

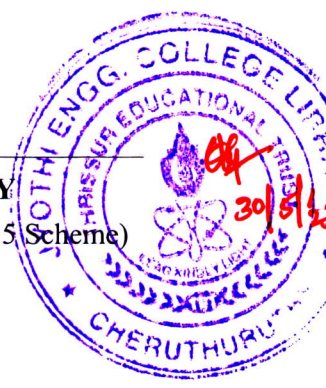
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Name: \_\_\_\_\_

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S,FE) / S4 (PT) (S,FE) Examination May 2023 (2015 Scheme)



**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) With a neat sketch explain the parts, working and applications of a Vernier Height Gauge. (5)
- b) What is meant by wringing of slip gauges? Explain various grades and applications of slip gauges. (5)
- 2 a) What is meant by calibration of an instrument? Explain various methods to quantify errors in measurement. (5)
- b) State and explain Abbe's principle. Give any one practical situation which violates Abbe's principle. (5)
- 3 a) With suitable examples explain clearance fit, interference fit and transition fit. (5)
- b) With neat sketches and suitable examples explain the hole basis system and the shaft basis system. (5)
- 4 a) With a neat sketch explain NPL flatness interferometer. Explain any one practical application of NPL flatness interferometer. (5)
- b) Explain the Taylor's principle of gauging. Differentiate between work tolerance, gauge tolerance and gauge wear allowance. (5)

**PART B**

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

- 5 a) Explain the measurement of the effective diameter of a screw thread with the three wire method. (5)
- b) With a neat sketch explain the measurement of the flank angle and the form by the profile projector. (5)
- 6 a) Differentiate between the roughness and the waviness. Explain the Ra, Rq and Rz values in the surface roughness measurement. (5)

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- b) With a neat sketch explain the parts and the working of a Tomlinson surface meter. (5)
- 7 a) Explain the alignment testing of a drilling machine. (5)
- b) With a neat sketch explain the parts, working and applications of a laser interferometer. (5)
- 8 a) Explain the functions, applications and advantages of a machine vision system. (5)
- b) With the help of neat sketches explain the various types of CMM probes. (5)

**PART C**

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

- 9 a) Explain the various stages in a generalized measuring system. (5)
- b) Differentiate between the active and the passive transducers. (5)
- 10 a) Explain with suitable examples the static characteristics of a measuring device. (5)
- b) Explain the working of any three types of transducers. (5)
- 11 Explain the principle, working, applications, advantages and limitations of LVDT. (10)
- 12 a) Explain the principle and operation of the electrical resistance strain gauge. (5)
- b) Explain the parts, working and applications of the hydraulic load cell. (5)
- 13 a) With a neat sketch explain the working of a hydraulic dynamometer. (5)
- b) Explain the three component force measurement using a piezoelectric quartz crystal. (5)
- 14 a) Explain the laws of thermocouples and its applications. (5)
- b) Explain the basic principle of operation of a pyrometer and a thermistor. (5)

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