

Code No: 09A50302

**R09**

**Set No. 2**

**III B.Tech I Semester Examinations, December 2011**  
**METROLOGY AND SURFACE ENGINEERING**  
**Mechanical Engineering**

**Time: 3 hours**

**Max Marks: 75**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

\*\*\*\*\*

1. Make a comparative study of CLA, RMS and Ten point height method of measurement of surface finish. With the help of an example explain the difference. [15]
2. What is the basic principle involved in ion implantation. With the help of a neat sketch explain the process. Mention the advantages and applications. [15]
3. (a) Do you think interchangeability reduces the number of rejects? Justify your answer.  
(b) Differentiate between hole basis system and shaft basis system. [8+7]
4. (a) Give the broad classification of fluids and explain them briefly.  
(b) State the advantages and disadvantages of chemical fluids. [7+8]
5. (a) What are the different grades of slip gauges? Explain.  
(b) What are the precautions required while using slip gauges? [7+8]
6. (a) With the help of a neat sketch explain the construction of a reed type of comparator?  
(b) What are the characteristics expected from a comparator? [8+7]
7. Explain the formation of interference fringes when light falls on an optical flat resting on a lapped surface. What is the effect of using a monochromatic beam, instead of white light? [15]
8. (a) Explain the use of rollers and slip gauges for the measurement of minor diameter of internal threads?  
(b) Explain how a thread micrometer can be used to measure effective diameter of a thread. What are the advantages and limitations? [7+8]

\*\*\*\*\*

Code No: 09A50302

**R09**

**Set No. 4**

**III B.Tech I Semester Examinations, December 2011  
METROLOGY AND SURFACE ENGINEERING  
Mechanical Engineering**

**Time: 3 hours**

**Max Marks: 75**

**Answer any FIVE Questions  
All Questions carry equal marks**

\*\*\*\*\*

1. (a) Give the complete classification of taper gauges.  
(b) Explain the construction and working of optical bevel protractor. [7+8]
2. List out various compounds used in abrasive finishing. Explain their features and functions. [15]
3. List out the process variables of electroplating and explain their influence on the quality of the product. [15]
4. (a) Explain the need for limit system.  
(b) With the help of suitable diagrams explain minimum and maximum metal condition of shaft and hole. [7+8]
5. With the help of a neat sketch explain the construction, working advantages, limitations and applications of pneumatic comparator. [15]
6. (a) Explain the procedure of use of straight edges to check straightness.  
(b) Explain the concept of reference plane. [8+7]
7. How CLA index number is determined? Explain why CLA index number alone is not sufficient to specify the surface texture required and to make the information complete, what else is to be specified? How the required texture is specified in the drawing? [15]
8. Explain the measurement of the flank angle of external threads by optical projectors. [15]

\*\*\*\*\*

Code No: 09A50302

**R09**

**Set No. 1**

**III B.Tech I Semester Examinations, December 2011  
METROLOGY AND SURFACE ENGINEERING  
Mechanical Engineering**

**Time: 3 hours**

**Max Marks: 75**

**Answer any FIVE Questions  
All Questions carry equal marks**

\*\*\*\*\*

1. (a) Explain the nomenclature of screw thread with the help of a neat sketch.  
(b) Discuss the various types of pitch errors along with their causes and effects. [7+8]
2. Describe the principal features of International standard system of limits and fits for screwed work. [15]
3. (a) Explain the construction and working of a Profilograph for surface roughness measurement?  
(b) Explain the following terms?
  - i. Roughness
  - ii. Waviness
  - iii. lay. [7+8]
4. What are the different types of surface contaminants generally observed? What are their sources? Explain them in detail. [15]
5. (a) Explain the reason why surface treatment of manufactured products may be necessary.  
(b) Explain the process of roller burnishing. [8+7]
6. Explain comparative methods of testing straightness of geometrical form. [15]
7. How do you measure external dovetail, internal dovetail and angle of dovetail with the help of precision balls and rollers? [15]
8. (a) Why damping is essential in mechanical comparators? How it is achieved in sigma comparator?  
(b) What are the advantages, uses and disadvantages of electrical comparators? [8+7]

\*\*\*\*\*

Code No: 09A50302

**R09**

**Set No. 3**

**III B.Tech I Semester Examinations, December 2011  
METROLOGY AND SURFACE ENGINEERING  
Mechanical Engineering**

**Time: 3 hours**

**Max Marks: 75**

**Answer any FIVE Questions  
All Questions carry equal marks**

\*\*\*\*\*

1. (a) What are the similarities and differences between electroplating and anodizing?  
(b) What are the advantages of cladding? [8+7]
2. (a) Explain the construction and working of free flow air gauges?  
(b) Compare among measuring instrument, gauge and comparator. [7+8]
3. Give the complete classification of Interference fit. Explain them with the help of suitable examples. [15]
4. (a) What is a straight edge? Explain how it can be used to measure the straightness.  
(b) Explain the procedure for flatness measurement on surface table. [8+7]
5. (a) Differentiate between end standards and line standards.  
(b) Describe how the taper of a plug gauge is measured using Sine bar. [6+9]
6. (a) What are the various types of errors observed in threads?  
(b) What are the sources of errors in screw threads? Explain? [7+8]
7. (a) How can fatigue wear be reduced?  
(b) How do wear mechanisms affect mold and tooling design? [7+8]
8. (a) Sketch and explain Taylor-Hobson talysurf surface roughness measuring instrument?  
(b) The heights of peak and valleys of 22 Successive points on a surface are 32, 28, 41, 24, 35, 19, 31, 21, 40, 18, 44, 24, 41, 25, 40, 26, 35, 18, 40, 18, 39, 21 microns respectively, measured over a length of 20mm. Determine CLA and RMS values of roughness surface? [7+8]

\*\*\*\*\*