Reg. No.

Question Paper Code : **51408**

B.E/B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Second Semester

Civil Engineering

Common to all branches (Except Marine Engineering)

CY 2161 /CY 24/080010002 – ENGINEERING CHEMISTRY – II

(Regulations 2008)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Construct a cell with Fe and Mg at standard conditions and calculate the emf developed. Given : $E°$ (Fe^{2+}/Fe) = –0.44 V and $E°$ (Mg^{2+}/Mg) = –2.37 V.

2. Zinc reacts with dilute H_2SO_4 to give hydrogen but Ag does not. – Explain.

3. State Pilling – Bedworth rule.

4. Name any two anodic inhibitors.

5. What is knocking ?

6. What are the desirable characteristics of metallurgical coke ?

7. Brief on degrees of freedom with example.

8. Mention about peritectic point in phase diagram of $Mg_2SiO_4 – SiO_2$.

9. State any two metal ions which can be estimated using Flame photometer.

10. Define absorbance.

1   51408

PART – B (5 × 16 = 80 Marks)

11. (a) (i) What is an ion selective electrode ? Explain its principle and working. **(6)**

      (ii) Derive an expression for Nernst equation. The emf of a cell measured by means of a hydrogen electrode against a saturated calomel electrode at 298 K is 0.4188 V. If the pressure of the H_2 (g) was maintained at 1 atm, calculate the pH of the unknown solution, given the potential of reference calomel electrode is 0.2415 V. **(10)**

OR

  (b) (i) Draw the conductometric titration curve of strong acid versus strong base and explain it. **(4)**

      (ii) Explain with suitable examples any two applications of emf series. **(4)**

      (iii) Explain the potentiometric titration of $FeSO_4$ Vs. $K_2Cr_2O_7$ with a neat diagram. **(8)**

12. (a) (i) What is an electrochemical cell ? Explain the mechanism of electrochemical corrosion with suitable example. **(8)**

      (ii) Explain differential aeration corrosion with suitable examples. **(8)**

OR

  (b) (i) Write the difference between electroplating and electroless plating. **(8)**

      (ii) State the constituents of oil paints with examples and their functions. **(8)**

13. (a) Explain the types of petrol cracking. **(16)**

OR

  (b) (i) Write briefly about the techniques to prevent knocking. **(8)**

      (ii) Explain the methods of production of synthetic petrol. **(8)**

14. (a) (i) Explain the phase diagram of water in detail with a neat diagram. **(10)**

      (ii) Define phase, component and degrees of freedom with suitable example. **(6)**

OR

2

51408

(b) (i) Explain the phase diagram of lead silver system. (8)

(ii) What is condensed phase rule ? What is its significance ? (8)

15. (a) (i) Draw the block diagram of a flame photometer and explain the principle of its operation. (8)

(ii) Derive Beer Lambert's Law. What are its limitations ? (5)

(iii) A solution of thickness 2 cms transmits 40% incident light. Calculate the concentration of the solution. Given that $\varepsilon = 5000 \text{ dm}^3 \text{ mol}^{-1} \text{ cm}^{-1}$. (3)

OR

(b) (i) Explain the principle, construction and working of UV Visible spectrometer with a neat diagram. (10)

(ii) Explain how Fe^{2+} can be estimated using calorimetric technique. (6) .