

B.E. METALLURGICAL ENGINEERING THIRD YEAR FIRST SEMESTER – 2025

Time: 3 hours

PHYSICAL METALLURGY

Full Marks: 100

Answer any four (4) questions.

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| 1 | <p>What is flux? What is diffusivity? What is growth? What is the stimulus of temperature on growth?</p> <p>What are the differences between mixture and solid solution?</p> | <p>2+2+5+7</p> <p>9</p> |
| 2 | <p>What is spinoidal decomposition? What is miscibility gap? Why does miscibility gap reduce with increase in temperature? What is downhill diffusion?</p> | <p>8+5+8+4</p> |
| 3 | <p>Why do liquidus and solidus temperatures change during solidification of an alloy? Why does dendrite form in Copper? What is coring?</p> | <p>10+8+7</p> |
| 4 | <p>What are the influences of undercooling on the radius of nucleus? What is the energy requirement for homogeneous nucleation? Why is heterogeneous nucleation favored? When is no energy required for nucleation?</p> | <p>7+8+7+3</p> |
| 5 | <p>What is time temperature transformation diagram? What is the shape of the diagram? Why? Why do pipe and porosity form during solidification? What are the methods to escape development of pipe and porosity? What are the conditions of equilibrium of phases in the alloy?</p> | <p>2+2+6+5</p> <p>+5+5</p> |
| 6 | <p>What is phase diagram? What are methods of determination of phase diagram? What is the recovery? What is the use of resistivity in measurement of recovery?</p> | <p>3+15+3+</p> <p>4</p> |