

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: ME312
Course Name: METROLOGY AND INSTRUMENTATION

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

Marks

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| 1 | a) List out the various elements of measurement. | (3) |
| | b) What is ABBE's Principle? | (3) |
| | c) Distinguish between accuracy and precision of an instrument? | (4) |
| 2 | a) Explain line standard and end standard measurement | (4) |
| | b) Distinguish between limits and tolerance. | (3) |
| | c) What is Taylor's principle of gauging? | (3) |
| 3 | a) Explain any two types of Limit plug gauges | (4) |
| | b) Explain the working of Sigma comparator with a neat sketch | (4) |
| | c) List the advantages of pneumatic comparator? | (2) |
| 4 | a) Explain the working of a NPL flatness interferometer. | (4) |
| | b) Distinguish between hole basis system and shaft basis system | (2) |
| | c) With neat sketches explain the difference between clearance fit and interference fit? | (4) |

PART B

Answer any three full questions, each carries 10 marks.

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| 5 | a) Describe any three terms associated with a screw thread. | (3) |
| | b) Differentiate between surface roughness and waviness? | (3) |
| | c) List out the various methods to measure surface roughness. | (4) |
| 6 | a) What is meant by sampling length? | (2) |
| | b) What is a CMM probe? Explain the various types of probes used in CMM | (5) |
| | c) List out the application of Machine vision system? | (3) |
| 7 | a) Differentiate between the Type A and the Type B optical flats | (2) |
| | b) With a neat sketch explain the machine vision system | (4) |

- c) With neat sketches explain Bridge type CMM and Cantilever type CMM (4)
- 8 a) Explain three wire method of the screw thread measurement? (4)
- b) Explain the measurement of the flank angle using the profile projector and the microscope? (3)
- c) Explain the working of the Tomlinson surface meter. (3)

PART C

Answer any four full questions, each carries 10 marks.

- 9 a) Give any four classifications of the measuring instruments. (4)
- b) Explain the static characteristics of measuring instruments. (4)
- c) Differentiate between the active and passive transducers. (2)
- 10 a) With suitable examples explain the fidelity and the measuring lag. (3)
- b) How will you assess the sensitivity of an instrument? (3)
- c) What is the combined sine and cosine error in measurement? (4)
- 11 a) List out any four classifications of a transducer. (4)
- b) Explain the working of hydraulic load cell (3)
- c) List the advantages and limitations of LVDT (3)
- 12 a) Explain the method of measuring strain by using strain gauges. (3)
- b) Explain the three component force measurement using piezoelectric quartz crystal. (4)
- c) Explain the method of measuring torque by using a mechanical dynamo meter. (3)
- 13 a) Explain the basic principle and operation of a vibro-meter. (4)
- b) What is a pressure thermometer? (3)
- c) Explain the working of liquid in glass thermometer. (3)
- 14 a) Explain the measurement of Thermocouple EMF. (3)
- b) List out any four thermocouple materials. (4)
- c) What is a resistance temperature detector (RTD)? (3)
