

# Non-Traditional Machining VTU CBCS Question Paper Set 2018

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10ME665

**Sixth Semester B.E. Degree Examination, June/July 2015**  
**Non – Traditional Machining**

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART - A**

- 1 a. List and explain the various factors to be considered for selection of machining processes. (07 Marks)  
b. Classify various non traditional machining process based in energy source used with giving suitable examples. (06 Marks)  
c. Based on various parameters of machining, compare the conventional and non – conventions machining processes. (07 Marks)
- 2 a. Explain with graph the effect of various parameters on material removal rate (MRR) in USM process. (10 Marks)  
b. With neat sketch, explain the main elements of ultrasonic machining process. (10 Marks)
- 3 a. Draw the schematic diagram of abrasive jet machining and explain working principle. (08 Marks)  
b. List the applications of Abrasive jet machining. (04 Marks)  
c. Mention the advantages and disadvantages of water jet machining. (08 Marks)
- 4 a. Explain the chemistry of ECM process with diagram. (08 Marks)  
b. List the functions of electrolyte in ECM process. (04 Marks)  
c. Explain with diagram, working of electro chemical grinding (ECG). (08 Marks)

**PART - B**

- 5 a. Explain the elements of chemical machining process. (06 Marks)  
b. Explain with flow chart the chemical blanking process. (10 Marks)  
c. Mention the limitations of chemical machining process. (04 Marks)
- 6 a. Explain with sketch, the mechanism of metal removal in electric discharge machining. (07 Marks)  
b. Explain the elementary relaxation circuit for EDM. (07 Marks)  
c. Explain the different methods of dielectric flushing in electric discharge machining. (06 Marks)
- 7 a. Explain with diagram the working of plasma arc machining. (10 Marks)  
b. What are the factors that govern the performance of plasma arc machining? Explain anyone of them. (06 Marks)  
c. Write the applications of plasma arc machining. (04 Marks)
- 8 a. Explain with sketch, the working of electron beam machining (EBM). (10 Marks)  
b. What are the Applications of EBM? (04 Marks)  
c. What are the advantages and applications of laser beam machining (LBM)? (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.

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**Sixth Semester B.E. Degree Examination, June/July 2016**  
**Non-Traditional Machining**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. How modern machining processes are classified? (06 Marks)
- b. What is the difference between conventional and non conventional machining processes. (05 Marks)
- c. What are the essential physical process parameters for an efficient use of modern machining process? (05 Marks)
- d. Why NTM processes are selected for manufacturing? (04 Marks)
- 2 a. Explain with neat diagram construction and working of USM processes. (10 Marks)
- b. Explain the following parameters with respect to USM:
  - i) Effect of amplitude and frequency of vibration.
  - ii) Effect of grain diameter.
  - iii) Effect of applied static load.
  - iv) Effect of slurry. (10 Marks)
- 3 a. Draw schematic diagram of Abrasive Jet Machining (AJM). Explain its construction and working. (06 Marks)
- b. List and explain the variables used in AJM. (12 Marks)
- c. List the application of water Jet machining. (02 Marks)
- 4 a. Draw schematic sketch of electro chemical machining and explain briefly the elements of ECM process. (10 Marks)
- b. Explain with neat schematic diagram of electro chemical grinding and their advantages and application. (10 Marks)

**PART – B**

- 5 a. What are the factors on which the selection of a resist for all in chemical machining depend? (03 Marks)
- b. Explain the elements of process (i) Maskants or resist (ii) etchants in CHM. (08 Marks)
- c. Explain with sketch progressive stages of metal removal in chemical blanking. (06 Marks)
- d. List the applications of chemical machining. (03 Marks)
- 6 a. Draw neat diagram of EDM (Electrical Discharge Machining). Explain its construction and working. (10 Marks)
- b. Explain briefly EDM process characteristics. (10 Marks)
- 7 a. Explain the construction and working principle of Plasma Arc Machining (PAM) with neat sketch. (08 Marks)
- b. List the general guideline for designing the torch. (06 Marks)
- c. What are the application of PAM and also mention advantages and limitations? (06 Marks)
- 8 a. With neat sketch, explain working principle of Electron Beam Machining (EBM). (08 Marks)
- b. Draw neat sketch of a typical set up for Laser Beam Machining (LBM) and explain briefly. (08 Marks)
- c. What are the advantages and limitations of LBM? (04 Marks)

