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Total No. of Questions : 08

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M.Tech. (PE) (Sem.–1) METAL CASTING Subject Code : PE-501 M.Code : 39002

Time : 2 Hrs. INSTRUCTIONS TO CANDIDATES: Max. Marks : 50

- 1. Attempt any FIVE question(s), each question carries 10 marks.
- a) How Silica Clay is different from colloidal clay? Explain with justification.
 - b) Explain the effect of silica grain shape and size distribution on casting performance characteristics.
 - c) What do you mean by 'Sintering Adhesion'? Explain.
- 2. a) State and explain the characteristics of core sand.
 - b) Write the name of the different ingredients used in moulding sand? Explain their significance.
 - c) Write the name and explain the functions of additives of moulding sand.
- 3. a) What is Nucleation? What do you mean by 'critical radius of nucleus and free energy concept'? Explain briefly.
 - b) Explain the term 'Constitutional Super Cooling'. How it affects the solidification of metal? Explain with justification.
- 4. a) How riser shape, size and placement are important for good quality casting? Explain with justifications.

b) Deduce an expression for time require to fill a mould cavity having simple top gate. Give simple sketch of a top gating system in support of your answer. Assume suitable dimension for the mould cavity and notation for the expression.

c) What is Metal Penetration? Explain.

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- 5. a) State and explain the design procedure for bottom gating. Give simple sketch of a bottom gate in support of your answer.
 - b) What do you mean by 'aspiration of gases'? Explain. Write the main objective and function of using the chills.
- 6. a) Explain Shell Moulding Process. Give sketches for different procedural steps of shell moulding process.
 - b) Explain cold box casting process with simple sketch. Write its applications.
- 7. a) Explain the non ferrous die casting of aluminum alloy ingot. Give a simple sketch of non ferrous die casting process.
 - b) Explain the casing process of brass ingot with simple sketch.
- 8. Write detail notes on the following :
 - a) Full moulding process.
 - b) Centreline feeding resistance during freezing of alloy.
 - c) Bonding mechanism of silica-water-clay.

<u>Note</u>: Any student found attempting answer sheet from any other person(s), using incriminating material or involved in any wrong activity reported by evaluator shall be treated under UMC provisions.

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