

B. E. PRODUCTION ENGINEERING 3RD YEAR 2ND SEMESTER EXAMINATION, 2023 (Supple)**SUBJECT – NON-TRADITIONAL MACHINING**

Time: Three hours

Full Marks: 100

PART-I*(Use a separate Answer-Script)*

No of Questions		Marks
	<u>Answer Question no. 1 and any two from the following</u>	
1	<p>Answer any four from the following:</p> <p>(i) Classify NTM processes on the basis of type of energy employed and mechanism of material removal.</p> <p>(ii) Explain in brief the basic principle of Electrochemical Machining Process.</p> <p>(iii) Differentiate between electrolyte and dielectric. Explain their applications in non-traditional machining processes.</p> <p>(iv) Explain operating principle of Electro Discharge Machining Process.</p> <p>(v) Differentiate between EDM and ECDM. What electrolyte used for ECDM and why?</p>	4x5
2.	<p>(i) Describe dynamics of ECM process and show variation of inter electrode gap with time for zero feed rate.</p> <p>(ii) Proceeding from the fundamental principles of Electrochemical Machining (ECM), mathematically show that under steady state conditions of machining, the gap thickness approaches to the equilibrium gap and hence the processes becomes inherently self-regulated.</p>	5 10
3.	<p>(a) Explain various types of power circuits used in EDM. What are the limitations of the R-C circuit?</p> <p>(b) In a Relaxtion circuit based EDM, deduce mathematical expression to find out: (i) charged voltage of the capacitor, (ii) charging current and (iii) 'time constant' of the RC circuit.</p>	6 9
4.	<p>Explain the main process parameters and applications for material machining of the following processes:</p> <p>(i) Electron Beam Machining, (ii) Electrochemical Grinding (ECG), (iii) Chemical Machining.</p>	5X3

EX/PROD/PC/B/T/323/2023(S)

B. E. PRODUCTION ENGINEERING THIRD YEAR SECOND SEMESTER
SUPPLEMENTARY EXAMINATION 2023

NON-TRADITIONAL MACHINING

Full Marks:100

Time: Three Hours

Part-II
(50 Marks)

Use Separate Answer scripts for each part.

Answer Question 1 and any TWO Questions from the rest.

1.
 - a) Classify mechanical energy based advanced machining processes.
 - b) Why is ultrasonic machining recommended for machining glass?
 - c) State four applications of Laser Beam Machining.
 - d) What are the types of abrasives used in abrasive water jet machining?
 - e) State four applications of electrochemical discharge machining.
 - f) What do you mean by hybrid machining?
 - g) Why is vacuum needed in electron beam machining?
 - h) Compare ordinary light and Laser beam.
 - i) What are the types of Laser beam recommended for micro-machining?
 - j) Mention four applications of plasma arc machining process.

(10 x 2)
 2.
 - a) Discuss on various elements of Abrasive Water Jet Machining (AWJM) System with sketch.
 - b) Distinguish between AJM and AWJM.
 - c) What are the applications and limitations of WJM?

(7+4+4)
 3.
 - a) Distinguish between Transferred Arc and Non-Transferred Arc PAM with sketch?
 - b) Describe about Tool Vibration Unit of USM with sketch.
 - c) Distinguish between rotary USM and stationary USM with sketch.

(4+6+5)
 4.
 - a) Discuss on the Nd:YAG Laser beam machining system with sketch.
 - b) Discuss on Electron Beam Machining System with sketch.

(8+7)
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