Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 08

M.Tech. (Mechanical Engineering) (2020 Onwards) (Sem.–3)

ADVANCED CASTING PROCESSES

Subject Code : MTME-210

M.Code : 74986

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

1. a) Discuss the suitability of ferrous and non ferrous materials for casting processes explaining salient material properties.

   b) What do you understand by pattern allowances? Explain various types of pattern allowances provided on patterns in sand casting process.

2. a) Describe the bonding mechanism of Silica - water clay systems.

   b) Write short note on nucleation and growth in metals and alloys.

3. a) Describe the difference in the solidification of pure metal and an alloy. Discuss the difference between homogeneous and heterogeneous nucleation.

   b) Describe the various components of a good running/gating system. Discuss the functions to be performed by each.

4. a) What do you understand by directional solidification? How directional solidification can be properly controlled to minimize the damages due to shrinkage?

   b) Define risers. What are its primary functions? Discuss various types of risers used in castings.

5. a) Molten metal can be poured into the pouring cup of a sand mold at a steady rate of 1000 cm^3/s. The molten metal overflows the pouring cup and flows into the downsprue. The cross-section of the sprue is round, with a diameter at the top = 3.4 cm. If the sprue is 25 cm long, determine the proper diameter at its base so as to maintain the same volume flow rate.

   b) Discuss the general procedural steps involved in designing a risering system.

6. a) Discuss the working principle, applications and limitations of investment casting process giving a neat sketch.

   b) Discuss all the formulas used to calculate the gating system dimensions.

7. a) Write short note on 'metal mould reaction' in context of sand casting.

   b) Discuss the working principle, applications and limitations of continuous casting process giving a neat sketch.

8. a) Discuss five casting defects giving neat sketches and explain their causes and remedies.

   b) Describe steps involved in repair and salvage of castings.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.