

### **Question Bank**

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1. What is the need for unconventional machining processes?
2. What are the characteristics of UCM processes?
3. What is meant by conventional machining processes?
4. What is meant by Unconventional machining processes?
5. Differentiate the conventional and unconventional machining processes in terms of principles. (or) Distinguish between traditional and non-traditional machining processes?
6. What are the various types of energy sources used in non-traditional machining techniques? Give examples for each. (or) How non – traditional machining processes are classified?
7. Identify the mechanism of material removal, transfer media and energy source for EDM.
8. Identify the mechanism of material removal, transfer media and energy source for ECM & ECG.
9. Identify the mechanism of material removal, transfer media and energy source for EBM.
10. Identify the mechanism of material removal, transfer media and energy source for LBM.
11. Identify the mechanism of material removal, transfer media and energy source for PAM.
12. Identify the mechanism of material removal, transfer media and energy source for USM.
13. Identify the mechanism of material removal, transfer media and energy source for AJM.
14. Identify the mechanism of material removal, transfer media and energy source for WJM.
15. Identify the energy source applied in the following processes: i) IBM ii) CHM iii) ECG iv) ECM v) EDM vi) EBM vii) AJM viii) LBM
16. What is the necessity for unconventional machining processes? (or) What are the importance of unconventional machining? (or) Enlist the requirement that demands the use of advanced machining process.
17. Explain the classification of Unconventional machining according to major energy source employed.
18. Name the unconventional machining processes which are i) used to remove maximum material ii) used to remove minimum material iii) consumes maximum power iv) consumes minimum power.
19. Name the unconventional machining processes for machining following materials: i) Non metals like ceramics, plastics and glass ii) Refractories iii) Titanium iv) super alloys v) steel.
20. Mention the best suited Unconventional machining process for the following operations:
21. Name the Unconventional machining processes which produce best surface finish.
22. Why conventional mechanical machining process is not so effective on soft metals like aluminium?
23. Name the important factors that should be considered during the selection of an unconventional machining process for a given job.
24. Write the importance of surface finishing in machining operations.
25. Classification of UCM (or) How are unconventional machining processes classified? (or)

What are the basic factors upon which the unconventional manufacturing processes are classified? Explain.

26. (i) Explain the factors that should be considered during the selection of an appropriate unconventional machining process for a given job. (ii) Compare and contrast the various unconventional machining process on the basis of type of energy employed, material removal rate, transfer media and economical aspects. (or) Classify unconventional machining processes based on basic mechanism involved in the process, sources of energy required for material removal, medium for transfer of energies and type of energy required shape materials.
27. Compare the mechanical and electrical energy processes in terms of physical parameters. Shape capabilities, Process capability, and Process economy. (or) Compare the process capabilities and limitations of electrical energy based, thermal energy based and mechanical energy based unconventional machining processes.
28. Explain the reasons for the development of Unconventional Machining Process. Discuss about the criteria recommended in selection of these processes. (or) Explain the need for the development of Unconventional Machining Process by considering any four simple cases of your own interest.
29. Make a comparison between traditional and unconventional machining processes in terms of cost, application, scope, Machining time, advantages and limitations.
30. For different non-conventional processes, present in the form of a table, various process parameters recommended.
31. i) What exactly are the items that can be considered with respect to the analysis of economics of various non – traditional machining processes? Briefly explain.  
ii) Make a comparison among various non - traditional machining processes in terms of the following. Presentation in the form of a table is preferred. a. Pocketing operation b. Contouring a surface.
32. How will you analyze the applicability of different processes to different type of materials namely metals, alloys and non metals? Presentation in the form of a table is preferred.
33. Is unconventional machining process an alternate or complement to conventional machining process? Justify.
34. What do you understand by the word “unconventional” in unconventional machining processes? Is it justified to use this word in the context of the utilization of these processes on the shop floor?
35. What are the abrasives used in AJM process?
36. What are the desirable properties of carrier gas in AJM?
37. List the applications of WJM process.
38. What is meant by transducer?
39. What is feed mechanism and state its types?
40. What is the effect of abrasive grain size on machining rate in USM?
41. What are the types of work materials for USM?
42. Define abrasive slurry.

