St.Joseph's College of Engineering , Chennai – 119.
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Department of Science (Chemistry)

UNIT – IV PHASE RULE AND ALLOYS

PART – A

1. What are the limitations of phase rule?
2. State the number of degrees of freedom for the following system:

   $PCl_{5(s)} \leftrightarrow PCl_{3(g)} + Cl_{2(g)}$ at 50^oC

   $CaCO_{3(s)} \leftrightarrow CaO_{(s)} + CO_{2(g)}$
3. State condensed phase rule.
4. What are alloys?
5. What are the constituents of German silver and nickel bronze? What are their uses?
6. What is metastable equilibrium?
7. What is the role of chromium in stainless steel?
8. Mention the composition and applications of nichrome.

PART – B

1. (a) State Gibb's phase rule. Explain the terms involved in it with suitable examples.

   (b) Draw and explain the phase diagram for water system and calculate the degrees of freedom along the curves, in areas and at triple point.
2. (a) Draw the phase diagram for Pb-Ag system and explain the application of this system to desilverisation of lead.

   (b) What are non-ferrous alloys? Write the composition, properties and uses of any three brass and bronze alloys.
3. (a) What is heat treatment of steel? Discuss the different methods of heat treatment of steel.

   (b) Draw and explain the phase diagram of Zn- Mg alloy system**.**
4. (a) Discuss the composition, properties and uses of ferrous alloys.

   (b) Explain the effect of alloying elements on the properties of steel.