

[Total No. of Questions - 9] [Total No. of Printed Questions - 4]  
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B. Tech 1st Semester Examination

Engineering Chemistry (NS)

NS-103

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

**Note :** All sections are compulsory. Attempt five questions in all selecting one question from each section A, B, C & D of the question and all the subparts of Section E.

#### SECTION - A

- (a) What do you understand by electrochemical series? How does it help in predicting whether a redox reaction is feasible or not? (4)

(b) Give the constructional details of glass electrode. How can this be used for the determination of pH of a solution? (5)

(c) Will zinc and silver react with 1M  $H_2SO_4$  to give  $H_2$  gas or not? (2)

(d) What is fuel cell? Describe the construction and working of hydrogen oxygen fuel cell. (5)

(e) A concentration cell is constructed by dipping two copper electrodes in 0.001M and 0.1M  $CuSO_4$  and two solutions are connected by a salt bridge. Calculate the EMF of the cell at 298 K. (4)
- (a) What is condensed phase rule? Why in such a case the phase rule equation is  $F=C-P+1$ ? (4)

(b) Construct and explain the phase diagram of lead-silver system. (10)

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- (c) For one component system, triple point is invariant. Explain. (2)

(d) Explain the terms eutectic point & eutectic mixture. (2)

(e) In phase diagram of ice, fusion curve of ice has a negative slope whereas the sublimation curve has a positive slope. Why? (2)

#### SECTION - B

- (a) What is Pilling Bedworth rule? Give its importance. (2)

(b) Write a short note on:  
(i) Intergranular corrosion, (ii) Differential Metal Corrosion (3×2=6)

(c) Explain rusting of iron with the help of electrochemical theory of corrosion. (8)

(d) What is sacrificial anode? How does it protect a submerged pipeline? (4)
- (a) What do you understand by hardness of water? What is its cause? Distinguish between carbonate and non-carbonate hardness of water. (5)

(b) What are the different factors contributing to boiler corrosion? How can the boiler corrosion be minimized? (5)

(c) Hardness of water always expressed in terms of  $CaCO_3$  equivalents. Why? (2)

(d) Justify the following:  
(i) COD is greater than BOD.  
(ii) Chloramine is a better disinfectant than bleaching powder. (3×2=6)

(e) What is break point chlorination? Write its significance. (2)

#### SECTION - C

- (a) What types of electronic transitions are involved in ultra violet and visible region? Discuss with suitable examples. (5)

[P.T.O.]