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10ME665

**Sixth Semester B.E. Degree Examination, June/July 2017**  
**Non Traditional Machining**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART – A**

- 1 a. Give broad classification of nontraditional machining process. (06 Marks)  
b. Explain the need for development of nontraditional machining process. (04 Marks)  
c. With a neat sketch, explain the working principle of ultrasonic machining process. (10 Marks)
- 2 a. Sketch and explain any two type of tool feed system in ultrasonic machining process. (10 Marks)  
b. Discuss the influence of the following parameters on USM process :  
i) Amplitude and frequency of vibration ii) Grain size iii) Effect of slurry  
iv) Effect of applied static load v) Effect on work material. (10 Marks)
- 3 a. Explain the process variables that influence the metal removal rate in abrasive jet machining. (10 Marks)  
b. Explain with help of a neat sketch, working principle of water jet machining process and also mention its advantages. (10 Marks)
- 4 a. With a neat sketch, explain the working principle of Electro Chemical Machining (ECM) process. (08 Marks)  
b. Describe Chemistry involved in ECM process. (06 Marks)  
c. Explain with neat sketch, Electro Chemical Grinding (ECG) process. (06 Marks)

**PART – B**

- 5 a. Explain the process characteristics in Chemical Machining (CHM) process. (06 Marks)  
b. Explain with neat sketch, the sequence of process steps involved in chemical blanking process. (08 Marks)  
c. Discuss the factors to be considered for selection of Maskants and types that are used in chemical machining. (06 Marks)
- 6 a. Explain the working principle of EDM process, with neat sketch. (08 Marks)  
b. List the commonly used dielectric fluid in EDM process. What properties should they possess? (06 Marks)  
c. Sketch and explain Travelling wire EDM process. (06 Marks)
- 7 a. Briefly explain the parameters that influence PAM performance. (06 Marks)  
b. Explain the types of torches used in PAM process. (08 Marks)  
c. Lists the important safety precaution to be considered to PAM process. (06 Marks)
- 8 a. Explain the working principle of LBM, with neat sketch. (08 Marks)  
b. Explain briefly types of lasers used in LBM process. (06 Marks)  
c. With a neat sketch, explain the principle of EBM process. (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any recalculation of identification number to be avoided and corrections written on P. 8 - 50 will be treated as unbalanced.

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10ME665

**Sixth Semester B.E. Degree Examination, Dec.2013 / Jan. 2014**  
**Non – Traditional Machining**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting atleast TWO question from each part.**

**PART – A**

- 1 a. What is NTM? Classify the NTM processes. (07 Marks)  
b. Compare and contrast between traditional and non – transitional machining processes. (07 Marks)  
c. List the factors influencing process selection and explain any two. (06 Marks)
- 2 a. Write a note on process capability of USM. (06 Marks)  
b. With a neat figure, explain tool feed system used in USM. (06 Marks)  
c. Discuss the effects of: i) Grain size ii) Amplitude and frequency of vibration  
iii) Applied static load iv) Slurry on MRR in USM. (08 Marks)
- 3 a. Explain the variables that influence MRR and accuracy in AJM. (10 Marks)  
b. What are the advantages and applications of WJM? (06 Marks)  
c. Explain AJM mechanics. (04 Marks)
- 4 a. Describe various process parameters affecting ECM. (10 Marks)  
b. Differentiate ECG with conventional grinding. (05 Marks)  
c. With a neat sketch, explain electro – chemical Honing. (05 Marks)

**PART – B**

- 5 a. List the factors affecting the selection of Maskants and Etchants. (10 Marks)  
b. Explain the sequence of operations in chemical blanking. (06 Marks)  
c. List the functions of electrolyte. (04 Marks)
- 6 a. Explain flushing. Enumerate any 2 methods of flushing used in EDM. (10 Marks)  
b. With a figure, explain the mechanism of material removal in EDM. (06 Marks)  
c. List the advantages and applications of EDM. (04 Marks)
- 7 a. With a neat sketch, explain the principle of PAM. (10 Marks)  
b. List out the advantages, disadvantages and applications of PAM. (10 Marks)
- 8 a. With a neat sketch, explain the mechanism of metal removal in LBM. (10 Marks)  
b. With a neat figure, explain the principle of EBM. (10 Marks)

