**Total No. of Questions : 4]**

**SEAT No. :** [ ]

**PC375**

**[Total No. of Pages : 2**

# [6358]-103
# F.E. (Insem)
# ENGINEERING CHEMISTRY
## (2019 Pattern) (Semester - I) (107009)

***Time : 1 Hour]*** ***[Max. Marks : 30***

***Instructions to the candidates:***

1) ***Answer Q.1 or Q.2, Q.3 or Q.4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

***Q1)*** a) Explain zeolite process of softening of water, with figure, process and reactions. **[5]**

b) What is priming and foaming? Give causes, disadvantages and prevention of priming and foaming. **[4]**

c) What are different types of impurities in water. Explain any two in detail. **[3]**

d) 100 ml of alkaline water sample requires 5.8 ml of 0.02 m HCl upto phenolphthalin end point and 14.2 ml upto methyl orange end point. Find the types and amount of alkalinities in water sample. **[3]**

OR

***Q2)*** a) Give the causes, disadvantages and preventions of scale formation in boilers. **[5]**

b) Define Desalination of water. Explain reverse osmosis process for desalination of water with neat labelled diagram. **[4]**

c) Give any two exchanging reactions and regenration reactions of ion exchange/Deminerlisation process. **[3]**

d) 50 ml of water sample requires 15 ml of 0.02 m EDTA during titration. Whereas 50 ml of boiled water sample requires 11 ml of same EDTA in the titration. Calculate total, temporary and permanent hardness of water sample. **[3]**

***P.T.O.***

***Q3)*** a) Explain pH metric titration of strong acid against strong base, with procedure, titration curve and calculations. **[5]**

b) What are ion selective electrodes? Give composition and working of enzyme based membrane electrode for determination of urea. **[4]**

c) Explain the conductometric titration with reaction and titration curve before and after equivalence point of strong acid-strong base. **[3]**

d) What is Buffer solution? Explain the types with example. **[3]**

OR

***Q4)*** a) Explain construction, working of conductivity cell used in the conductometric titrations with suitable diagram. **[5]**

b) What is the reference electrode? Draw neat labelled diagram of Calomel electrode and give its cell representation with two demerits. **[4]**

c) Define following terms **[3]**

i) Specific conductance

ii) Equivalent conductance

iii) Cell constant

d) Explain the conductometric titration of weak acid Vs. Weak base with two stages and titration curve. **[3]**