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

III B.Tech. II Semester Supplementary Examinations, January -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) Define and explain fits, basic size and fundamental deviation.
   (b) Explain with neat sketch the basic hole system and unilateral tolerance. Discuss their suitability in comparison to other systems.

2. (a) What is Taylor's principle as applied to the design of limit gauges? Design a suitable 'GO' and 'NOGO' plug gauge for a bored hole 25.1/25.0 mm dia.
   (b) Describe with neat sketches the method to measure the absolute length of slip gauges.

3. (a) Describe with a neat sketch the working principle and the applications of Toolmaker's microscope.
   (b) How flatness is measured with the surface plate? Explain with neat sketch.

4. (a) What is meant by roughness and waviness of machined surfaces? Describe an instrument for measuring surface finish.
   (b) Describe various methods of measuring surface texture giving their relative advantages.

5. (a) What is a comparator? What are the characteristics and the uses of comparators?
   (b) Describe with neat sketches the pneumatic comparators and their uses.

6. (a) What are the various methods to measure the gear tooth thickness? Explain any one method with a neat sketch.
   (b) Describe in de-tail the total composite error and tooth to tooth composite errors.

7. (a) List out and explain with neat sketch the elements of screw thread measurement.
   (b) Describe in detail the virtual effective diameter and various errors in screw threads.

8. Describe in detail, how you would check the following:
   (a) The squareness to table of the spindle and the spindle feed of a radial drill.
   (b) The spindle axis of a lathe is parallel to the bed.
   (c) The cross travel guides of a milling machine are square to the faces of the vertical guides.

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

III B.Tech. II Semester Supplementary Examinations, January -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) Discuss all the types of Tolerances.
   (b) Define and explain fits, basic size and fundamental deviation.

2. (b) What are the important points in wringing slip gauges together? What is the function of protector.
   (b) Explain how asine bar may be employed to determine the inclined angle of a taper plug gauge.

3. (a) Describe with a neat sketch the working principle and the applications of Toolmaker's microscope.
   (b) Describe the use of Optical flats and monochromatic light for dimensional comparison and testing flatness of surfaces.

4. (a) Distinguish between surface roughness and surface waviness.
   (b) Describe with a neat sketch the working of Talysurf instrument and state its uses.

5. (a) Classify the Comparators. Describe mechanical comparator and clearly explain the magnification method adopted in it.
   (b) Describe with a neat sketch the principle, working and uses of optical comparators.

6. (a) Explain with a neat sketch how the gear tooth thickness can be measured by Flange micro meter.
   (b) Describe in detail the Rolling gear tester with a neat sketch.

7. (a) List out and explain with neat sketch the elements of screw thread measurement.
   (b) Write a note on angle of thread, thread pitch and profile thread gauges.

8. (a) Explain what is understood by the term 'Alignment test 'of a machine tool.
   (b) Explain with neat sketch the method of checking the following in the acceptability test of drilling machine.
   (i) if the table and the pillar are mutually perpendicular
   (ii) If the spindle slides perpendicular to the base.

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

III B.Tech. II Semester Supplementary Examinations, January -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) Define the terms 'tolerance', allowance and limits. Explain unilateral system of dimensioning and state its advantages.
   (b) Write a short note on interchangeable manufacture and the 'selective assembly' of machine parts.

2. (a) What are the different methods of measuring angles? State the accuracy of each method suggested.
   (b) Sketch the micrometer and explain its working.

3. (a) With a neat sketch explain the working and uses of optical projector.
   (b) What is an Autocollimator? Explain the working principle with neat sketch.

4. (a) What is meant by roughness and waviness of machined surfaces? Describe an instrument for measuring surface finish.
   (b) Describe with a neat sketch the working of Talysurf instrument and state its uses.

5. (a) Classify the Comparators. Describe mechanical comparator and clearly explain the magnification method adopted in it.
   (b) Describe with neat sketches principle, working of electrical and electronic comparators.

6. Explain in detail the methods to measure the gear tooth thickness.

7. (a) List out and explain with neat sketch the elements of screw thread measurement.
   (b) Describe with neat sketch how the effective diameter can be measured.

8. Describe in detail, how you would check the following:
   (i) The squareness to table of the spindle and the spindle feed of a radial drill.
   (ii) The spindle axis of a lathe is parallel to the bed.
   (iii) The cross travel guides of a milling machine are square to the faces of the vertical guides.

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

III B.Tech. II Semester Supplementary Examinations, January -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 clearly what is selective assembly, when it is used, and how does it differ from interchangeable assembly?
   (b) Discuss all the types of Tolerances.

2. (a) What are the basic principles that should be observed in the design of instruments and gauges?
   (b) What are the different methods of measuring angles? State the accuracy of each method suggested.

3. (a) Describe a method to find out the flatness of a surface plate.
   (b) Explain how flatness is measured. What is an optical flat?

4. (a) Describe various methods of measuring surface texture giving their relative advantages.
   (b) Explain how surface finish is measured with profilograph with a neat sketch.

5. (a) What is a comparator? What are the characteristics and the uses of comparators?
   (b) Describe with a neat sketch the principle, working and uses of optical comparators.

6. (a) Explain with a neat sketch how the gear tooth thickness can be measured by Gear tooth vernier.
   (b) Describe in detail the total composite error and tooth to tooth composite errors.

7. (a) Write a note on angle of thread, thread pitch and profile thread gauges.
   (b) Describe in detail the virtual effective diameter and various errors in screw threads.

8. (a) Explain what is understood by the term 'Alignment test 'of a machine tool.
   (b) Explain with neat sketch the method of checking the following in the acceptability test of drilling machine.
   (i) if the table and the pillar are mutually perpendicular
   (ii) If the spindle slides perpendicular to the base.

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