

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 CO₂ 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)

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

OR

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

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 (06)
four different ways on the paper?

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 (10)
energy profile diagram.

* * * *

140579-m-energ-pune