Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

OE00047 Advance Machining Processes

Programme: B.Tech. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Which of the following material is not generally machined by USM. **1**

(a) Copper (b) Silicon (c) Glass (d) Germanium

ii. Which of the following gas, should never be used as the carrier of abrasives? **1**

(a) Nitrogen (b) CO_2 (c) Oxygen (d) Air

iii. Between which of the following values, does the current range lies in ECM. **1**

(a) 0.002 to 0.01 A (b) 0.01 to 10 A

(c) 50 to 10000 A (d) 105 to 106 A

iv. Which type of adjustment is to be done for gap voltages? **1**

(a) Continuous adjustment (b) Discontinuous adjustment

(c) Periodic adjustment (d) All of these

v. In Electrical discharge machining, the temperature developed is of the order of- **1**

(a) 2,000°C (b) 6,000°C (c) 10,000°C (d) 14,000°C

vi. In Electron beam machining, the order in which electrons passed after emitted by filament cathode- **1**

(a) Diaphragm – anode –focusing lens – deflector coil

(b) Anode – diaphragm – focusing lens – deflector coil

(c) Focusing lens – anode – diaphragm –deflector coil

(d) Deflector – coil anode – diaphragm – focusing lens

vii. Range of voltage used in Ultrasonic-Assisted ECM (USECM) is- **1**

(a) 0.1 - 0.5 V (b) 3 – 15 V

(c) 100-300 V (d) 1000-2000 V

P.T.O.

viii. Range of current density used in Ultrasonic-Assisted ECM (USECM) is- **1**
(a) 5 – 30 A/cm^2 (b) 0.1 – 0.8 A/cm^2
(c) 50 – 100 A/cm^2 (d) 100 – 200 A/cm^2

ix. What is the value of burr height that can be removed using electrochemical de-burring process? **1**
(a) 0.1 mm (b) 0.3 mm (c) 0.5 mm (d) 0.7 mm

x. In which of the following, an electrochemical oxidation on the work surface takes place- **1**
(a) Electrochemical grinding
(b) Electrical discharge machining
(c) Electrochemical machining
(d) Ultrasonic Machining

Q.2 i. What are the basic limitations of conventional machining process? **2**

ii. What are the basic factors upon which the non-conventional machining processes is classified? Explain it. **3**

iii. Discuss the effects of the following parameters on working accuracy and rate of metal removal in AJM: **5**
(a) Grain size, (b) Jet velocity and (c) stand of distance

OR iv. Explain principle, construction and working of ultrasonic machining. **5**

Q.3 i. What is etch factor? **2**

ii. Explain various steps involved in chemical machining process and give specific advantages, disadvantages and application of chemical machining. **8**

OR iii. Explain the working principle and chemistry involved in electro-chemical machining process. Explain the hardware used in this process with diagram. **8**

Q.4 i. Explain working principle of EBM with diagram. **3**

ii. Why is flushing important in electric discharge machining. Give a schematic diagram of EDM process and explain its specific limitation. **7**

OR iii. Explain lasing operation and mechanism of material removal in LBM with diagram. **7**

Q.5 i. What is hybrid machining process? Give its basic classification. **3**

ii. Explain in detail Ultrasonic-Assisted ECM (USECM) with advantages. **7**

OR iii. Explain in detail Laser assisted ECM (ECML) with advantages. **7**

Q.6 Attempt any two:

i. Explain electrochemical grinding with diagram. **5**

ii. Explain electro-discharge grinding with diagram. **5**

iii. Explain electrochemical de-burring (ECD) with diagram. **5**

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Q.1	i.	Which of the following material is not generally machined by USM. (a) Copper	1
	ii.	Which of the following gas, should never be used as the carrier of abrasives? (c) Oxygen	1
	iii.	Between which of the following values, does the current range lies in ECM. (c) 50 to 10000 A	1
	iv.	Which type of adjustment is to be done for gap voltages in ECM? (a) Continuous adjustment	1
	v.	In Electrical discharge machining, the temperature developed is of the order of (c) 10,000°C	1
	vi.	In Electron beam machining, the order in which electrons passed after emitted by filament cathode (b) anode – diaphragm – focusing lens – Deflector coil	1
	vii.	Range of voltage used in Ultrasonic-Assisted ECM (USECM) is (b) 3 – 15 V	1
	viii.	Range of current density used in Ultrasonic-Assisted ECM (USECM) is (a) 5 – 30 A/cm^2	1
	ix.	What is the value of maximum burr height that can be removed using electrochemical de-burring process? (c) 0.5 mm	1
	x.	In which of the following, an electrochemical oxidation on the work surface takes place?	1

		(a) Electrochemical grinding (c) EEm	
Q.2	i.	basic limitations- ½ × 4 = 2 Marks	2
	ii.	Basic Factor 1 × 3 = 3 Marks	3
	iii.	Explanation 3 Marks Graph 2 Marks	5
OR	iv.	Principle- 1 Marks construction – 2 Marks working – 2 Marks	5
Q.3	i.	Definition OR Ratio – 2 Marks	2
	ii.	various steps involved- 3 Marks advantages -2 Marks disadvantages- 2 Marks application- 1 Marks	8
OR	iii.	working principle- 2 Marks chemistry involved- 3 Marks hardware used and diagram - 3 Marks	8
Q.4	i.	working principle-1.5 Marks diagram-1.5 Marks	3
	ii.	Importance of Flushing- 2 Marks diagram of EDM- 3 Marks specific limitation- 2 Marks	7
OR	iii.	Explain Lasing operation- 3 Marks Mechanism of MRR and diagram- 4 Marks (3 mechanism + 1 Dia)	7
Q.5	i.	Definition of hybrid machining process- 1 Marks basic classification- 2 Marks	3
	ii.	Explanation with diagram- 5 Marks Advantages-2 Marks	7
OR	iii.	Explanation with diagram- 5 Marks Advantages-2 Marks	7
Q.6		Attempt any two:	
	i.	Explanation with diagram- 5 Marks	5
	ii.	Explanation with diagram- 5 Marks	5
	iii.	Explanation with diagram- 5 Marks	5