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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.

P.T.O.

*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 soften 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 O<sub>2</sub>, was found to increase weight of CaCl<sub>2</sub> 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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