

Roll No.

Total No. of Questions : 08]

[Total No. of Pages : 02

M.Tech.
METAL CASTING
SUBJECT CODE : PE - 501
Paper ID : [E0441]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 100

Instruction to Candidates:

- 1) Attempt any **Five** questions.
- 2) **All** questions carry equal marks.

Q1) (a) Describe the bonding mechanism of Silica - water clay systems.

(b) Compare and contrast between the characteristic features of natural and synthetic sands.

Q2) (a) Describe the difference in the solidification of pure metal and an alloy. Discuss the difference between homogeneous and heterogeneous nucleation.

(b) What is meant by critical radius of nucleus and what is the significance of this parameter?

Q3) (a) What is meant by mould constant and its significance in metal casting?

(b) Explain the formation of casting from liquid metal poured in a mould. Discuss the conditions which favour the formation of fine equi-axial grains.

Q4) (a) Why is homogeneous nucleation much more difficult than heterogeneous nucleation in actual practice?

(b) The higher is the degree of undercooling, the smaller is the size of a stable nucleus during homogeneous nucleation.

(c) Sub-angular and not fully rounded sand grains are preferred in actual practice for green sand moulding purposes.

Q5) (a) Describe the various components of a good running/gating system. Discuss the functions to be performed by each.

(b) Discuss the effect of appendages on risering.

Q6) (a) Discuss the general procedural steps involved in designing a risering system.

(b) Discuss the use and function of chills in metal casting.

Q7) (a) Discuss the working principle, applications and limitations of shell moulding process.

(b) Describe the characteristic features, working and main limitations of die casting process for aluminium alloy.

Q8) Write short notes on the following:

(a) Swelling of clays.

(b) Vacuum moulding

(c) Mould constant

