

Code No: RR320302

RR

Set No. 2

III B.Tech II Semester Examinations, December 2010

METROLOGY

Mechanical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain with a sketch the working of Microptic Auto Collimator .
(b) Elucidate the working principle of optical projector and optical flats. [8+8]
2. Differentiate the following with reference to surface finish
 - (a) Roughness grade numbers and roughness symbols
 - (b) M system and E system
 - (c) Traversing length and sampling length
 - (d) R_p and R_a values [4×4]
3. (a) Discuss the causes of following errors in screw thread pitches
 - i. progressive error
 - ii. periodic error
 - iii. Drunken error
 - iv. irregular errors.
 (b) Enumerate various gear parameters measured in metrology lab and corresponding instruments required for measurement. [8+8]
4. (a) Identify whether the following fits are hole-based or shaft-based. Convert them in to equivalent other systems.
 - i. $H_{11} - d_{11}$
 - ii. $H_{11} - d_{11}$
 - iii. $T_7 - h_6$
 (b) Determine and sketch the limits of tolerance and allowance for a 90mm shaft and hole pair designated $H_8 - e_9$. The basic size lies in the range of 80-100mm. The multipliers for grades 8 and 9 are 25 and 40 respectively. The fundamental deviation for 'e' shaft is $(-11 D^{0.41})$ microns. [6+10]
5. (a) Discuss the advantages of digital measuring instruments over others. What are progressive errors in micrometers?
(b) Describe the uses and advantages of dial indicators. [8+8]
6. (a) Describe the specifications needed for sine bars.

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- (b) Show the arrangement of angle gauges with neat sketches to measure
 $15^0 - 10' - 25''$ and
 $85^0 - 25' - 33''$ with minimum number of gauges from a set of

 $[1^0, 3^0, 9^0, 27^0, 41^0]$ $[1', 3', 9', 27']$ and $[3'', 6'', 18'', 38'']$

[6+10]

7. (a) Explicate plain and tapered plug gauges for tapers, with sketches
(b) Design and sketch a working gauge with a GO and NO-GO ends for spindle
 $\frac{55.006}{55.000}$ mm and a hole of $\frac{54.980}{54.800}$ mm. [6+10]
8. (a) Elucidate with a neat sketch the working principle of electrical comparators.
(b) What are the various machine tool tests common to most of machine tools. [8+8]

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Set No. 4

III B.Tech II Semester Examinations, December 2010

METROLOGY

Mechanical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain with a sketch the working of Microptic Auto Collimator .
(b) Elucidate the working principle of optical projector and optical flats. [8+8]
2. (a) Explicate plain and tapered plug gauges for tapers, with sketches
(b) Design and sketch a working gauge with a GO and NO-GO ends for spindle $\frac{55.006}{55.000}$ mm and a hole of $\frac{54.980}{54.800}$ mm. [6+10]
3. (a) Discuss the causes of following errors in screw thread pitches
 - i. progressive error
 - ii. periodic error
 - iii. Drunken error
 - iv. irregular errors.
 (b) Enumerate various gear parameters measured in metrology lab and corresponding instruments required for measurement. [8+8]
4. (a) Elucidate with a neat sketch the working principle of electrical comparators.
(b) What are the various machine tool tests common to most of machine tools. [8+8]
5. Differentiate the following with reference to surface finish
 - (a) Roughness grade numbers and roughness symbols
 - (b) M system and E system
 - (c) Traversing length and sampling length
 - (d) R_p and R_a values [4×4]
6. (a) Describe the specifications needed for sine bars.
(b) Show the arrangement of angle gauges with neat sketches to measure $15^\circ - 10' - 25''$ and $85^\circ - 25' - 33''$ with minimum number of gauges from a set of $[1^\circ, 3^\circ, 9^\circ, 27^\circ, 41^\circ]$, $[1', 3', 9', 27']$ and $[3'', 6'', 18'', 38'']$ [6+10]
7. (a) Discuss the advantages of digital measuring instruments over others. What are progressive errors in micrometers?

