Roll No.....

Total No. of Questions : 08] [Total No. of Pages : 02

Paper ID [PE501]

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M. Tech.

METAL CASTING (PRE/PE - 501)

Time : 03 Hours **Maximum Marks : 100**

Instruction to Candidates:

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

Q1) (a) Discuss the different ingredients of moulding sand. Also compare these ingredients with the ingredients of core sands.

(b) Discuss in brief the influence of clay content and percentage of tempering water on the strength of a moulding sand.

Q2) (a) Explain how nucleation occurs and grows in the freezing of the pure metal.

(b) List and discuss briefly the factor that affects the fluidity of metals.

Q3) (a) Define risers. What are its primary functions? Design the ingate dimensions for pouring a 20 kg casting in 11 sec, with the runner having a cross-section area of 600 sq. mm and the two ingates of 25 mm width each. (Assume any missing data).

(b) What are the different types of gates? What are the different objectives that a designed gating system must accomplish?

Q4) (a) Discuss:

(i) External chill. (ii) Internal chill.

'The use of internal chill is more suitable than external one'. Explain.

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

(c) Give a short review about the directional solidification process. Discuss how the directional solidification can be controlled.

Q5) (a) Discuss the vacuum moulding process.

(b) Compare die casting and full mould process from the point of process, product and applications.

(c) Why is aluminium casting preferred to be done by cold chamber than hot chamber die casting?

Q6) (a) What are the different suitable casting processes used for brass metals, justify your answer.

(b) Explain why certain metals are added in aluminium during casting process.

(c) What are the different properties of aluminium that make it suitable for its use in casting?

Q7) (a) The metal contracts in volume as it cool in the mould. Discuss the stages in which the contraction of the metal takes place.

(b) Discuss the mechanism of skin effect when a pure metal is allowed to freeze.

Q8) Write short note on the following:

(a) Rate of solidification.

(b) Factors on which the nucleation depends.

(c) Applications of shell moulding.

(d) Swelling of casting.