

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Code No. : 12005

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) II-Semester Main Examinations, May-2017

Applied Chemistry
(Civil, Mech. & EEE)

Time: 3 hours

Max. Marks: 70

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

Part-A (10 × 2 = 20 Marks)

1. Differentiate electrolytic and galvanic cells.
2. Quinhydrone electrode when coupled with saturated calomel electrode, the cell potential was 0.384 V at 25°C. Calculate the pH of the solution. ($E_{sce}^0 = 0.2422$ V and $E_{Q,H_2O}^0 = 0.6994$ V).
3. Leclanche cell is non-rechargeable. Justify your answer with relevant chemical equation.
4. Write the reactions involved during the charging of Lead-Acid batteries.
5. What is condensed phase rule? Give its significance.
6. Compute the degrees of freedom of the system, decomposition of calcium carbonate in a closed vessel.
7. Give characteristics of a good refractory.
8. What is viscosity Index? Give its significance.
9. How refractories are classified? Give an example of each.
10. List the applications of composites.

Part-B (5 × 10=50 Marks)

11. a) Derive equation for calculation of variation of potential of an electrode with change in concentration of electrolyte and temperature. [5]
b) Describe the construction and working of an Ion selective electrode. [5]
12. a) Illustrate the construction, charging and discharging reactions of Li ion battery. [6]
b) Write the electrodes and electrolyte used in Ni-Cd battery and write the reaction when it behaves as a galvanic cell. [4]
13. a) Explain water system with a neat phase diagram. [5]
b) Describe Pb-Sn phase diagram. [5]
14. a) Explain characteristics and applications of thermal insulators. [5]
b) Describe refractoriness, thermal spalling and porosity of refractory material. [5]
15. a) What is doping? Explain the mechanism of conduction in doped conducting polymer. [5]
b) Define composite. Discuss the important types of fiber reinforced composites. [5]
16. a) Write a note on Phosphoric acid cell. [4]
b) Explain specific, equivalent and molar conductance and write the relation between them. [6]
17. Answer any *two* of the following:
 - a) Describe the mechanism of lubrication [5]
 - b) Explain Iodine number and saponification number of a lubricant and discuss their significance. [5]
 - c) Explain Ag-Pb system with a neat phase diagram. [5]

12. a) What are static data members of a class? How are they different from normal members of the class? [3]
- b) Write a function definition for 'add tax'. The function has two formal parameters: tax rate which is the amount of sales tax expressed as a percentage and a list which is the cost of items before tax. The function changes the cost of items so that it includes sales tax. [4]
13. a) Can constructors be overloaded? If yes what are the different ways of overloading constructors? [3]
- b) Write a class to represent complex numbers (numbers having the real part and the imaginary part). Also add the following member functions to the class: [4]
- constructor to initialize the members of the class
 - to display the complex number
 - overload + operator to add two complex numbers.
14. a) Explain about runtime polymorphism. How is it implemented in C++? Explain with the help of example, the use of private, public and protected access modifier's. [4]
- b) Define a class PartFilledArrayMax that is derived of PartFilledArray which has an array as a member in base. Derived class has one additional member variable named max value that holds the maximum value stored in the array. Define a member function 'getmax' that return max value stored in the array. Define constructors including copy constructor. [3]
15. a) What is a Queue? Explain its operations with example. [4]
- b) Write a program to implement bubble sort Define a class ArrayoutofBounds and throw the exception if the function bubble sort tries to access the array beyond its boundaries. [3]
16. a) Explain about the various control structures in C++. [4]
- b) Write a program to read from a file named names.txt and display it on the monitor. Display the message "File cannot be opened" if the file cannot be opened successfully. [3]
17. Write short notes on any *two* of the following: [7]
- Dynamic arrays
 - Overriding
 - Linked list.

