

Total No. of Questions :8]

SEAT No. :

P4025

[Total No. of Pages :3

[5351] - 105

F.E. Engineering

ENGINEERING CHEMISTRY

(2015 Pattern) (Semester - I & II)

Time : 2 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Neat diagrams must be drawn whenever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Assume suitable data if necessary.*
- 4) *Use of electronic pocket calculator is allowed (non-programmable).*

- Q1)** a) What are the causes, disadvantages and preventions of scales and sludges in boilers. **[6]**
- b) Explain construction of calomel electrode with labelled diagram and its representation. **[3]**
- c) Explain conductometric titration of precipitation reaction (AgNO_3 and KCl) using titration curve and reactions involved. **[3]**

OR

- Q2)** a) Explain different types of electronic transitions that occur in the molecule after absorbance of UV radiations with suitable examples and labeled diagram. **[6]**
- b) Explain Phosphate conditioning method of internal treatment of boiler feed water with principle. **[3]**
- c) 50 ml water sample requires 3.7 ml of 0.025 N H_2SO_4 upto phenolphthalein end point and further 4.8 ml upto methyl orange end point during the titration. Calculate types and amounts of alkalinity present in water. **[3]**

P.T.O.

- Q3)** a) Explain free radical polymerization mechanism with suitable example. [6]
b) Give the reaction for preparation of biodiesel. State the advantages of biodiesel. [3]
c) 0.5 g of coal sample on complete combustion was found to increase the weight of U tube containing CaCl_2 by 0.2 g and U tube containing KOH by 1.2 g. Calculate % of C and H in the given coal sample. [3]

OR

- Q4)** a) What are fuel cells? Explain working of PAFC with figure and cell reactions. State their advantages and limitations. [6]
b) What is conducting polymer? Give the structural requirement and its applications. [3]
c) Give preparation reaction, properties and applications of SBR. [3]
- Q5)** a) Explain production of hydrogen by steam reforming of methane and coke with reaction conditions and removal of CO_2 . [6]
b) Explain the structure, properties and applications of Graphite. [4]
c) Explain physical methods for storage of hydrogen gas. [3]

OR

- Q6)** a) Explain structural features of fullerene with diagram, properties and applications. [6]
b) Explain the structure, properties and applications of diamond. [4]
c) What are saline hydrides? Give preparation reaction of Lithium hydride with any two applications. [3]

- Q7)** a) Explain the wet corrosion mechanism of hydrogen evolution and oxygen absorption. [6]
- b) Discuss any four factors affecting rate of corrosion with respect to nature of environment. [4]
- c) Compare: Cathodic protection & anodic protection. [3]

OR

- Q8)** a) What is Pilling-bedworth rule? State and explain nature of oxide films formed on metal surface along with suitable examples and chemical reactions. [6]
- b) What is cathodic protection? Explain the method involved using sacrificial anode and give its applications. [4]
- c) Explain metal cladding method with suitable example. [3]

