

Seat No.	
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[4956]-103**F.E. EXAMINATION, 2016****ENGINEERING CHEMISTRY****Time : Two Hours****Maximum Marks : 50**

- N.B. :—** (i) Neat diagrams must be drawn wherever necessary.
(ii) Figures to the right indicate full marks.
(iii) Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
(iv) Assume suitable data, if necessary.

1. (a) Describe Demineralisation/Deionization method with figure, process, ion exchange and regeneration reactions for softening of hard water. [6]
- (b) What is reference electrode ? Draw neat labelled diagram of glass electrode and give its representation. [3]
- (c) Define the terms : [3]
- (i) Resistance
(ii) Cell constant
(iii) Equivalent conductance.

Or

2. (a) Explain principle, instrumentation and applications of UV visible spectrophotometer. [6]
- (b) Explain any *three* principles of green chemistry. [3]
- (c) An exhausted zeolite softener was regenerated by passing 150 litres of NaCl solution having strength 150 gms./lit. of NaCl. How many litres of hard water sample having hardness 400 ppm can be softened by using softener. [3]
3. (a) Give preparation, reaction, properties and applications of following : [6]
- (i) Styrene-butadiene rubber
- (ii) HDDE.
- (b) What is power alcohol ? Give preparation with reaction and advantages of power alcohol. [3]
- (c) Calculate carbon and hydrogen in coal sample from the following data : [3]
- 0.25 gm of coal sample on burning in combustion chamber in current of pure O₂, was found to increase weight of CaCl₂ U tube by 0.12 gm and KOH U tube by 0.57 gm.

Or

4. (a) Draw neat labelled diagram and give the construction working of Bomb calorimeter to determine GCV of a fuel. State formula with corrections to calculate GCV. [6]

- (b) Explain bulk polymerisation technique. Draw the figure and state its disadvantages. [3]
- (c) Distinguish between thermosoftening and thermosetting polymer with example. [3]
5. (a) Explain industrial production of hydrogen by steam reforming of methane and coke. [5]
- (b) Give structure, one method of preparation and application of silane. [4]
- (c) Explain the structure and properties of graphite. [4]

Or

6. (a) What are carbon nanotubes ? Give types with respect to their structure and its applications. [5]
- (b) Discuss the properties of hydrogen which make it difficult for storage. [4]
- (c) Explain the structure of Diamond, give its properties and applications. [4]
7. (a) Discuss any *five* factors affecting corrosion. [5]
- (b) What is cathodic protection ? Explain any *one* method in detail. [4]
- (c) Define electroplating ? Explain process with neat labelled diagram and its applications. [4]

Or

8. (a) Define Net corrosion. Explain corrosion by hydrogen evolution mechanism. [5]
- (b) What is anodic and cathodic coating ? Which is more protective and why ? [4]
- (c) What is Galvanising ? Explain process with neat labelled diagram to protect iron from corrosion. [4]

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