

1. Which process utilizes electrolysis to remove metal from a workpiece?

- a) Chemical machining
- b) Electrochemical deburring
- c) Electrochemical grinding
- d) Electrochemical honing

Answer: c) Electrochemical grinding

Explanation: Electrochemical grinding is a process that uses electrolysis to remove metal from a workpiece. It combines the advantages of grinding with those of electrochemical machining.

2. What is the primary function of the electrolyte in electrochemical machining (ECM)?

- a) Lubrication
- b) Cooling
- c) Material removal
- d) Electrical insulation

Answer: c) Material removal

Explanation: The electrolyte in ECM acts as a medium through which the dissolved ions facilitate the removal of metal from the workpiece by electrochemical reactions.

3. Which type of power source is typically used in electrochemical machining?

- a) Direct current (DC)
- b) Alternating current (AC)
- c) Pneumatic

d) Hydraulic

Answer: a) Direct current (DC)

Explanation: Direct current is commonly used in electrochemical machining to provide the necessary electrical energy for the electrolytic process.

4. What is the purpose of the control system in electrochemical machining?

- a) To regulate the flow of electrolyte
- b) To adjust the voltage
- c) To maintain machining accuracy and consistency
- d) To control tool wear

Answer: c) To maintain machining accuracy and consistency

Explanation: The control system in ECM ensures that the machining process proceeds with the desired precision and consistency by regulating various parameters.

5. Which factor primarily determines the metal removal rate in electrochemical machining?

- a) Voltage
- b) Current density
- c) Electrolyte temperature
- d) Tool speed

Answer: b) Current density

Explanation: The metal removal rate in ECM is primarily determined by the current density, which influences the rate of electrochemical dissolution of the workpiece material.

6. Electrochemical deburring is primarily used for:

- a) Sharpening cutting tools
- b) Removing burrs from machined components
- c) Smoothing rough surfaces
- d) Adding surface texture

Answer: b) Removing burrs from machined components

Explanation: Electrochemical deburring is a process specifically designed to remove burrs, which are unwanted projections or rough edges, from machined components.

7. In electrochemical honing, the tool acts as:

- a) Anode
- b) Cathode
- c) Electrolyte dispenser
- d) Insulator

Answer: b) Cathode

Explanation: In electrochemical honing, the tool is connected to the negative terminal of the power source, making it the cathode in the electrochemical cell.

8. Which of the following is a common electrolyte used in electrochemical machining?

- a) Water
- b) Oil
- c) Sodium chloride solution
- d) Nitric acid

Answer: c) Sodium chloride solution

Explanation: Sodium chloride (salt) solution is commonly used as an electrolyte in electrochemical machining due to its ability to conduct electricity and facilitate the electrochemical reactions.

9. Electrochemical machining is a process suitable for machining:

- a) Only conductive materials
- b) Only non-conductive materials
- c) Both conductive and non-conductive materials
- d) Magnetic materials only

Answer: a) Only conductive materials

Explanation: Electrochemical machining can only be used to machine materials that conduct electricity, as the process relies on electrochemical reactions between the workpiece and the electrolyte.

10. What distinguishes electrochemical grinding from conventional grinding processes?

- a) Use of abrasive wheels
- b) Utilization of electrolyte
- c) High-speed rotation of the workpiece
- d) Absence of heat generation

Answer: b) Utilization of electrolyte

Explanation: Electrochemical grinding differs from conventional grinding processes by incorporating electrolyte to facilitate electrochemical dissolution of the workpiece material.

11. What type of surface finish is typically achieved through electrochemical grinding?

- a) Rough
- b) Smooth
- c) Matte
- d) Textured

Answer: b) Smooth

Explanation: Electrochemical grinding typically produces smooth surface finishes due to the combined mechanical and electrochemical action on the workpiece material.

12. Which of the following is NOT a common application of chemical machining?

- a) Etching patterns on semiconductor wafers
- b) Fabricating microfluidic devices
- c) Removing material from aerospace components
- d) Sharpening cutting tools

Answer: d) Sharpening cutting tools

Explanation: Chemical machining is not typically used for sharpening cutting tools, as it is more commonly employed for etching, shaping, or removing material from larger components.

13. Chemical machining primarily relies on:

- a) Mechanical abrasion
- b) Thermal energy
- c) Chemical reactions

d) Electrical discharge

Answer: c) Chemical reactions

Explanation: Chemical machining relies on chemical reactions between the workpiece material and the etchant to selectively remove material, rather than mechanical or thermal means.

14. What is the main advantage of electrochemical deburring over mechanical deburring methods?

- a) Higher material removal rate
- b) Greater precision
- c) Lower cost
- d) Reduced tool wear

Answer: b) Greater precision

Explanation: Electrochemical deburring offers greater precision compared to mechanical deburring methods, as it can target specific areas with burrs without affecting surrounding surfaces.

15. Which of the following is a common material used as a tool electrode in electrochemical machining?

- a) Copper
- b) Aluminum
- c) Titanium
- d) Stainless steel

Answer: a) Copper

Explanation: Copper is commonly used as a tool electrode in electrochemical machining due to its conductivity and compatibility with the electrochemical process.

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