[4656] – 102

Seat No.	

F.E. (Semester – I) Examination, 2014
ENGINEERING CHEMISTRY
(2012 Pattern)

Time : 2 Hours Max. Marks : 50

Instructions : *1) Answer Q.* ***1*** *or Q.* ***2****, Q.* ***3*** *or Q.* ***4****, Q.* ***5*** *or Q.* ***6****, Q.* ***7*** *or Q.* ***8****.*
2) Neat diagram must be drawn ***wherever*** *necessary.*
3) Figure to the ***right*** *side indicate* ***full*** *marks.*
4) ***Use*** *of logarithmic table or electronic pocket calculator is* ***allowed****.*
5) Assume suitable data if ***necessary****.*

1. A) Define scale and sludge. Give the causes, disadvantages and removal of scale and sludge formation in boiler. **6**

   B) State and derive Beer Lamberts law. **3**

   C) Define specific conductance, equivalent conductance and molar conductance. **3**

OR

2. A) Explain the pH metric titration of - mixture of weak acid - strong acid against std. alkali giving chemical reaction procedure with titration curve. **6**

   B) What are merits of green synthesis and demerits of traditional synthesis of indigo dye ? **3**

   C) A water sample is non alkaline to phenolphthalein indicator. However, 100 ml of the same sample on titration with 0.02 N H_2SO_4 requires 14.5 ml of acid to obtain end point using methyl orange indicator. Identify type of alkalinity and determine its extent. **3**

3. A) Give preparation reaction, properties and uses of following polymers. **6**

   a) LDPE b) Styrene - butadiene rubber

   B) What is biodiesel ? Give its synthesis and advantages. **3**

   C) A gaseous fuel used in internal combusion engine contain CH_4 = 45%, H_2 = 30%, CO = 20%, N_2 = 5% by volume. Find the minimum quantity (volume) of air required for complete combusion of 1 M^3 of gaseous fuel. **3**

OR

P.T.O.

4. A) Draw neat labelled diagram and give the construction, working of bomb calorimeter to determine GCV of a fuel. **6**

   B) Distinguish thermoplastic and thermosetting polymer with suitable example. **3**

   C) What is biodegradable polymer ? Give the structure of PHBV and its applications ? **3**

5. A) Explain structure, properties and applications of fullerene. **5**

   B) Explain industrial production of hydrogen by steam reforming of methane and coke. **4**

   C) Explain the structure and properties of graphite. **4**

OR

6. A) Give the isotopes of hydrogen with their applications and write the properties of hydrogen which makes it more difficult to store and transport. **5**

   B) What are the types of CNTs with respect to their structure ? Give the applications of CNTs. **4**

   C) Explain chemical storage method of hydrogen gas in the form of alanates and metal hydrides. **4**

7. A) Define corrosion and explain effect of following factors on rate of corrosion

      i) Purity of metal

      ii) Relative area of anode and cathode. **5**

   B) State the types of oxide film formed on the surface of following metals with reactions.

      1) Na 2) Al

      3) Au 4) Mo **4**

   C) What is cathodic coating ? Explain timing with neat labelled diagram to protect metal from corrosion. **4**

OR

8. A) Explain electrochemical corrosion by H_2 evolution and O_2 absorption mechanism. **5**

   B) What is principle of cathodic protection and explain it with any one suitable method ? **4**

   C) Define electroplating. Explain electroplating process with neat labeled diagram and applications. **4**

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