

PART-B

1. Discuss the thermodynamics of metal solidification in metal mold casting. How do cooling rates and temperature gradients influence the microstructure of the cast metal?
2. Explain how the composition of the metal alloy affects the casting process and the final product's mechanical properties.
3. Evaluate the role of mold material properties (e.g., thermal conductivity, strength) in metal mold casting.
4. Discuss advanced techniques in metal mold design and their impact on improving casting efficiency and product quality.
5. Analyze case studies where metal mold casting has been used to solve complex manufacturing challenges.
6. Investigate the principles of pressure application in squeeze mold casting. How does pressure distribution affect the formation of defects in the cast product?
7. Explore the relationship between squeeze mold design and the reduction of porosity and other casting defects.
8. Explain the mechanism of vacuum creation and its effects on the metal flow and solidification process in vacuum mold casting.
9. Evaluate the impact of vacuum pressure levels on the defect rates in vacuum mold casting. How do varying pressures affect casting quality?
10. Analyze real-world applications where vacuum mold casting has been instrumental in achieving desired product characteristics. Provide case studies if possible.