Total No. of Questions : 4]

SEAT No. :

PF2

[Total No. of Pages : 2

APR-26/FE/Insem-2
F.E. (Insem)
ENGINEERING CHEMISTRY
(2019 Pattern) (Semester - II) (107009) (Credit System)

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

Instructions to the candidates:

1) ***Answer Q. No. 1 or Q. No. 2 and Q. No. 3 or Q. No. 4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicates full marks.***
4) ***Use of logarithmic tables, slide rule, mollier charts, pocket electronic calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Explain demineralization method with principle, figure, ion exchange reaction and regeneration for softening of impure water. **[5]**

b) Explain the difference between scales and sludges. **[4]**

c) What is EDTA? Draw M-EDTA complex, structure and give chemical reactions involved. **[3]**

d) 50 ml water sample required 12.1 ml of N/50 HCl upto phenolphthalein end point and total 18.5 ml of the same acid upto methylorange end point. Calculate type and amount of alkalinity present in water sample. **[3]**

OR

Q2) a) Define scales. Explain any three causes and preventive measure of scales in boiler. **[5]**

b) What is hardness of water? Explain the difference between temporary hardness and permanent hardness. **[4]**

c) Explain reverse osmosis process with figure and advantages. **[3]**

d) A zeolite bed exhausted by softening 4000 litres of water requires 10 litres of 15% NaCl solution for regeneration. Calculate the hardness of water sample. **[3]**

P.T.O.

Q3) a) Explain three stages of pH meter titration between strong acid with strong base with titration curve and reaction. **[5]**

b) Define reference electrode. Give the construction of calomel electrode with labelled diagram. **[4]**

c) Define : **[3]**

i) Ion selective electrode

ii) Molar conductance

iii) Cell constant

d) Give the composition of membrane of ISE for the determination of H^+, F^- and Cl^-. **[3]**

OR

Q4) a) Explain the three stages of conductometric titration of weak acid and weak base with titration curve and reaction. **[5]**

b) Which electrodes are used for measurement of pH. Explain the standardization process of pH meter. **[4]**

c) Define : **[3]**

i) Buffer

ii) Equivalent conductance

iii) Specific conductance

d) Explain the construction of conductivity cell with labelled diagram. **[3]**