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

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.

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)

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