Reg No.:_____ 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)

	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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