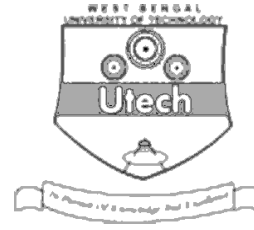


# CS/M.TECH (PE)/SEM-2/PEM-202/09

## NON-TRADITIONAL MACHINING PROCESSES ( SEMESTER - 2 )



1. ....  
Signature of Invigilator

2. ....  
Signature of the Officer-in-Charge

**Reg. No.**

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**Roll No. of the Candidate**

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## CS/M.TECH (PE)/SEM-2/PEM-202/09

### ENGINEERING & MANAGEMENT EXAMINATIONS, JULY - 2009

## NON-TRADITIONAL MACHINING PROCESSES ( SEMESTER - 2 )

Time : 3 Hours ]

[ Full Marks : 70

**INSTRUCTIONS TO THE CANDIDATES :**

1. **This Booklet is a Question-cum-Answer Booklet.** The Booklet consists of **32 pages.** **First page** of the Booklet shows Instructions to the Candidates. The **questions** of this concerned subject commence from **Page No. 3.**
2. You have to answer the questions in the space provided marked 'Answer Sheet'. Write on both sides of the paper.
3. Fill in your Roll No. in the box provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. Use of Mobile Phone, Calculator or Log table is totally prohibited in the examination hall.
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, which will lead to disqualification.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

**No additional sheets are to be used and no loose paper will be provided**

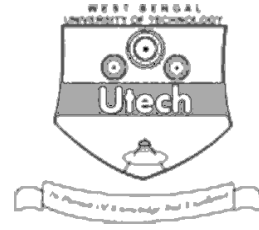
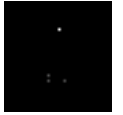
**FOR OFFICE USE / EVALUATION ONLY**

Marks Obtained

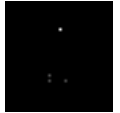
Question Number											Total Marks	Examiner's Signature
<b>Marks Obtained</b>												

.....  
Head-Examiner / Co-Ordinator / Scrutineer

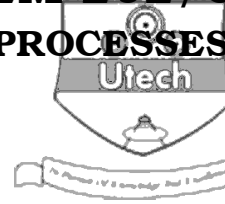
**44012 (04/07)**



**DO NOT WRITE ON THIS PAGE**



**CS / M.TECH (PE) / SEM-2 / PEM-202 / 09**  
**NON-TRADITIONAL MACHINING PROCESSES**  
**SEMESTER – 2**



Time : 3 Hours ]

[ Full Marks : 70

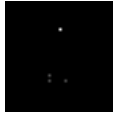
*The figures in the margin indicate full marks.*

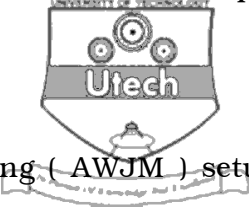
*Candidates are required to give their answers in their own words as far as practicable.*

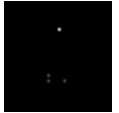
Answer any *five* questions.

5 × 14 = 70

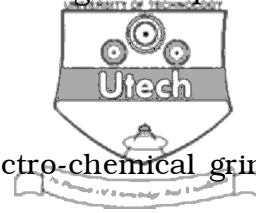
1. a) State at least one typical job each of which needs the one of following non-traditional machining processes for its industrial manufacture. Give reasons.
  - i) Abrasive Jet Machining ( AJM )
  - ii) Chemical Machining ( CHM )
  - iii) Plasma Arc Machining ( PAM )
  - iv) Laser Beam Machining ( LBM ). 6
- b) What are the necessary precautions to take in PAM and EBM processes ? 3
- c) Discuss how eco-friendly machining can be resulted in sustainable development. 5
2. a) Discuss about the basic principle of material removal in ultrasonic machining ( USM ). Give sketches. 7
- b) Explain why the typical shape of horn is employed in USM. 4
- c) List the abrasive materials and tool materials commonly used in USM. 3



3. a) Discuss in detail the effects of different process parameters on the performance of AJM.  8
- b) Draw a sketch of the abrasive water jet machining ( AWJM ) setup and briefly state the working principle of the system components. 6
4. a) State the theories of material removal in EDM process. 6
- b) Select the range of basic process parameters for high material removal rate and to achieve high finish of the job in EDMing process. Give reasons. 4
- c) Why is servo-control needed in EDMing ? 4
5. a) “Tool rooms use wire-cut EDM process widely” — Justify. 3
- b) Explain why the wire roll used in one pass is not reused. 3
- c) How is a hybrid generator working in an EDM setup ? 5
- d) What is the use of CNC system in EDM process ? 3
6. a) Discuss briefly about the working principle of the electrochemical machining ( ECM ) process. What is the roll played by masking in this process ? 7
- b) Comment on the material removal in electrochemical grinding ( ECG ). What are its advantages ? List the process parameters. 7
7. a) How is Laser generated ? List few widely used lasing materials. 8
- b) Describe the advantages of laser beam machining. Comment on the hole drilled by laser beam. 6



8. a) State the specific advantages obtained by hybridizing EDM process with ECM process. How is this process operated ? 8
- b) Briefly discuss about the ultrasonic assisted electro-chemical grinding or laser-assisted ECM process. 6
9. a) Mention the measurement devices used in micro and nano-size components. 4
- b) Write short notes on any *two* of the following : 2 × 5
- i) CBN tool for micro-machining
  - ii) Protein engineering for micro part fabrication
  - iii) LIGA process for assembled object manufacture
  - iv) Lithography process.



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END