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

Total No. of Questions : 08

M.Tech (ME) (2019 Batch) (Sem.–2,3)

ADVANCED CASTING PROCESS

Subject Code : MTME-210

M.Code : 74986

Time : 3 Hrs. **Max. Marks : 100**

INSTRUCTIONS TO CANDIDATES :

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

1. (a) The desired volume flow rate of the molten metal into a mold is 0.01 m^3/min. The top of the sprue has a diameter of 20 mm and its length is 200 mm. What diameter should be specified at the bottom of the sprue in order to prevent aspiration? What is the resultant velocity and Reynold number at the bottom of the sprue if the metal being cast is aluminum and has a viscosity of 0.004 N-s/m^2. [13]

   (b) List the types of moulding sand. Discuss the desirable properties of moulding sand. [7]

2. (a) With the help of a neat sketch explain the shell moulding process. List its advantages and disadvantages. [10]

   (b) Discuss in detail about the Thixocasting and Rheocasting processes. [10]

3. (a) Three pieces being cast have the same volume but different shapes. One is a sphere, one a cube and the other with a height equal to its diameter. What piece will solidify the fastest and which one the slowest? [10]

   (b) Explain the design requirements of gating system for ferrous and non-ferrous materials with necessary sketches. [10]

4. (a) What is nucleation? What are its various types? Explain with the help of a neat sketch. [10]

   (b) Explain the various factors to control the directional solidification. [10]

5. (a) What do you mean by degasification of liquid metals? Explain any method for the same. [10]

(b) Explain the principle of progressive solidification. What are its advantages and disadvantages? [10]

6. (a) What are the advantages and limitations of Aluminium castings? [10]

(b) Explain the various methods for the riser design. [10]

7. (a) With the help of a neat sketch, describe the heat transfer between the metal and the mould. [10]

(b) Explain the continuous casting process with a case study. Also, state its advantages, limitations and product applications. [10]

8. Write in short notes on the following : [5×4=20]

(a) Casting defects

(b) Heat treatment processes

(c) Non-destructive methods for inspection of castings

(d) Casting of Aluminium and Magnesium alloys

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.