

Unit 5 - Week 3 - Gating Systems and Rate of solidification

Course outline

How does an NPTEL online course work?

Week 0

Week 1 - Basics of Manufacturing Processes

Week 2 - Introduction to casting process

Week 3 - Gating Systems and Rate of solidification

- Vertical and Bottom Gating Systems
- Numerical Estimation To Find Mold Filling Time and Mold Design
- Effects of Friction and Velocity Distribution in Time of Filling
- Numerical Design of Gating Systems Using Frictional and Bending losses
- Principle of Cooling and Solidification in Single and Multiphase Systems
- Estimation of Rate of Solidification
- Principles of Cooling and Solidification of Casting
- Modeling of Solidification Rates of Thin Casting in a Metal Mold

Quiz : Assignment 3

- Assignment 3 solution with solved numerical
- Manufacturing Process Technology I and II: Feedback For Week 03

Week 4 - Estimation of solidification time with different conditions and Riser design

Week 5 - Machining Processes

Week 6 - Cutting tool life estimation

Week 7 - Introduction to Micro-Systems Fabrication Technology

Week 8 - Abrasive water jet machining and Ultrasonic Machining

Week 9 - Introduction to Electrochemical Machining

Week 10 - Electro-discharge Machining Process

Week 11 - Laser Beam and Electron Beam Machining Processes

Week 12 - Metal Forming Processes

Text Transcripts

DOWNLOAD VIDEOS

Assignment 3

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-02-19, 23:59 IST.

Assignment 3

1) In which of the following type of gating, mold is filled from bottom to top? 1 point

- Inclined gating
- Vertical gating
- Bottom gating
- None of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Bottom gating

2) The height of the down sprue is 100 mm, and its cross-sectional area at the base is 300 mm². The cross-sectional area of the horizontal runner is also 300 mm². Assuming no losses, calculate the time (in seconds) required to fill a mold cavity of 3×10⁵ mm³ volume in casting. (Consider g=10 m/s²) 1 point

- 1.5 s
- 0.71 s
- 3.2 s
- 0.14 s

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.71 s

3) Which of the following is not true with respect to the aspiration effect? 1 point

- It is produced when there is a sudden change in the flow direction.
- It is produced when pressure falls below atmospheric pressure.
- It is produced when gases enter the molten metal stream.
- All of the statements are true.

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the statements are true.

4) Which of the following is not the correct match of gating components and their function? 1 point

- Pouring basin → Increases eroding force.
- Splash core → Reduces eroding force.
- Strainer → Removes the dross.
- Skim bob → Prevents heavier and lighter impurities from entering the mold.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Pouring basin → Increases eroding force.

5) Sprue design is made tapered instead of straight _____. 1 point

- To have smoothness in the metal flow.
- To maintain the pressure balance.
- To avoid the erosion of mold sand.
- To allow easy flow of molten metal.

No, the answer is incorrect.
Score: 0

Accepted Answers:
To maintain the pressure balance.

6) What among the following can be the most appropriate reason for the velocity of a fluid in contact with any solid surface to be zero? 1 point

- No-slip condition.
- Cohesive forces in the fluid particles.
- Low velocity of the fluid.
- High intermolecular forces between the fluid particles.

No, the answer is incorrect.
Score: 0

Accepted Answers:
No-slip condition.

7) Which of the following gating designs is used to avoid the splashing of the molten metal in the mold? 1 point

- Vertical gating.
- Horizontal gating.
- Inclined gating.
- Bottom gating.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Bottom gating.

8) Solidification plays an important role in deciding which of the following characteristics of the casting. 1 point

- Crystal structure.
- Alloy composition.
- Concentration gradient of the various components.
- All of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above.

9) The degree of super-cooling necessary is reduced by the presence of _____. 1 point

- Surface that serves as initial nuclei for crystal growth.
- Type of crystal structure.
- Number of components of the casting.
- None of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Surface that serves as initial nuclei for crystal growth.

10) The direction of crystal growth in an alloy is most dependent on which of the following factor? 1 point

- Atmospheric temperature.
- Thermal gradient within the mold.
- Atmospheric pressure.
- Room temperature.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Thermal gradient within the mold.