

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: ME312

Course Name: METROLOGY AND INSTRUMENTATION (ME, MP, PE)

Max. Marks: 100

Duration: 3 Hours

Use of approved Data book permitted.

PART A

Answer any three full questions, each carries 10 marks.

Marks

- | | | |
|---|---|-----|
| 1 | a) Explain the process of wringing of slip gauges. | (4) |
| | b) What is sine bar? How sine bars are used for angle measurement? | (6) |
| 2 | a) Explain the construction and uses of Vernier Bevel Protractor. | (5) |
| | b) With neat sketches explain the method of measuring angles using Angle Dekkor. | (5) |
| 3 | a) Explain with suitable examples how holes, shafts and fits are designated? | (4) |
| | b) Define the following terms:- | (6) |
| | (i) Allowance. | |
| | (ii) Tolerance. | |
| | (iii) Limits. | |
| 4 | a) Sketch and describe the optical arrangement of N.P.L. Flatness Interferometer. | (6) |
| | b) State and explain Taylor's Principle of Gauge Design. | (4) |

PART B

Answer any three full questions, each carries 10 marks.

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|---|---|-----|
| 5 | a) Define the following terms used in screw thread:- | |
| | (i) Pitch | |
| | (ii) Lead | |
| | (iii) Major Diameter | |
| | (iv) Minor Diameter | (5) |
| | (v) Pitch Diameter | |
| | b) Explain with neat sketches the method used for measuring the major diameter of screw thread. | (5) |
| 6 | a) Define the following terms in surface texture measurements:- | |
| | (i) Primary Texture. | |
| | (ii) Secondary Texture. | |
| | (iii) Lay. | (4) |

- (iv) Sampling Length.
- b) Describe the method of evaluating roughness using
 - (i) Peak to valley high method. (6)
 - (ii) C.L.A. method.
- 7 a) With neat sketches explain the working principle of Laser Interferometer. (6)
- b) Discuss the different types of probes used in CMM. (4)
- 8 a) Explain the various steps in machine vision system. (6)
- b) List the advantages and applications of CMM. (4)

PART C

Answer any four full questions, each carries 10 marks.

- 9 a) Explain the dynamic characteristics of a measuring instrument. (6)
- b) Define the following terms used in measuring devices:-
 - (i) Drift.
 - (ii) Threshold. (4)
 - (iii) Hysteresis.
 - (iv) Span.
- 10 a) Discuss how measuring instruments are classified? (4)
- b) Define sensors. How sensors are classified? (6)
- 11 With neat sketches explain the construction and working of LVDT. List the advantages and applications of LVDT. (10)
- 12 a) With sketches explain the working of Electrical Dynamometer. (6)
- b) Define thermocouple. List its advantages and disadvantages. (4)
- 13 a) Explain the working principle of Pneumatic load cell with neat sketches. (5)
- b) How temperature is measured by using bimetallic strip thermometer? (5)
- 14 a) Explain the construction and working of RTD. (5)
- b) With sketches explain measurement of vibration using accelerometers. (5)
