CODE NO: 07A60301

| CODE NO: 07A60301                                                                                                                                                                                                      |                                                                                                                                            | R07                                                        | <b>SET No - 1</b>                                     |  |  |
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| III B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011<br>METROLOGY AND SURFACE ENGINEERING<br>(MECHANICAL ENGINEERING)<br>Time: 3hours Max. Marks: 80<br>Answer any FIVE questions<br>All Questions Carry Equal Marks |                                                                                                                                            |                                                            |                                                       |  |  |
| 1.a)<br>b)                                                                                                                                                                                                             | Differentiate between hole basis a<br>What do you understand by interc                                                                     | nd shaft basis systems with hangeability and selective     | h aid of sketches.<br>assembly? [8+8]                 |  |  |
| 2.a)<br>b)                                                                                                                                                                                                             | Explain the application and usage Design a 'GO' and 'NO GO' ring whose dimensions are $50^{+0.015}$ mm.                                    | of sine bar and sine center<br>g gauges for the measurem   | rs.<br>Thent of outer race of a bearing<br>[8+8]      |  |  |
| 3.a)<br>b)                                                                                                                                                                                                             | Explain the working principle and Describe the working principle of                                                                        | applications of Tool make<br>an Autocollimator.            | er's microscope.<br>[8+8]                             |  |  |
| 4.a)                                                                                                                                                                                                                   | With help of a line diagram explain the constructional features and working of sigma mechanical comparator                                 |                                                            |                                                       |  |  |
| b)                                                                                                                                                                                                                     | Explain the working principle of p                                                                                                         | profilometer with a neat sk                                | etch. [8+8]                                           |  |  |
| 5.a)                                                                                                                                                                                                                   | Explain the three wire method for measuring the effective diameter of a screw thread.<br>Derive the expression for the effective diameter. |                                                            |                                                       |  |  |
| b)                                                                                                                                                                                                                     | List out various errors in screw thread.                                                                                                   | threads. Also mention th                                   | eir effect on the working of [8+8]                    |  |  |
| 6.a)<br>b)                                                                                                                                                                                                             | What is meant by an alignment test<br>Explain the alignment test for drill                                                                 | st on machine tools and the<br>ling machine.               | ey are necessary? [8+8]                               |  |  |
| 7.a)<br>(b)                                                                                                                                                                                                            | What is gear pitch? Describe any to<br>Discuss various applications of co                                                                  | two methods of measuring<br>ordinate measuring machi       | gear pitch.<br>ne (CMM). [8+8]                        |  |  |
| 8.a)<br>b)                                                                                                                                                                                                             | What is diffusion coating? Explain<br>What are the advantages of surface<br>surfaces.                                                      | n various types of diffusion<br>e treatments? Explain abou | n coatings.<br>ut mechanical modification of<br>[8+8] |  |  |

SET No - 1

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#### III B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011 METROLOGY AND SURFACE ENGINEERING (MECHANICAL ENGINEERING)

#### **Time: 3hours**

**CODE NO: 07A60301** 

Max. Marks: 80

# Answer any FIVE questions All Questions Carry Equal Marks

| 1.a)<br>b) | Discuss the salient features of Indian standard system of limits, fits and tolerances Explain the unilateral and bilateral tolerance system.                           | [8+8]            |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 2.a)<br>b) | Explain the manufacturing method for slip gauges and how they calibrated?<br>Explain the Taylor's principle for the design of plain limit gauges.                      | [8+8]            |
| 3.a)<br>b) | Describe the working principle and applications of optical projector and optical fla<br>What are the various instruments used for measuring flatness of surface plate? | ats.<br>[8+8]    |
| 4.a)<br>b) | Differentiate between surface roughness and surface waviness.<br>Explain pneumatic comparators and their uses in mass production with help sketch.                     | of neat<br>[8+8] |
| 5.a)<br>b) | What are various errors encounter in measurement of screw threads?<br>Explain the measuring procure for effective diameter, pith and angle of thread.                  | [8+8]            |
| 6.a)<br>b) | Explain the alignment test for lathe machine with aid of neat sketch.<br>What is meant by acceptance charts? How is it prepared?                                       | [8+8]            |
| 7.a)<br>b) | Explain the measurement technique for pitch pressure angle of a gear.<br>Discuss the role of CMM in designing of components.                                           | [8+8]            |
| 8.a)<br>b) | Describe different degreasing methods in details.<br>Write short notes on (i) Overlay coatings and (ii) Diffusion coatings.                                            | [8+8]            |
|            |                                                                                                                                                                        |                  |

