Total No. of Questions : 4]

SEAT No. : ____

P-5369

[Total No. of Pages : 2

[6185]-52
F.E. (Insem.)
ENGINEERING CHEMISTRY
(2019 Pattern) (Semester-I) (107009)

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

Instructions to the candidates :

1) ***Solve Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of logarithmic tables rule, Mollier chart, electronic pocket calculator and steam is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) What is EDTA? Give its structure. Explain the process for water hardness determination using EDTA with reactions. **[5]**

b) Explain reverse osmosis process with figure advantages and applications. **[4]**

c) Define caustic embrittlement. Give causes and prevention of caustic embrittlement. **[3]**

d) An exhausted zeolite was regenerated by 150 litre of MaCl having strength 150gm/liter. How many liters of Hard water having Hardness 400 ppm as $CaCo_3$ can be softened by this softener? **[3]**

OR

Q2) a) Draw neat and labelled diagram of demineralization method give ion exchange and regeneration reaction of water containing $CaCl_2$. **[5]**

b) Define the following terms. **[4]**

i) Scale
ii) Sludge
iii) Priming
iv) Foaming

c) 100ml of an alkaline water sample requires 5.2ml of N/50 Hcl upto phenolphtalein end point and 15.8ml for methyl orange end point. Find the type and amount of alkalinity in water sample. **[3]**

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

P.T.O.

Q3) a) What is reference electrode? Give construction of calomel electrode with labelled diagram and its representation. **[5]**

b) What are ion selective electrode? Give composition of membrane of ion selective electrode used to detect H^+,F^- and $C1^-$ ions. **[4]**

c) Explain any three factors affecting the conductivity. **[3]**

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

OR

Q4) a) Explain pH metric titration of HCl against NaOH, with procedure, titration curve and calculations. **[5]**

b) Give construction with neat labelled diagram and representation of glass electrode. **[4]**

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

i) Specific conductance

ii) Equivalent conductance

iii) Molar conductance

d) What is conductometric titration? Give the reaction and draw the titration curve for conductometric titration between strong acid against strong base. **[3]**

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