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10ME665

**Sixth Semester B.E. Degree Examination, Dec.2014/Jan.2015**

**Non – Traditional Machining**

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART - A**

- 1 a. List the unconventional machining processes under mechanical energy thermal and chemical energy category. (06 Marks)  
b. Differentiate between conventional (traditional) and non traditional machining processes with examples. (06 Marks)  
c. Make a comparison between traditional and non traditional machining process in terms of cost, application, scope, machine time and limitations. (08 Marks)
- 2 a. What are the advantages and disadvantages of USM? (06 Marks)  
b. With a neat sketch, explain the principle working of USM. (14 Marks)
- 3 a. How does ASM differ from conventional sand blasting process? (04 Marks)  
b. What are the different types of abrasives used in ASM? (04 Marks)  
c. State and explain the working and principle of abrasive jet machining. (12 Marks)
- 4 a. What are the advantages and disadvantages of ECM? (06 Marks)  
b. What are the factors that influences oxidation of ECM? (04 Marks)  
c. Explain the principle of electro chemical grinding, with a neat sketch. (10 Marks)

**PART - B**

- 5 a. Explain the principle steps involved in chemical milling to produce pockets and contours. (06 Marks)  
b. List out the advantages and disadvantages of chemical machining. (08 Marks)  
c. List out the major applications of CHM. Further process application related to improving the surface characteristics. (06 Marks)
- 6 a. Name some of the dielectric fluids commonly used in EDM. Name some of the tool material used in EDM. (06 Marks)  
b. What are the basic requirements of the dielectric fluid used in EDM? (04 Marks)  
c. With the help of neat sketch, explain wire cut electrical discharge machining. (10 Marks)
- 7 a. Explain the basic principle of PAM. (04 Marks)  
b. With a neat sketch, explain the working of PAM. List out the advantages and limitations of PAM process. (16 Marks)
- 8 a. What are the important characteristics required for electron beam in Electron Beam Machining. (04 Marks)  
b. List out the commonly used gasses in Laser beam machining. (04 Marks)  
c. Explain with a neat sketch, Electron Beam machining and list out its advantages. (12 Marks)

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10ME665

**Sixth Semester B.E. Degree Examination, Dec.2017/Jan.2018**  
**Non Traditional Machining**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting at least TWO questions from each part.**

**PART – A**

- 1 a. Distinguish between conventional and non-conventional machining processes. (04 Marks)  
b. Discuss briefly, how the non-traditional machining processes are classified. (06 Marks)  
c. Explain different parameters for selecting modern machining processes. (10 Marks)
- 2 a. Explain USM process with a neat diagram. (08 Marks)  
b. List out advantages and limitations of USM process. (06 Marks)  
c. Discuss the effects of the following parameters on the rate of material removal and surface finish obtainable in ultrasonic machining  
i) Amplitude and frequency of vibration  
ii) Abrasive grid size  
iii) Static load. (06 Marks)
- 3 a. Explain with a schematic diagram the abrasive jet machining process. (06 Marks)  
b. Discuss the following variables that influence the metal removal in AJM.  
i) Carrier gas      ii) Type of abrasive      iii) Standoff distance  
iv) Work material      v) Velocity of the abrasive jet. (10 Marks)  
c. List out advantages of water jet machining process. (04 Marks)
- 4 a. List out different characteristics of an electrolyte to be effective and efficient in ECM process. (04 Marks)  
b. Explain ECM process with a schematic diagram. (06 Marks)  
c. Briefly discuss the economics of ECM process. (05 Marks)  
d. Discuss different applications of ECM. (05 Marks)

**PART – B**

- 5 a. Explain the following parameters with respect to chemical machining  
i) Resists (Maskants)      ii) Etchants. (10 Marks)  
b. What are the specific advantages of using chemical machining over electro-chemical machining? (05 Marks)  
c. Give some practical applications of chemical machining. (05 Marks)
- 6 a. Explain the mechanism of metal removal in EDM. (10 Marks)  
b. Discuss the factors that influence the choice of electrode material in EDM. (05 Marks)  
c. Discuss the advantages of EDM as compared to other non-traditional methods. (05 Marks)
- 7 a. Explain with a neat sketch the principle process of metal removal in PAM. (10 Marks)  
b. List out different applications of PAM. (05 Marks)  
c. Discuss advantages and limitations of PAM process. (05 Marks)
- 8 a. With a neat diagram, explain the process of metal removal by Laser Beam Machining (LBM). (10 Marks)  
b. Discuss with a neat diagram, Electron Beam Machining (EBM). (06 Marks)  
c. List out advantages and limitation of LBM process. (04 Marks)