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Max. Marks: 80

#### III B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011 METROLOGY AND SURFACE ENGINEERING (MECHANICAL ENGINEERING)

#### Time: 3hours

**CODE NO: 07A60301** 

## Answer any FIVE questions All Questions Carry Equal Marks

- - -

- 1.a) Describe the terms: normal size, tolerance, deviation and allowance.
- b) Discuss the slient features of British standard system of limits, fits and tolerances. [8+8]
- 2.a) Explain the working principle of micrometer with help of neat sketch. What is the function of rachet in micrometer.
  - b) List various angle measurement intruments. Describe the working principle of Bevel protractor. [8+8]
- 3.a) Explain the Tool maker's microscope and its usage for measurement of thread angle.
- b) What are the applications and advantages of interferometer? [8+8]
- 4.a) Explain the roughness indicess terms:  $R_a$  or CLA,  $R_z$  and RMS values in numerical assessment of roughness.
  - b) Describe the working principle and advantages of electrical comparator with help of sketch. [8+8]
- 5.a) What are the different elements of a screw thread? Enlist the instruments used for the measurement of the elements of the screw thread.
  - b) Explain the working principle and usage of profile thread gauges. [8+8]
- 6.a) What are requirements of machine alignment tests? Explain alignment test on milling.
- b) Explain preparation of acceptance charts. What is need of these charts? [8+8]
- 7.a) List various types of CMMs and write the industrial applications.
- b) Explain the measurement of gear tooth thickness with aid of neat sketch. [8+8]
- 8.a) Write short notes on the following surface cleaning processesi) Wire brushingii) Tumbling
  - iii) Sand blasting or Shot blasting
  - iv) Ultrasonic cleaning.
  - b) Explain the overlay coating process for turbine blades. [10+6]

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| Derive an equation | for effective | diameter of | f a screw | thread. |
|--------------------|---------------|-------------|-----------|---------|
| 1                  |               |             |           |         |

| 6.a) | Explain the alignment test for horizontal milling machine. |
|------|------------------------------------------------------------|
| b)   | What is meant by acceptance charts? Why it prepared?       |

Explain how the major diameter of an external thread is measured.

Explain working and usage of Talysurf in surface roughness measurement.

#### Explain the effective diameter measurement by two wire method. 7.a) Explain about salient features of 3D coordinate measuring machine. b) [8+8]

- 8.a) Explain the principle and applications of plasma spray coating technique.
- Write short notes on the following b)
  - i) Overlay coatings and
  - ii) Diffusion coatings. [8+8]

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# **CODE NO: 07A60301**

**Time: 3hours** 

centers?

1.a)

2.a)

b)

3.a) b)

4.a)

5.a)

b)

b)

b)

**III B.TECH - II SEMESTER EXAMINATIONS, APRIL/MAY, 2011** 

#### METROLOGY AND SURFACE ENGINEERING (MECHANICAL ENGINEERING)

Explain the unilateral and bilateral tolerance system.

Describe the usage of chart gauges in optical projector.

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**Answer any FIVE questions All Questions Carry Equal Marks** - - -

Explain the usage of sine bar with suitable sketch. What do you understand by sine

Explain the Tool maker's microscope and its usage for measurement of thread angle.

Describe the salient features of Reed type mechanical comparator with suitable sketch.

Differentiate between hole basis and shaft basis systems with aid of sketches.

Explain the Taylor's principle for the design of plain limit gauges.

Max. Marks: 80

[8+8]

[8+8]

[8+8]

[8+8]

[8+8]

[8+8]