43. Write the typical applications of ultrasonic machining.
44. State the principle of ultrasonic machining process?
45. State the benefits of Water Jet Machining process.
46. Define tool wear ratio.
47. Explain water jet machining process?
48. What are the factors that affect the material removal rate in AJM process?
49. State the applications of AJM process?
50. State the advantages and limitations of USM.
51. Explain the abrasives used in USM process?
52. What are the types of tool materials for USM?
53. What is water jet machining process?
54. State the working principle of HJM process.
55. State the working principle of Abrasive Jet Machining.
56. What is ultrasonic machining?
57. What are the components of USM?
58. What is piezoelectric effect?
59. Write short notes on piezoelectric crystals?
60. What is magnetostrictive effect?
61. What is the purpose of concentrator used in USM?
62. What are the types of transducers used in ultrasonic machining processes?
63. What is inverse Piezoelectric effect?
64. What are the different types of concentrators?
65. What are the characteristics of carrier fluid?
66. What are the elements of Carrier Fluid?
67. Name the carrier gas (Transfer medium) used in AJM process.
68. What are the materials used for nozzle manufacturing in AJM process?
69. List the Advantages and Disadvantages of AJM process.
70. List the benefits and disadvantages of WJM process.
71. How does AJM differ from conventional sand blasting process?
72. Give a summary of the abrasive of their application for different operation?
73. Explain the principle of USM and its equipment. Explain the factors, which influence the MRR in USM. Compare USM with traditional Abrasive machining.
74. Explain the following in detail i) Types of transducers for USM ii) Feed mechanisms in USM iii) USM typical applications iv) Abrasives for USM
75. Describe the principle and equipment for Abrasive Jet machining. (OR) Write the names of various elements of AJM and explain them in brief.
76. Explain the process parameter which controls the AJM machining quality.(or) With a neat sketch explain the process of AJM? Explain the process control measures to be taken to control quality and MRR.
77. i) Describe the principle and equipment for Water Jet Machining.  
ii) Explain the different applications and process control features of WJM.
78. Explain the functions of Transducer and horns used in USM. List the tool materials used.

79. Briefly explain the effect of operating parameters on MRR. List the applications of USM.
80. Discuss the process parameters, applications, advantages and disadvantages of water jet machining process.
81. Describe the principle and working of a USM with a neat sketch. List the advantages, limitations and applications of USM. Discuss about the control of quality in machining in USM.
82. Discuss the effects of the following parameters on MRR and surface finish in USM: i) amplitude and frequency ii) Abrasive size iii) Concentration of abrasives iv) Material hardness v) static load vi) effect of slurry, tool and work material.
83. Compare USM, WJM and AJM in terms of process capabilities and limitations.
84. Discuss about the control of quality in USM and the capabilities of USM.
85. Briefly explain about the mechanisms involved in material removal by USM.
86. What is the fundamental principle of abrasive jet machining? Briefly explain with a neat diagram, the AJM process. In AJM, how is material removal rate increased? Also state how nozzle life is improved in such a machining process.
88. i) Make a comparison between ultrasonic machining and conventional grinding.
89. ii) What are the actions do the ultrasonic vibrations imparted to the fluid medium surrounding the tool have?
90. Draw the schematic layout of AJM and explain its operating characteristics. What are the methods adopted to have an effective control over the mass flow rate of the abrasive?
91. Define electrical discharge machining?
92. What are functions of dielectric fluid used in EDM?
93. What are the basic requirements of dielectric fluid used in EDM?
94. What is the dielectric fluids commonly used in EDM?
95. What are the prime requirements of tool material in EDM?
96. What is the effect of capacitance in EDM?
97. Name some of the tool material used in EDM?
98. What are the process parameters which affect efficiency?
99. Write the formula for finding the energy discharge in EDM?
100. How do you increase the inductance of the circuit?
101. Define W/T ( Tool Wear) ratio?
102. What is cycle time?
103. Define over cut?
104. Define Rehardening?
105. What is recast metal?
106. Explain electrode wear?
107. What are types of power supply circuits used in EDM?
108. What are the design factors to be considered while selecting the machine tool?
109. Why the servo controlled system is needed in EDM?
110. Define electrical discharge machining?
111. What are the factors affecting metal removal rate?
112. How the tool materials are classified?

