



MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.

Department of Robotics and Automation Question Bank - Academic Year (2020-21)

Course Code & Course Name : 19RAC10 & Metrology and Measurements
Name of the Faculty : S.Palanisamy
Year/Sem/Sec :

Unit-I: Basics of Metrology

Part-A (2 Marks)

1. What is Range of measurement?
2. What is Resolution?
3. Differentiate between sensitivity and range with suitable example
4. Define system error and correction
5. Define calibration.
6. Give any four methods of measurement.
7. Give classification of measuring instruments
8. What is Hysteresis?
9. Differentiate accuracy and Uncertainty with example.
10. Differentiate between precision and accuracy

Part-B (16 Marks)

- 1 Give the structure of Generalized measuring system and Explain. (16)
- 2 Explain the classification of various measuring methods. (16)
- 3 With suitable example, explain the difference between precision and accuracy. (16)
- 4 Describe the different types of errors in measurement and their causes (8)
- 5.(i). Distinguish between and give appropriate examples in each case: (6)
Repeatability and reproducibility
- (ii). Systematic and random errors (6)
- (iii). Static and dynamic response (4)

Unit-II : Linear and Angular Measurements

Part-A (2 Marks)

1. What is laser micrometer?
2. State the working principle of an electronic comparator
3. What is wringing of gauge blocks?

4. What is the use of autocollimator in mechanical measurements?
5. What are the considerations while manufacturing the slip gauges?
6. List the various types of linear measuring instruments?
7. List out any four angular measuring instrument used in metrology.
8. What is comparator?
9. Classify the comparator according to the principles used for obtaining magnification.
10. How the mechanical comparator works?

Part-B (16 Marks)

1. Describe with the neat sketch, a Vernier Bevel Protractor and Vernier Height Gauge (16)
2. With neat diagram, explain the construction and working principle of depth micrometer (16)
3. Write the advantages and disadvantages of the mechanical comparator. (16)
4. With neat sketch explain the working principle of differential pneumatic comparator (16)
- 5 Explain the working principle of AC Laser Interferometer (16)

Unit-III : Advances in Metrology

Part-A (2 Marks)

1. What do you mean by alignment test on machine tools?
2. Mention any 4 types of CMM.
3. What is CNC CMM?
4. What are the benefits of Using CMM?
5. Mention any advantages of column type CMM.
6. Name the types of accuracy specifications used for CMM.
7. State any 2 applications of laser in machine tool metrology
8. What are the advantages of using Laser beam interferometer?
9. Why monochromatic light is used in interferometer instead of white light?
10. What is the purpose of retro-reflectors in laser interferometers?

Part-B (16 Marks)

- 1 Describe the working of Laser Micrometer with sketch. (16)
- 2 Describe the steps involved in measurement in CMM (16)
- 3 Sketch the schematics of an interferometer and explain its Working (16)
- 4 Describe the working of Laser Micrometer with sketch. (16)
- 5 Describe in detail of the function and application of machine vision system (16)

Unit-IV : Form Measurement

Part-A (2 Marks)

1. Name the various types of pitch errors found in screw?
2. Name the various methods for measuring effective diameter.
3. What is run out?
4. Name the various methods for measuring pitch diameter
5. Name the two corrections are to be applied in the measurement of effective diameter.
6. Define drunken thread.
7. What is the effect of flank angle error?
8. What are the applications of toolmaker's microscope?
9. Define: Periodic error.
10. What are the commonly used forms of gear teeth?

Part-B (16 Marks)

- 1 Describe with a neat sketch the measurement of pitch of internal and external screw threads using a pitch measuring machine. (16)
- 2 Explain with suitable sketches the measurement of straightness using autocollimeter. (16)
- 3 Explain working principle of Tomlinson surface meter with a neat sketches. (16)
- 4.(i). Discuss the various types of screw pitch errors. (8)
- (ii). Describe the stylus-type surface measuring instrument (8)
- 5 Briefly explains step by step procedure of for determining flatness of surface with sketch (16)

Unit-V : Measurement of Power, Flow and Temperature

Part-A (2 Marks)

1. List some methods employed for measuring torque.
2. Write the working principle of hot wire anemometer.
3. List the instruments used for measuring temperatures
4. What is the working principle of thermocouple?
5. List of devices used to measure the force.
6. Classify the types of Strain Gauges.
7. List out instruments used to measure pressure.
8. Mention the types of flow meter.
9. List out instruments used to measure linear velocity.
10. What are the laws of thermo couple?

Part-B (16 Marks)

- 1.(i) Explain the construction and working of a Venturimeter. (8)
- (ii) Describe a method of orifice flow measurement using a suitable instrument. (8)
- 2 Rotometer – Explain in detail with sketch. (16)
- 3 Explain with the help of neat sketch a method used for force measurement using elastic force meter. (16)
- 4 Explain briefly any one method of torque measurement (16)
- 5 Describe any 4 power measurement equipment. (16)

Course Faculty

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