

Unit 7 - Week 5 - Machining Processes

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

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

Week 5 - Machining Processes

- Introduction of Machining Processes
- Review of Basic Machining Processes and the Mechanics of Chip Formation
- Estimation of Cutting Ratio and Shear Angle
- Merchant's Force Analysis
- Merchant theory (Cutting Forces Analysis)
- Merchant Theory (Force Analysis) Part-2
- Lee Shaffer's Solution
- Specific Energy Model for Cutting
- Modeling of Heat Generation and Cutting Tool Temperature
- Quiz : Assignment 5**
- Assignment 5 solution
- Manufacturing Process Technology I and II: Feedback For Week 05

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

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Assignment 5

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

Due on 2020-03-04, 23:59 IST.

Assignment 5

1) What will be the surface obtained when generatrix and directrix are circular and straight line respectively in tracing process? **1 point**

- Plain
- Surface of revolution
- Straight line
- Cylindrical

No, the answer is incorrect.
Score: 0

Accepted Answers:
Cylindrical

2) Which of the following is not true for shaping process? **1 point**

- Cutting tool is provided reciprocating motion.
- Workpiece is fed parallel to the cutting direction.
- It's called intermittent cutting.
- All of the above is true.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Workpiece is fed parallel to the cutting direction.

3) Which of the following is correct for up milling? **1 point**

- Upward force tends to lift up the workpiece.
- Easier chip disposal.
- Cutting and feed direction are same.
- Less power is required.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Upward force tends to lift up the workpiece.

4) Which of the following is correct for down milling? **1 point**

- Tool wear is faster.
- Width of chip starts at maximum and decreases.
- Surface finish obtained is not good.
- More power is required.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Width of chip starts at maximum and decreases.

5) Which of the following is the correct expression for relation between rake angle (α), shear angle (Φ), and cutting ratio (r)? **1 point**

- $\tan \Phi = r \cos \alpha / (1 + r \sin \alpha)$
- $\tan \Phi = (1 - r \sin \alpha) / r \cos \alpha$
- $\tan \Phi = r \cos \alpha / (1 - r \sin \alpha)$
- $\tan \Phi = (1 + r \sin \alpha) / r \cos \alpha$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\tan \Phi = r \cos \alpha / (1 - r \sin \alpha)$

6) In an orthogonal cutting operation, the tool has a rake angle of 15° . The chip thickness before the cut is 0.30 mm, and the cut yields a deformed chip thickness of 0.65 mm. What are the shear plane angle and the shear strain for the current machining operation? **1 point**

- 11.48° and 5.14
- 26.85° and 2.19
- 32.72° and 1.37
- 5.26° and 4.72

No, the answer is incorrect.
Score: 0

Accepted Answers:
 26.85° and 2.19

7) In an orthogonal cutting operation, the tool has a rake angle of 15° . The chip thickness before the cut is 0.30 mm, and the cut yields a deformed chip thickness of 0.65 mm. What is the friction angle in this case calculated through Ernst & Merchant's theory and Lee & Shafer theory, respectively? **1 point**

- 32.4° and 16.5°
- 12.8° and 37.1°
- 51.3° and 33.15°
- 13.4° and 39.42°

No, the answer is incorrect.
Score: 0

Accepted Answers:
 51.3° and 33.15°

8) Which of the following is the correct relationship between rake angle (α), shear angle (Φ), and friction angle (λ) as per Stabler's relationship? **1 point**

- $\Phi + \lambda - \alpha = \pi/4$
- $2\Phi + \lambda - \alpha = \pi/2$
- $2\Phi + \lambda - \alpha = \pi/4$
- $\Phi + \lambda - \alpha/2 = \pi/4$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\Phi + \lambda - \alpha/2 = \pi/4$

9) Which of the following process is not grouped under metal removal process? **1 point**

- Boring
- Milling
- Extrusion
- Drilling

No, the answer is incorrect.
Score: 0

Accepted Answers:
Extrusion

10) What will be the coefficient of friction in machining when $F_T = 400$ N, $F_C = 1200$ N, $\alpha = 15^\circ$. **1 point**

- 0.66
- 0.11
- 1
- 0.33

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.66