113. Indicate the range of pulse duration and current in EDM.
114. What are the principal components of EDM process?
115. Name the most commonly used spark generating circuits.
116. Give the wear ratio for Brass, Copper, copper tungsten and non metallic electrode.
117. What are the drawbacks of using Relaxation circuit?
118. What is tool wear in EDM? How does tool wear occur in EDM?
119. How to minimize tool wear in EDM?
120. Identify the characteristics of an electrode material in order to serve as a good tool.
121. What are the advantages and limitations of EDM?
122. What is an arc gap? How is the arc gap controlled in EDM?
123. List the applications of EDM.
124. List the advantages and disadvantages of wire – cut EDM
125. List the applications of WEDM.
126. What is meant by wire cut EDM? Mention its salient feature.
127. With the help of a neat sketch, explain the working of a spark erosion machine. (or) With the help of neat sketch, describe the EDM process.
128. What are the desirable properties of a dielectric fluid? Give some examples for dielectric fluids. Explain the functions of dielectric fluid.
129. What are the important process parameters that control the material removal rate in EDM? Explain any four factors
130. Explain the process of wire cut EDM and list any two of its advantages, limitations and applications. (or) Explain the process of wire cut EDM with respect to process equipment, applications, advantages and limitations.
131. Explain the process of Electrical discharge grinding (EDG) and list any two of its advantages, limitations and applications.
132. Explain the process of Electrical discharge wire cutting processes and list any two of its advantages, limitations and applications.
133. Explain the different types of power generator circuits in EDM.
  - a. Explain the servo system used to control the feed rate in EDM process.
  - b. With a typical component explain the working of a wire EDM system.
134. List out the three types of spark generators used in EDM. Describe them.
135. Explain how MRR and quality is controlled in EDM process.
136. List the recent developments in EDM process and state the limitations of EDM process.
137. Explain the classification and characteristics of various spark erosion generators?
138. Explain the working principle, elements and characteristics of wire EDM.
139. Draw and explain the relaxation circuit (RC) used in EDM process?
140. Sketch and discuss the effects of the following parameters on MRR during EDM
  - c. Pulse duration on material removal rate,
  - d. Surface finish and relative electrode wear rate
141. With the help of a neat diagram the sequence of events constituting the process of metal removal from the work piece by a single discharge in EDM process?
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143. Explain the following on wire EDM technology: i) Dielectric system ii) Deionized water iii) Positioning system iv) Wire drive system.
144. Write the Faraday's first law of electrolysis?
145. Write the Faraday's second law of electrolysis?
146. Write Ohm's law?
147. What are the factors that influence oxidation in ECM?
148. What are the materials used to make the tool electrode? (or) What are the materials used for tools in ECM?
149. What are the main functions of electrolysis in the ECM?
150. What are the properties are expected from the electrolysis used in the ECM?
151. What are the electrolytes commonly used in ECM?
152. What are the results due to improper selection of electrolyte in ECM?
153. What are the methods generally used to filter the electrolyte?
154. What are the characteristics(requirements) of a good ECM tool?
155. What are the parameters that affect the MRR?
156. How the current density affects the MRR?
157. What are the advantages and Disadvantages of ECM?
158. What are the applications of ECM?
159. Define ECG. (or) State the principle of ECG process.
160. Which material is used to make the grinding wheel?
161. What are the important functions of abrasive particles used in ECG?
162. What are the advantages and disadvantages of ECG?
163. What are the limitations of ECG?
164. What is the application of ECG?
165. State the principle of chemical machining process.
166. Write the principle of ECM process.
167. What are the factors to be considered while designing the tool?
168. Compare the CHM with ECM with respect to their process parameters.
169. Describe the Laser Beam Machining equipment and Electron Beam Machining equipment. Explain the production of laser beam and working principle of LBM?
170. What are the applications of EBM process?
171. Explain the features of EBM unit. Explain the effect of increasing the accelerating potential on MRR.
172. Explain the process of LBM and PAM with neat sketches.
173. Discuss the process parameters of EBM and their influence on Machining quality.
174. Explain the principle of LBM with neat sketch and list out the advantages and disadvantages?
175. Explain the process of PAM with a neat sketch. With respect to principle, equipment process parameter, advantages, disadvantages and applications.
176. Explain the thermal features of Laser beam machining. Discuss the performance of various types of Lasers.

178. Discuss about the process capabilities of EBM and the process parameters of EBM in improving machining quality.
179. i) What are the unique characteristics a Laser machining technique possesses that make it the only choice for the job? ii) What is meant by “optical pumping” briefly explain the “population inversion between energy levels” with respect to laser beam machining?
180. Why is EBM carried out in vacuum? Explain the process with a neat sketch.
181. Explain the production of Laser beam and working principle of LBM process.
182. Write short notes on: i. Process characteristics of EBM ii. Why vacuum is need and what is its order in EBM process iii. What is spontaneous emission and what is laser? iv. Advantages of laser
183. What are the types of laser used for material processing applications? Describe how the system can be used for machining purpose.
184. Make a comparison between LBM and EDM on the basis of their application and limitation.
185. Explain the principle, construction and working of electron beam machining. Also how a
186. complex shape can be cut using EBM process.
187. With the help of a neat diagram, explain plasma arc machining process mentioning how heating of the work piece takes place in the process