Seat
No.

[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_2, was found to increase weight of $CaCl_2$ 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 prepration 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* mehod in detail. [4]

(*c*)   Define electroplating ? Explain process with neat labelled diagram and its applications. [4]

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]