

Roll No. \_\_\_\_\_

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**7E7016**

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**B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018**

**Mechanical Engineering**

**7ME6.1A / 7PI4A Micro and Nano Manufacturing**

**Common with ME, PI**

**Time: 3 Hours**

**Maximum Marks: 80**

**Min. Passing Marks: 26**

*Instructions to Candidates:*

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

*Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL

2. NIL

### UNIT- I

- Q.1 (a) Explain the effect of size in micro-machining. [8]  
(b) Explain meso-machining processes. [8]

OR

- Q.1 (a) Describe Burr formation in Micro-machining operations. [8]  
(b) Explain the mechanism for large plastic flow. [8]

### UNIT- II

- Q.2 (a) Explain the characteristic features and applications of micro-turning. [8]  
(b) Explain different types of machine tools used for micro-drilling. [8]

OR

- Q.2 (a) Explain the Micro-molding processes with the help of a neat sketch. [8]  
(b) Explain the characteristic features and application of micro-milling. [8]

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### UNIT- III

- Q.3 (a) Explain Nano-grinding with the help of a neat sketch. [8]  
(b) Describe Laser micro-fabrication. [8]

OR

- Q.3 (a) Explain Nanosecond pulse micro fabrication, also explain its effects. [8]  
(b) Explain femtosecond pulse micro-fabrication. [8]

### UNIT- IV

- Q.4 (a) Explain the process of selection and pre-treatment of substrate material. [8]  
(b) Explain the modified HFCVD process. [8]

OR

- (a) Describe the process of diamond deposition on tungsten carbide. [8]  
(b) Briefly describe the performance of diamond coated micro-tool. [8]

### UNIT- V

- Q.4 Describe briefly :
- (a) Preferential etching [4]
  - (b) Angle lapping [4]
  - (c) X-ray diffraction [4]
  - (d) Aspheric lens [4]

OR

- Q.5 (a) Explain Micro – Raman spectroscopy with the help of a neat sketch. [8]  
(b) Explain cross section microscopy with the help of a neat sketch. [8]