

Hall Ticket No.

Question Paper Code: AME512



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## MODEL QUESTION PAPER-II

B.Tech V Semester End Examinations, November - 2019

Regulations: R16

### PRECISION ENGINEERING

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

#### UNIT – I

1. a) What are the basic components of displacement error? [7M]  
b) Explain the VDI specification in NC system. [7M]
2. a) What are the different methods to check flatness? [7M]  
b) What is the influence of spindle rotation error in the boring operation? [7M]

#### UNIT – II

3. a) What are the errors occurred due to variation of total compliance? [7M]  
b) What are thermal deformations in machine tools? [7M]
4. a) What is thermal rigidity? How does it effects thermal inaccuracies? [7M]  
b) What are the errors occurred due to variation of total compliance? [7M]

#### UNIT – III

5. a) Write about free surface technique in micro-stereo lithography. [7M]  
b) What are the challenges in diamond machining of brittle materials? [7M]
6. a) What is thermal stabilization time of micro sized components? [7M]  
b) Explain plasma etching in mirror grinding process. [7M]

#### UNIT – IV

7. a) Explain wafer inspection systems. [7M]  
b) Explain vertical resolution of profile instrument. [7M]
8. a) Explain different measurement methods in production processes. [7M]  
b) Drawn and explain block diagram of image processing unit. [7M]

## UNIT – V

9. a) What is the procedure for LIGA process? [7M]  
b) Describe briefly the basic lithography process. [7M]
10. a) What are partial fields and full fields? [7M]  
b) Describe EUV and X- ray lithography. [7M]



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## COURSE OBJECTIVES:

The course should enable the students to:

I	Understand the BIS code fits and tolerances for geometrical dimensioning and tolerance (GD &T).
II	Understand the principal application of different measuring instruments.
III	Summarize the application of latest manufacturing techniques (nano).

## COURSE OUTCOMES (COs):

CO 1	Describes the General concept of accuracy, dimensional wear of cutting tools, clamping errors & setting errors, location of rectangular prism & cylinder, basic type of tests, measuring instruments used for testing machine tools, alignment tests, straightness, flatness, parallelism, squareness, Circularity, cylindricity.
CO 2	Describes the Influence of static stiffness, thermal effects, compliance of work piece, Influence of vibration on accuracy.
CO 3	Describes Top down and bottom up approach, development of Nanotechnology, precision and micro-machining, Stereo microlithography.
CO 4	Describes Nano Measuring Systems such as mechanical measuring systems, optical measuring systems, electron beam measuring systems, pattern recognition and inspection systems.
CO 5	Describes various types of Lithography such as Photolithography, nano lithography, electron beam lithography, ion Beam lithography, optical lithography, LIGA process, dip pen lithography, deep UV.

## COURSE LEARNING OUTCOMES (CLOs):

AME512.01	Describes the General concept of accuracy,
AME512.02	Describe dimensional wear of cutting tools, clamping errors & setting errors
AME512.03	Describes how to location of rectangular prism & cylinder.
AME512.04	Describes basic type of tests and measuring instruments used for testing machine tools.
AME512.05	Describes the Influence of static stiffness.
AME512.06	Describes thermal effects and methods of decreasing thermal effects,
AME512.07	Describes the compliance of work piece
AME512.08	Describes the Influence of vibration on accuracy.
AME512.09	Describes the importance of Top down and bottom up approach,
AME512.10	Explains the development of Nanotechnology, precision and micro-machining, Stereo microlithography.
AME512.11	Explains the development of precision and micro-machining.
AME512.12	Explains the development Stereo microlithography.
AME512.13	Classify the various Nano Measuring systems.
AME512.14	Discuss the various Mechanical measuring systems
AME512.15	Discuss the optical measuring systems, electron beam measuring system.
AME512.16	Discuss the pattern recognition and inspection systems.
AME512.17	Classify the various Lithography's.
AME512.18	Describe the importance of Nano lithography & electron beam lithography
AME512.19	Describe the importance of ion Beam lithography & optical lithography
AME512.20	Explain LIGA Process, Dip Pen Lithography & deep UV

**MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES**

<b>SEE Question No</b>	<b>Course Learning Outcomes</b>			<b>Course Outcomes</b>	<b>Bloom's Taxonomy Level</b>
1	a	AME512.01	What are the basic components of displacement error?	CO 1	Understand
	b	AME512.02	Explain the VDI specification in NC system.	CO 1	Understand
2	a	AME512.03	What are the different methods to check flatness?	CO 1	Understand
	b	AME512.04	What is the influence of spindle rotation error in the boring operation?	CO 1	Understand
3	a	AME512.05	What are the errors occurred due to variation of total compliance?	CO 2	Remember
	b	AME512.06	What are thermal deformations in machine tools?	CO 2	Understand
4	a	AME512.08	What is thermal rigidity? How does it effects thermal inaccuracies?	CO 2	Remember
	b	AME512.07	What are the errors occurred due to variation of total compliance?	CO 2	Understand
5	a	AME512.09	Write about free surface technique in micro-stereo lithography.	CO 3	Remember
	b	AME512.10	What are the challenges in diamond machining of brittle materials?	CO 3	Remember
6	a	AME512.11	What is thermal stabilization time of micro sized components?	CO 3	Understand
	b	AME512.12	Explain plasma etching in mirror grinding process.	CO 3	Understand
7	a	AME512.13	Explain wafer inspection systems.	CO 4	Remember
	b	AME512.14	Explain vertical resolution of profile instrument.	CO 4	Understand
8	a	AME512.15	Explain different measurement methods in production processes.	CO 4	Understand
	b	AME512.16	Drawn and explain block diagram of image processing unit.	CO 4	Remember
9	a	AME512.17	What is the procedure for LIGA process?	CO 5	Understand
	b	AME512.18	Describe briefly the basic lithography process.	CO 5	Remember
10	a	AME512.19	What are partial fields and full fields?	CO 5	Understand
	b	AME512.20	Describe EUV and X- ray lithography.	CO 5	Understand

**Signature of Course Coordinator**

**HOD, ME**