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10ME665

**Sixth Semester B.E. Degree Examination, June/July 2013**  
**Non-Traditional Machining**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. Justify the need of unconventional manufacturing process in today's industries. (06 Marks)  
b. Distinguish between conventional and unconventional manufacturing process. (04 Marks)  
c. What are the basic factors upon which the unconventional manufacturing processes are classified? Explain. (10 Marks)
- 2 a. Explain with help of a neat sketch the working principle of ultra sonic machining process, and also mention its advantages. (10 Marks)  
b. Explain how various process parameters influence the material removal rate in ultrasonic machining process. (10 Marks)
- 3 a. Explain how the following parameters influence the metal removal rate in abrasive jet machining process: i) Nozzle tip distance; ii) Velocity of abrasive; iii) Abrasive flow rate; iv) Gas pressure. (10 Marks)  
b. Explain the desired properties of abrasive materials used in abrasive jet machining. (05 Marks)  
c. Which are the abrasive materials used in water jet machining? (05 Marks)
- 4 a. With suitable sketches, explain the metal-removal mechanism in electro chemical grinding. (08 Marks)  
b. Why are chemical machining and electro chemical machining considered as chipless machining? Explain the mechanisms of metal removal on both cases and compare it with conventional grinding process. (12 Marks)

**PART – B**

- 5 a. Explain in brief the following in chemical machining process:  
i) Maskants; ii) Etchants. (08 Marks)  
b. With the help of neat sketches, explain the different steps involved in chemical blanking. (12 Marks)
- 6 a. Discuss the factors influencing the choice of electrode material in EDM. (05 Marks)  
b. Explain with help of a neat sketches any two types of flushing. Methods used in EDM. (05 Marks)  
c. Explain with help of neat sketches, the mechanism of metal removal in EDM process, and also mention its advantages and disadvantages. (10 Marks)
- 7 a. With a neat sketch, explain the plasma arc machining (PAM) process and also mention its applications. (10 Marks)  
b. Which are the important considerations are to be made in the design of plasma torch? (06 Marks)  
c. Mention any two advantages and disadvantages of plasma arc machining. (04 Marks)
- 8 a. With a neat sketch, explain the mechanism of metal removal in LBM process. (08 Marks)  
b. State the advantages, disadvantages and application of EBM. (06 Marks)  
c. Explain how the electron beam is generated in electron beam machining (EBM) process. (06 Marks)

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10ME665

**Sixth Semester B.E. Degree Examination, June / July 2014**  
**Non Traditional Machining**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. Explain the need of NTM and give the complete classification of NTM. (10 Marks)  
b. With schematic diagram, explain USM. (10 Marks)
- 2 a. Explain the parameters that effect on metal removal in USM process. (08 Marks)  
b. Explain the tool feed mechanism in USM. (06 Marks)  
c. Explain clearly the applications, advantages and disadvantages of USM process. (06 Marks)
- 3 a. Explain the variables in AJM process. (08 Marks)  
b. With simple sketches explain nozzle geometry in AJM process. (06 Marks)  
c. Write the applications, advantages and limitations of waterjet machining process. (06 Marks)
- 4 a. Explain the chemistry in ECM process. (08 Marks)  
b. With sketch explain the following:  
i) Electrochemical grinding.  
ii) Electro chemical Honing. (12 Marks)

**PART – B**

- 5 a. What is chemical machining? Explain the fundamental principles. (06 Marks)  
b. Explain the following with sketches : i) Chemical milling ii) Chemical Blanking (08 Marks)  
c. Explain the different types of Maskants used in chemical machining. (06 Marks)
- 6 a. What are the requirements of a good dielectric fluid used in EDM process? Explain the methods of dielectric flushing in EDM process. (10 Marks)  
b. With sketch explain Rotary pulse generator type power supply circuit in EDM. (06 Marks)  
c. Explain the following with respect to EDM:  
i) EDM tool (Electrodes)  
ii) Heat affected zone. (04 Marks)
- 7 a. Explain with sketch the principle of plasma generation and mechanism of metal removal in plasma arc machining. (10 Marks)  
b. Explain the safety precautions in PAM. (04 Marks)  
c. Mention any two advantages, applications and limitation in PAM. (06 Marks)
- 8 With a sketch explain the following process and also mention their merits and demerits :  
a. Laser beam machining.  
b. Electron beam machining. (20 Marks)

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