

Section-5

Q2

Ans. → Casting Solidification

- It covers the understanding of mechanism of solidification of metals and alloys, which is essential for understanding the structure developed in casting.
- When a molten metal is poured into a sand mould, the outer-most metal cools down earlier than the rest. Thus, a sort of solid shell of reasonable thickness, is quickly formed all along the inside surface of the mould.
- This can be described as a "Solid Zone", consisting of the chilled solid metal.
- The interior-most metal is liquid and the area covering it is called "Liquid Zone".
- This process continues till solidification reaches the axes, which are the last to solidify. Such a progressive solidification only ensures a sound casting free of internal voids and shrinkage.
- This type of solidification is called "Directional" or "Progressive Solidification".

- The factors through which this directional solidification can be controlled are the following :-
- Proper design & positioning of gating system.
- Proper design and positioning of risers.
- Use of exothermic materials at the risers of a desired portion of the casting.
- Use of metal chills at suitable points in the mould.

* Solidification Time :-

• It is a function of volume & surface area.

• It is given as :-

$$\text{Solidification Time} = \left(\frac{\text{Volume}}{\text{Surface Area}} \right)^2$$

Ans.

#> Risering :-

A riser is a passage made in the cope through which the molten metal rises after the mold is filled up.

• It provides many advantages as follows :-

(i) In the initial stages of pouring it allows the air, steam & gases to go out of the mould.

(ii) Once seeing the rising molten metal through it, it is ensured that the mould cavity has been completely filled up.

(iii) It acts as a reservoir to feed the molten metal to the casting to compensate the shortage during solidification.

Types of Riser :-

• Riser are of two types :-

(a) An Open Riser

(b) The Blind Riser.