - Cooling correction = 0.020°C
 - Acid correction = 60cal
 - Fused wire correction = 10cal
- Calculate net and gross calorific value of coal assuming the latent heat of condensation of steam as 580 cal/gm.
- b) What is Green Chemistry? Give twelve principles of Green Chemistry. 08
- Q.6** a) Explain principle, construction & working of Boy's calorimeter. 06
- b) What is electrochemical corrosion? Discuss oxygen absorption mechanism with example. 05
- c) Explain cathodic protection method for protection from corrosion. 05
- Q.7** a) Give composition properties and applications of brasses. 06
- b) What is hot dipping? Discuss tinning in details. 05
- c) What are the factors affecting rate of corrosion. 05
- Q.8)** Write notes on **any four**. 18
- a) Fuel cells
 - b) Characteristics of good fuel
 - c) Galvanization
 - d) Electroplating
 - e) Oxidation corrosion
 - f) Duralumin and Alnico
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