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Total No. of Pages : 02

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M.Tech. (PE) (Sem.–1)

METAL CASTING

Subject Code : PE-501

M.Code : 39002

Time : 2 Hrs. Max. Marks : 50

INSTRUCTIONS TO CANDIDATES:

1. Attempt any FIVE question(s), each question carries 10 marks.

1. 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.

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.