

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**SIXTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 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

- |   |  |     |
|---|--|-----|
| 1 | a) Why do we go for highly precise measuring instruments?  | (3) |
|   | b) What is meant by calibration and precision of an instrument?                                  | (3) |
|   | c) Differentiate between the line standards and the end standards.                               | (4) |
| 2 | a) What is the advantage of using the wavelength standard?                                       | (3) |
|   | b) What is meant by wringing of slip gauges?   | (3) |
|   | c) Explain how Sine bar is used for measurement of small size component and large size component | (4) |
| 3 | a) With a neat sketch explain Johansson Mikrokator.  | (4) |
|   | b) Explain the working of a laser interferometer   | (3) |
|   | c) What is meant by the hole basis system and the shaft basis system.                            | (3) |
| 4 | a) Write the difference between inspection gauges and workshop gauges?                           | (3) |
|   | b) Differentiate between clearance fit and interference fit.                                     | (3) |
|   | c) What is meant by work tolerance and gauge tolerance?  | (4) |

**PART B**

*Answer any three full questions, each carries 10 marks.*

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|---|--|-----|
| 5 | a) Explain the measurement of effective diameter of a screw thread with two wire method. | (3) |
|   | b) Explain the measurement of flank angle by profile projector.                          | (3) |
|   | c) What is the meaning of surface texture, roughness and waviness?                       | (4) |
| 6 | a) What is Ra, Rt and Rz values in surface roughness?                                    | (3) |
|   | b) With a neat sketch explain the working of a Talysurf.                                 | (3) |
|   | c) With a neat sketch explain the working of an autocollimator.                          | (4) |
| 7 | a) Explain the alignment testing of a drilling machine.                                  | (3) |
|   | b) Explain the components and construction of a Co-ordinate Measuring Machine.           | (4) |

- c) Explain any four applications of the Co-ordinate Measuring Machine. (3)
- 8 a) Differentiate between contact probes and non-contact probes. (3)
- b) Explain any three applications of a machine vision system. (3)
- c) Explain the steps in machine vision. (4)

**PART C**

*Answer any four full questions, each carries 10 marks.*

- 9 a) What is the significance of mechanical measurement? (3)
- b) Explain any four methods of measurement. (4)
- c) Explain the various stages in a generalized measuring system. (3)
- 10 a) Explain the terms repeatability and sensitivity. (3)
- b) Explain the static characteristics of a measuring instrument. (4)
- c) How will you quantify parallax error in measurement? (3)
- 11 a) Explain any three dynamic error of an instrument. (3)
- b) What is LVDT and mention the advantages of LVDT (4)
- c) Explain any three classifications of a transducer. (3)
- 12 a) Explain the working of an electrical resistance strain gauge. (3)
- b) How the three component force measurement is carried out by using a piezoelectric quartz crystal. (4)
- c) Explain the different types of strain gauges (3)
- 13 a) Explain the basic principle of hydraulic load cell. (3)
- b) How the torque measurement is carried out by a rope brake dynamometer. (3)
- c) Explain how vibration is measured by using an accelerometer. (4)
- 14 a) What is radiation pyrometer (4)
- b) List out any two advantages of thermocouple over thermometer. (3)
- c) What is a thermistor? (3)

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