No. of Printed Pages : 03 Roll No. .....

A5

B. Tech. EXAMINATION, 2021

(First Semester)

(B Scheme) (Re-appear Only)

(Common for all Branches)

ENGINEERING CHEMISTRY

CH101B

Time : 2½ Hours] [*Maximum Marks : 75*

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) What do you mean by term chemical potential ?

(b) Define degree of freedom at incongruent melting point.

(c) What should be the value of entropy in term of free energy for the spontaneity of a reaction ?

(d) How many grams of $MgCl_2$ dissolved per litre gives 60 ppm of hardness ?

(e) Explain the role of acid and chemical reaction involved in formation of urea formaldehyde.

(f) What are fullerenes ?

(g) Define Chlorofic value of fuel.

(h) What is principle of TGA ?

2. (a) Derive equation for an ideal gas when temperature is variable.

(b) ΔG° for a certain reaction at equilibrium is zero. Calculate its equilibrium constant.

(c) Water boils at 373 K at one atmospheric pressure. At what temperature will it boil when atmospheric pressure become 528 mm of Hg at same space station ? Latent heat of water = 2.28kJ g^{-1}.

3. (a) What is meant by eutectic point ? Explain, how eutectic point can be calculated ? Discuss the Pb-Ag system.

(b) Derive phase rule equation viz. F = C – P + 2.Why is it not applicable to two component system ?

4. (a) About 0.25 g of calcium carbonate was dissolved in HCl and the solution was made up to one litre. About 100 ml of hard water sample required 30ml of same EDTA solution during the titration. After boiling 100ml of the same water required 10 ml of EDTA solution. Find the temporary and permanent hardness in given water sample.

(b) Give the basic reactions of alkalinity producing ions, Name the different kind of indicators and why are they used for alkalinity measurement ?

(c) Define desalination. How is it removed ? Explain *one* method in detail.

5. Write notes on the following :

(a) Galvanic corrosion

(b) Anodic protection.

6. (a) Define free radical mechanism for polymerization.

(b) Describe composite materials and their advantage.

(c) Why do all simple organic molecules not produce polymer ?

7. (a) What are inorganic polymers ? Explain one of them in detail.

(b) How Bakellite is formed ? Explain its structure and chemical reaction of formation.

(c) What is caprolactum and what kind of polymer is derived from it ? Write its mechanism of polymerization.

8. (a) Define Fire point and Flash point. Define the fire point of lubricants with the help of Pensky-Marten's apparatus.

   (b) Write down the mechanism of hydrodynamic lubricants.

9. (a) Explain the conductance graph of precipitation reactions.

   (b) Weather CO_2 is IR active or not, explain.

   (c) Which law of spectroscopy explain the relationship of absorbance with concentration ?