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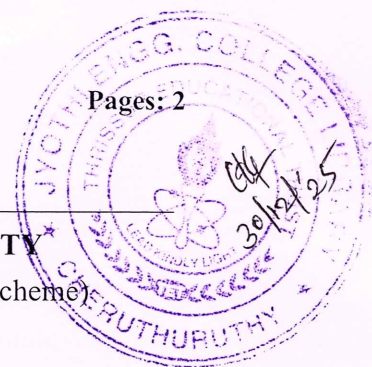
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Reg No.: \_\_\_\_\_

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<br>a) Roughness<br>b) Lay<br>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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