B.Tech. SEM -I Computer/ Info. Tech./ Electronics / Bio Medical / E & TC) 2014 Course (CBCS) : SUMMER - 2019

SUBJECT: ENGINEERING CHEMISTRY

Day: Tuesday
Date: 14/05/2019

S-2019-2529

Time: 10.00 AM TO 01.00 PM
Max. Marks: 60

N.B:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Use to the non-programmable **CALCULATOR** is allowed.
4) Neat diagram must be drawn **WHEREVER** necessary.
5) Assume suitable data if necessary.

Q.1 **a)** What are Zeolites or permutits? Describe permutit process of softening of hard water with its applications. Give the reactions in regeneration of the permutit. **(06)**

b) What is boiler corrosion? Why should the presence of CO_2 in boiler feed water avoided? **(04)**

OR

Q.1 **a)** What are internal and external treatments required for prevention of scale formation in boilers? **(06)**

b) A completely exhausted Zeolite softener needs 120 liters of 10% brine solution for regeneration. How many liters of hard water of hardness 500 ppm can be softened by this softener? **(04)**

Q.2 **a)** State different laws of crystallography. **(06)**

b) Explain the term: Weiss indices and Miller indices. **(04)**

OR

Q.2 **a)** What are the elements of crystal symmetry? Explain with reference to simple cubic structure. **(06)**

b) What is the influence of the tri and dicalcium silicates and tri calcium aluminate on the properties of cement? **(04)**

Q.3 Define the term calorific value of fuels. How is the calorific value of solid fuel determined by Bomb calorimeter? **(10)**

OR

Q.3 **a)** Explain proximate analysis of coal. How is it carried out? **(06)**

b) Calculate the gross and net calorific value of coal sample having the following composition. C = 80%, H = 7%, O = 3%, S = 3.5%, N = 2.1% and ash = 4.4%. **(04)**

P.T.O.

Q.4 When is the cathodic protection method used for controlling corrosion? What are the modes for employing it? **(10)**

OR

Q.4 Explain hydrogen evolution and oxygen absorption mechanism of electrochemical corrosion. **(10)**

Q.5 **a)** State and explain Kohlrausch's law of independent migration of ions. **(06)**

b) State the postulates of Arrhenius ionic theory. **(04)**

OR

Q.5 **a)** What are buffer solutions? Give preparation and mechanism. **(06)**

b) State and explain Ostwald's dilution law. **(04)**

Q.6 **a)** How do you represent organic molecule in three dimensional structures by four different ways on the paper? **(06)**

b) State and explain following terms: **(04)**
i) Enantiomers ii) Racemic mixture

OR

Q.6 What are isomers? Explain the conformational isomerism of n-butane with energy profile diagram. **(10)**

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