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- (b) Describe the uses and advantages of dial indicators. [8+8]
8. (a) Identify whether the following fits are hole-based or shaft-based. Convert them in to equivalent other systems.
- i. $H_{11} - d_{11}$
 - ii. $H_{11} - d_{11}$
 - iii. $T_7 - h_6$
- (b) Determine and sketch the limits of tolerance and allowance for a 90mm shaft and hole pair designated $H_8 - e_9$. The basic size lies in the range of 80-100mm. The multipliers for grades 8 and 9 are 25 and 40 respectively. The fundamental deviation for 'e' shaft is $(-11 D^{0.41})$ microns. [6+10]

FIRSTRANKER

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Set No. 1

III B.Tech II Semester Examinations, December 2010

METROLOGY

Mechanical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Differentiate the following with reference to surface finish
 - (a) Roughness grade numbers and roughness symbols
 - (b) M system and E system
 - (c) Traversing length and sampling length
 - (d) R_p and R_a values [4×4]
2. (a) Discuss the advantages of digital measuring instruments over others. What are progressive errors in micrometers?
 (b) Describe the uses and advantages of dial indicators. [8+8]
3. (a) Explicate plain and tapered plug gauges for tapers, with sketches
 (b) Design and sketch a working gauge with a GO and NO-GO ends for spindle $\frac{55.006}{55.000}$ mm and a hole of $\frac{54.980}{54.800}$ mm. [6+10]
4. (a) Discuss the causes of following errors in screw thread pitches
 - i. progressive error
 - ii. periodic error
 - iii. Drunken error
 - iv. irregular errors.
 (b) Enumerate various gear parameters measured in metrology lab and corresponding instruments required for measurement. [8+8]
5. (a) Describe the specifications needed for sine bars.
 (b) Show the arrangement of angle gauges with neat sketches to measure $15^\circ - 10' - 25''$ and $85^\circ - 25' - 33''$ with minimum number of gauges from a set of $[1^\circ, 3^\circ, 9^\circ, 27^\circ, 41^\circ]$, $[1', 3', 9', 27']$ and $[3'', 6'', 18'', 38'']$ [6+10]
6. (a) Identify whether the following fits are hole-based or shaft-based. Convert them in to equivalent other systems.
 - i. $H_{11} - d_{11}$
 - ii. $H_{11} - d_{11}$

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Set No. 1

iii. $T_7 - h_6$

- (b) Determine and sketch the limits of tolerance and allowance for a 90mm shaft and hole pair designated $H_8 - e_9$. The basic size lies in the range of 80-100mm. The multipliers for grades 8 and 9 are 25 and 40 respectively. The fundamental deviation for 'e' shaft is $(-11 D^{0.41})$ microns. [6+10]
7. (a) Explain with a sketch the working of Microptic Auto Collimator .
(b) Elucidate the working principle of optical projector and optical flats. [8+8]
8. (a) Elucidate with a neat sketch the working principle of electrical comparators.
(b) What are the various machine tool tests common to most of machine tools. [8+8]

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Set No. 3

III B.Tech II Semester Examinations, December 2010

METROLOGY

Mechanical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain with a sketch the working of Microptic Auto Collimator .
(b) Elucidate the working principle of optical projector and optical flats. [8+8]
2. (a) Describe the specifications needed for sine bars.
(b) Show the arrangement of angle gauges with neat sketches to measure
 $15^0 - 10' - 25''$ and
 $85^0 - 25' - 33''$ with minimum number of gauges from a set of
 $[1^0, 3^0, 9^0, 27^0, 41^0]$
 $[1', 3', 9', 27']$ and
 $[3'', 6'', 18'', 38'']$ [6+10]
3. (a) Discuss the causes of following errors in screw thread pitches
 i. progressive error
 ii. periodic error
 iii. Drunken error
 iv. irregular errors.
 (b) Enumerate various gear parameters measured in metrology lab and corresponding instruments required for measurement. [8+8]
4. (a) Discuss the advantages of digital measuring instruments over others. What are progressive errors in micrometers?
(b) Describe the uses and advantages of dial indicators. [8+8]
5. Differentiate the following with reference to surface finish
 (a) Roughness grade numbers and roughness symbols
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 (c) Traversing length and sampling length
 (d) R_p and R_a values [4×4]
6. (a) Elucidate with a neat sketch the working principle of electrical comparators.
(b) What are the various machine tool tests common to most of machine tools. [8+8]
7. (a) Explicate plain and tapered plug gauges for tapers, with sketches

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- (b) Design and sketch a working gauge with a GO and NO-GO ends for spindle $\frac{55.006}{55.000}$ mm and a hole of $\frac{54.980}{54.800}$ mm. [6+10]
8. (a) Identify whether the following fits are hole-based or shaft-based. Convert them in to equivalent other systems.
- i. $H_{11} - d_{11}$
 - ii. $H_{11} - d_{11}$
 - iii. $T_7 - h_6$
- (b) Determine and sketch the limits of tolerance and allowance for a 90mm shaft and hole pair designated $H_8 - e_9$. The basic size lies in the range of 80-100mm. The multipliers for grades 8 and 9 are 25 and 40 respectively. The fundamental deviation for 'e' shaft is $(-11 D^{0.41})$ microns. [6+10]
