Hall Ticket Number:

Code No. : 11024 O

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (CBCS) I-Semester (Old) Examinations, June/July-2019

Engineering Chemistry
(Common to all branches)

Time: **3** hours Max. Marks: **60**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. How EMF of a cell changes during the redox titration of Fe^{2+} and $KMnO_4$?
2. Construct a galvanic cell under standard conditions using Magnesium and Nickel electrodes and write its cell reaction, E^o of Mg and Ni are -2.37V and -0.18V respectively).
3. Write the possible combinations of compounds causes alkalinity to the water.
4. The hardness of a water sample is found to be 500 ppm. Calculate the hardness in Clarke degree and degree French.
5. Draw a well labelled phase diagram of lead-silver system.
6. What is condensed phase rule?
7. What are nanowires? Explain their applications.
8. Explain the principle involved in bottom-up approach.
9. Classify the refractories and give an example of each.
10. Explain the synthesis of polyethene sulphone membrance.

Part-B (5 × 8 = 40 Marks)

11. a) Discuss the construction and working of a glass electrode. How is it useful for the determination of pH of a solution? [5]
    b) Calculate the potential for each half cell and the total cell at 25 ^{0}C for the following cell $Pb/Pb^{2+}(0.001N)//Cl^-(0.1N / Cl_2$ (1 atm), Pt. $E^0_{Pb^{2+}/Pb} = -0.126V$ and $E^0_{Cl2/2Cl^-} = +1.358V$. [3]
12. a) Explain the determination of hardness of water by complexometric method. [5]
    b) 20 ml of water sample required 15.5 ml of 0.05 N HCl using phenolpthalein indicator and 18.5 ml of same HCl using methyl orange indicator. Calculate different types of alkalinity present in water. [3]
13. a) Draw and explain the phase diagram of water system. [4]
    b) Discuss the eutectics and their applications in safety fuses. [4]
14. a) Give a brief account on carbon nanotubes. [4]
    b) Describe the synthesis of nanomaterial by chemical vapour deposition method. [4]
15. a) What are refractory materials? Explain pyrometric cone test and RUL test of refractory material. [4]
    b) Discuss any TWO casting methods of membranes. [4]
16. a) Draw and explain the conductometric titration of strong acid V/S strong base. [4]
    b) Illustrate the break-point chlorination of water and write its significance. [4]
17. Answer any ***two*** of the following:
    a) Calculate the number of degrees of freedom in the following system. [4]
    i) $2\ KClO_3(s) <=> 2\ KCl\ (s) + 3O_2(g)$ ii) $H_2O(S) <=> H_2O(l)$
    b) Discuss the properties of nanomaterial and their causes. [4]
    c) Explain the characteristics of refractories. [4]