

Reg No.: _____

Name: _____

03000ME312052001

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Regular and Supplementary Examination July 2021



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) Explain accuracy and precision with suitable examples. | (4) |
| | b) Differentiate between controllable and random errors. | (4) |
| | c) Differentiate between sensitivity and range. | (2) |
| 2 | a) State the advantages and disadvantages of pneumatic comparators. | (4) |
| | b) A 100mm sine bar was used to measure the taper angle of the specimen and the gauge block was 5.055mm. What is the taper angle? | (2) |
| | c) What is the principle of Angle dekkor? How is it used for the measurement of angles? | (4) |
| 3 | a) With the help of neat sketches state the essential conditions for clearance fit and Interference fit. | (4) |
| | b) Discuss the various types of limit gauges. | (4) |
| | c) Write notes on selective assembly. | (2) |
| 4 | a) What are the necessary conditions for interference of light waves? | (4) |
| | b) Describe the working principle of pitter-NPL gauge interferometer with a neat sketch. | (6) |

PART B

Answer any three full questions, each carries 10 marks.

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| 5 | a) Define any four terms from screw thread terminology. | (4) |
| | b) Explain the measurement of flank angle and pitch of a screw thread by profile projector. | (6) |
| 6 | a) What is autocollimator? Explain its principle and working with a neat sketch. | (6) |
| | b) How is Ten-point average of surface roughness calculated? | (4) |

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- 7 a) Explain the various alignment tests performed on pillar Type Drilling machine. (5)
b) How a laser interferometer is used for measuring the displacement? Explain with a neat diagram. (5)
- 8 a) State any four features of CMM. (4)
b) Write briefly about the various stages involved in machine vision system. (4)
c) List any four possible causes of errors in CMM. (2)

PART C

Answer any four full questions, each carries 10 marks.

- 9 a) With Block diagram explain functional elements of an instrument system. (5)
b) Describe any five types of transducers. (5)
- 10 a) Explain zero-order measurement system with suitable examples. (4)
b) Briefly describe linearity and non-linearity in measurements. (4)
c) Define measuring lag and fidelity. (2)
- 11 a) Write short notes on LVDT. (4)
b) What are thermocouples. State its applications? (4)
c) Write short notes on hysteresis. (2)
- 12 a) Explain the working principle behind strain gauges. (4)
b) What are the disadvantages of mechanical transducers? (3)
c) Name the instruments used for measurement of torque. (3)
- 13 a) With neat sketch briefly explain the working of an optical recording vibrometer. (4)
b) Write short notes on piezoelectric accelerometers. (3)
c) Write a note on hydraulic dynamometers. (3)
- 14 a) Using a sketch explain the working of an optical pyrometer. (4)
b) What are thermocouples. State its applications. (4)
c) State any four applications of thermistors. (2)
