Code No: R32031 **R10** **Set No: 1**

III B.Tech. II Semester Regular/Supplementary Examinations, May/June -2014

METROLOGY

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. a) Write the differences between (i) limits (ii) fits and (iii) tolerances.
   b) Find the limit sizes and tolerances of hole and shaft pair designated by ϕ 250 H_{10} n_7. Also estimate the type of fit. Given ϕ250 lies in the range of 250-280 mm. Fundamental deviation of shaft 'n' = 5 $D^{0.34}$

2. a) Give the advantages and disadvantages of unilateral and bilateral system of gauging.
   b) Explain the principle of operation of Reed type comparator with neat sketch.

3. a) Describe the principle of Auto- Collimator with neat sketch.
   b) Discuss with working principle of laser interferometer with neat sketch.

4. a) Write the difference between surface roughness and surface waviness.
   b) Explain briefly each of the following terms showing its importance in the measurement of surface texture. i) Lay ii) Ra iii) sampling length

5. a) Explain the principle of twisted strip mechanical comparator with neat sketch.
   b) Explain the principle of optical lever comparator with neat sketch.

6. How do you measure the i) pitch and ii) tooth thickness of spur gear? Explain the methods with neat sketches.

7. How do you measure i) effective diameter and ii) pitch of external screw threads? Explain the methods with neat sketches.

8. What are the various alignment tests used for testing a milling machine? Explain with neat sketches.

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Code No: R32031 **R10** **Set No: 2**

III B.Tech. II Semester Regular/Supplementary Examinations, May/June -2014

METROLOGY

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. a) Explain the Taylor's principle of limit gauging with neat sketch.
   b) Calculate the fundamental deviation and tolerances and hence the limits of size for the shaft and hole for the following fit: 60 mm H8 – f7. The diameter steps are 50 mm and 80 mm.

2. a) Explain with the help of diagram the principle of operation of sine bar.
   b) Explain the various errors in linear and angular measurements.

3. a) Define Interferometry? Explain the principle of Laser Interferometer with diagram.
   b) Describe the principle of auto collimator with neat sketch.

4. a) Explain briefly the different parameters used to measurement of surface texture.
   b) Briefly discuss the electrical stylus probe instrument with sketch.

5. a) Difference and distinguish between the mechanical and optical comparators.
   b) Explain the principle of twisted strip mechanical comparator with neat sketch.

6. How to measure the (i) profile and (ii) tooth thickness of a given spur gear? Explain.

7. a) Briefly explain about the measurement of effective diameter in internal thread gauges.
   b) Explain the various errors in screw thread measurements.

8. What are the various acceptance tests used for testing a lathe machine? Explain with neat sketches.

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Code No: R32031 **R10** **Set No: 3**

III B.Tech. II Semester Regular/Supplementary Examinations, May/June -2014

METROLOGY

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. a) Explain the terms of (i) Interchangeability and (ii) selective assembly.
   b) Discuss briefly different types of fits with neat sketches.

2. a) Explain with the help of diagram the principle of operation of spirit level.
   b) Explain the different types of plain limit gauges.

3. a) Explain principle and working of tool maker's microscope.
   b) Discuss the working principle of optical projectors with neat sketch.

4. a) Explain the different parameters of surface texture and calculation of sampling length.
   b) How to measure the surface finish by using Tomlinson surface meter? Explain.

5. a) Describe the principle of mechanical comparator with neat sketch.
   b) Discuss with working principle of optical projectors with neat sketch.

6. a) With neat sketch, discuss the gear tooth nomenclature with indicate the different parts.
   b) What are the different instruments used in gear tooth metrology? Explain any two.

7. a) Explain the different errors in screw threads in engineering metrology.
   b) Explain the (i) two – wire method (ii) three- wire method with neat sketches.

8. Explain the various acceptance tests used for testing drilling machines.

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Code No: R32031 **R10** **Set No: 4**

III B.Tech. II Semester Regular/Supplementary Examinations, May/June -2014

METROLOGY

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. a) Difference between Hole basis and Shaft basis system.
   b) Give the advantages and disadvantages of unilateral and bilateral system of gauging.

2. a) Explain with the help of diagram the principle of operation of angle dekkor.
   b) With neat sketches discuss the plug gauges and ring gauges with their applications.

3. a) Explain the principle of operation and construction of tool maker's microscope.
   b) Briefly discuss the principle of operation of NPL gauge interferometer.

4. Write short notes on the following:
   (i) CLA (ii) RMS (iii) sampling length and (iv) Talysurf

5. a) Describe the principle of sigma comparator with neat sketch.
   b) What are the advantages and disadvantages of pneumatic comparators?

6. a) Describe any one method to measure the tooth thickness of a spur gear.
   b) How to measure the gear tooth profile on profile projector?

7. a) What are the different errors in screw threads in engineering metrology? How to avoid these errors.
   b) Explain the measurement of the pitch of the screw thread with neat sketch.

8. a) Describe the principle and advantages of Coordinate Measuring Machine.
   b) What are the various alignment tests performed on lathe machines?

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