Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S,FE) Examination December 2025 (2019 Scheme)

Course Code: RAT342

Course Name: MECHANICAL MEASUREMENTS AND METROLOGY

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1		Explain the concept of threshold in measurement systems.	(3)
2		Define loading effect in a measurement system.	(3)
3		How is a fuel cell used for force measurement?	(3)
4		Compare how power is measured using absorption and transmission dynamometers.	(3)
5		Give any 3 applications of bimetallic strip.	(3)
6		Define Resistance Temperature Detector.	(3)
7		List the objectives of metrology and also define inspection in industrial applications.	(3)
8		Determine an autocollimator.	(3)
9		Define a) Roughness b) Lay c) Waviness	(3)
10		Illustrate the function of a light interference microscope in surface finish measurement?	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	Describe the concept of hysteresis and drift in measuring instruments.	(7)
	b)	Describe the working principle of a bevel protractor.	(7)

OR

12	a)	What are slip gauges? Explain the process of checking slip gauges for surface quality.	(7)
	b)	Explain the working principle of a micrometer. Give any 2 applications.	(7)

Module II

13	a)	Describe the construction and working of cantilever beams for force measurement.	(7)

b) Explain the working principle of load cells and discuss different types of load cells used for force measurement. (7)

OR

14 a) Explain how power is measured using a dynamometer. (7)

b) Describe the construction and operation of a torsion bar dynamometer with a neat sketch. (7)

Module III

15 a) Explain the construction and working principle of a resistive potentiometer. (7)

b) Compare mechanical tachometer with electrical and photoelectric tachometers in terms of accuracy and application. (7)

OR

16 a) Describe the working principle and construction of a Linear Variable Differential Transformer (LVDT). How does it measure linear displacement, and what are its advantages? (14)

Module IV

17 a) Describe the differences between accuracy and precision with suitable examples. (7)

b) Explain the working principle of a gear tooth vernier calliper. What are its applications. (7)

OR

18 a) With a neat sketch explain gear tooth terminology. (7)

b) What are the main sources of errors in the manufacturing of gears, and how can they be minimized? (7)

Module V

19 Classify comparators and explain the basic working principle of each. (14)

OR

20 Discuss the pneumatic method of measuring surface roughness. How does it work, and what are its advantages and limitations? (14)

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