

**B.E./B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022**

Fifth Semester

**Mechanical Engineering****20MEEL510 - NON TRADITIONAL MACHINING TECHNIQUES**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

Answer ALL Questions

**PART - A (10 × 2 = 20 Marks)**

- |   | <i>Marks,<br/>K-Level,CO</i> |
|---|------------------------------|
| 1. Compare the Conventional and non-conventional machining process.               | 2,K2,CO1                     |
| 2. Why the abrasive jet machining is not suitable to machine ductile materials?   | 2,K2,CO1                     |
| 3. State the various ways of gap-flushing used in Electrical Discharge Machining. | 2,K2,CO2                     |
| 4. Write a short note on Ion beam machining.                                      | 2,K2,CO2                     |
| 5. Give the difference between Etchants and Maskants.                             | 2,K2,CO3                     |
| 6. Outline parameters that affect the material removal rate in ECG.               | 2,K1,CO3                     |
| 7. What are the main elements of abrasive flow machining?                         | 2,K2,CO4                     |
| 8. State the role of Plasma-assisted polishing in semiconductor materials.        | 2,K2,CO4                     |
| 9. Why do we need non-traditional machining?                                      | 2,K2,CO5                     |
| 10. Write a short note on Bio machining.  | 2,K2,CO5                     |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Elaborate in detail the principle and influence of process variables upon the material removal in ultrasonic machining with a neat sketch. 13,K1,CO1
- OR**
- b) With a neat sketch describe Abrasive Water Jet Machining process. Explicate, how various process parameters affect metal removal rate in Abrasive Water Jet Machining. 13,K1,CO1
12. a) College emblem is to be engraved on copper blocks to be presented as a memento. Suggest a suitable electrical energy based process for the same with its construction and working principle. 13,K2,CO2
- OR**
- b) Discuss about the principles, equipment, thermal features, applications and advantages of Laser Beam Machining. Also, differentiate between the characteristics of solid state lasers and gas lasers. 13,K2,CO2

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

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13. a) With a neat sketch, explain the principles, equipment and chemistry of process, electrolytes, tools, accuracy and surface finish, process capabilities, applications and advantages of Electro Chemical Machining. 13,K2,CO3

**OR**

- b) With a neat sketch, explain the principle of electro chemical honing and electro chemical grinding with suitable examples. 13,K2,CO3
14. a) With a neat sketch, explain the principles, equipment and chemistry of Magnetorheological abrasive flow finishing (MRAFF) process. 13,K1,CO4

**OR**

- b) Explain in detail the construction and the working principle of plasma assisted polishing with an aid of a neat sketch. 13,K1,CO4
15. a) Explain in detail the role of Micromachining and Nano machining in the manufacturing era. 13,K2,CO5

**OR**

- b) With a neat sketch, explain the principles, equipment and chemistry of elastic emission machining process. 13,K2,CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) Sketch the Electric discharge diamond grinding with the effect of all the process parameters. List out its merits, demerits and applications. 15,K3,CO6

**OR**

- b) Identify the machining technique that uses a high frequency machining tool to machine non- conducting material such as ceramics, glass, etc., Enlighten the construction and working of the machining process as well as its benefits, drawbacks and applications. 15,K3,CO6