VIT

Vellore Institute of Technology

SCHOOL OF ADVANCED SCIENCES

B.Tech. (Q.P. was given based on slot-wise) – Winter Semester 2018-19

Continuous Assessment Test–I, January 2019

Course Code : CHY1701

Course name : Engineering Chemistry

Semester : Winter 2018-2019

Duration : 90 min.

Max. Marks : 50

Slot : E1+TE1

Engineering Chemistry Course Outcomes (CO) for Module-1 & Module-2	
Upon the completion of the course, students shall have ability to:	Code
Understand the principle and working of lime-soda process, zeolites, ion-exchange resins, reverse osmosis, electrodialysis etc	[U]
Apply the knowledge of water treatment processes and solving the problems in engineering field	[A]

	Answer ALL the Questions	CO	Marks
1.	What are the dissolved impurities in water that are responsible for boiler corrosion? How are these impurities removed by chemical and mechanical methods?	[U]	10
2.	What are the steps involved in treatment of water for municipal supply. How is it disinfected? Explain it.	[U]	10
3.	In the deionization process, water is usually first passed through the cation exchanger and then through the anion exchanger. Give reason and explain the resin based ion-exchange process with a suitable diagram.	[A]	10
4 (a)	Analysis of a sample water shows the following data in mg/L. $Ca(HCO_3)_2 = 4.86$; $Mg(HCO_3)_2 = 5.84$; $CaSO_4 = 6.80$; $MgSO_4 = 8.40$. Calculate the temporary, permanent and total hardness of the water.	[A]	5
(b)	"Excess addition of soda during softening of water leads caustic embrittlement". Justify the statement and also mention the methods to avoid it.	[A]	5
5 (a)	20 mL of standard hard water (containing 1.5 g $CaCO_3$ per litre) required 25 mL EDTA solution for end point. 100 mL of water sample required 18 mL EDTA solution, while same water after boiling required 12 mL EDTA solution. Calculate carbonate and non-carbonate hardness of water sample in ppm.	[A]	5
(b)	With the help of a neat diagram, explain the electro dialysis method for the desalination of water.	[U]	5