

VALLIAMMAI ENGINEERING COLLEGE

DEPARTMENT OF MECHANICAL ENGINEERING

CC7007 METROLOGY AND NON DESTRUCTIVE TESTING QUESTION BANK

PART A

Unit 1 Measuring Machines

1. What is microscope
2. What is the use of CMM
3. What are the important features of CMM
4. What are the errors in CMM
5. What is meant by axial length measuring accuracy
6. What are the applications of CMM
7. Compare CMM and UMM
8. What are the Mechanical accuracyWhat is the use of image shearing microscope.
9. Differentiate between sensitivity and range with suitable example.
10. Define system error and correction.,
11. Define: Measurand.
12. Define: Deterministic Metrology.
13. Define over damped and under damped system.
14. Give any four methods of measurement
15. Give classification of measuring instruments.
16. Define True size:
17. Define Actual size
18. What is Hysteresis
19. What is Resolution
20. Define Span

Part B

- 1.Explain Briefly about Tool makers Microscope
- 2.Explain Briefly about CMM
- 3.Explain Briefly about UMM
- 4.Explain Briefly about Image Shearing Microscope
- 5.Explains briefly about use of microscope in metrology
- 6.Draw the block diagram of generalized measurement system and explain different stages with examples.
- 7.Distinguish between Repeatability and reproducibility
- 8.Distinguish between Systematic and random error
9. Distinguish between Static and dynamic response
10. Describe the different types of errors in measurements and the causes. 6. List various types of measuring instruments and explain each one of them

Unit II STATISTICAL QUALITY CONTROL

1. Distinguish between random causes and assignable causes in sqc.
2. Justify the 3σ limits as control limits in any control chart.
3. Define operating characteristic function of a control chart. What is its importance in process control?
4. What is a c – chart. When and where it is used.
5. Explain *cusum* charts.
6. Define the terms: *aql*, *ltpd*, producers risk, consumers risk.
7. Distinguish between multiple sampling plans and sequential sampling plans.
8. Explain the technique of curtailed inspection.
9. What is meant by acceptance sampling
10. What is control planning
11. Define fmea
12. Define gauge repeatability
13. How will you study the process capability of a production process?
14. what are the important indices for measuring the process capability
15. derive the *asn* and *ati* functions for a *dsp* and draw their general
16. What the salient features of dodge- roming tables
17. What are statistical measyre tools
18. What is theory of probality
19. Define sampling
20. What is control charts

Part B

- 1.Explain Briefly on statistical measure tools
- 2.Explain briefly on process capability
- 3.Explain briefly on theory of probality
- 4.Explain the construction and interpretation of mean chart and range chart.
- 5.Describe various ways in which a control chart may be modified to meet special situations.
- 6.How will you study the process capability of a production process?
What are the important indices for measuring the process capability?
- 7.Derive the *ASN* and *ATI* functions for a *DSP* and draw their general shapes.
- 8.Describe an item by item sequential sampling plan by attributes.
- 9.Derive the acceptance and rejection lines of such a plan with a given producers risk and consumers risk.

10. The measurement X on an item follows a normal distribution with known standard deviation. The item is considered acceptable if X is large. Derive a *SSP* for a specified α and β

Unit III Liquid Penetrant And Magnetic Particles

1. What are characteristics of liquid penetrants
2. What is penetrating agents
3. How is the size of a liquid penetrant indication usually related to the discontinuity
4. Which of the following statements accurately describes the capabilities of liquid penetrant testing
5. What type of solvent removers may be used with a solvent removable penetrant?
6. What is the preferred pre-cleaning process for removal of oil and grease
7. What is the danger associated with using a wire brush during pre-cleaning?
8. Which type of emulsifier is designed to be used as a 'scrubber'?
9. What is a disadvantage of using the fluorescent penetrant process?
10. What is the minimum time considered necessary for dark adaptation of the eyes prior to evaluating the results of a fluorescent penetrant test?
11. Which type of penetrant processes would be best suited to the detection of wide, shallow discontinuities?
12. What is a disadvantage of the solvent removable penetrant process?
13. List four cleaning processes that are to be avoided
14. Which of the following statements accurately describes the capabilities of liquid penetrant testing
15. What type of solvent removers may be used with a solvent removable penetrant?
16. What is the preferred pre-cleaning process for removal of oil and grease
17. What is the danger associated with using a wire brush during pre-cleaning?
18. Which type of emulsifier is designed to be used as a 'scrubber'?
19. What are the principle operation of magnetic particles
20. Applications of liquid penetrating particles

Unit IV Radiography

1. Timers in x-ray machine
2. Advantages of rotating anode over stationary anode
3. Properties of x-ray
4. Working and principles of dynamo
5. Electro magnetic induction
6. Joule's law and Lenz's law
7. Faraday's law of electro magnetic induction
8. Grids describe in detail
9. Energy
10. Thermionic emission
11. Conductors and insulators
12. Describe Coolidge tube
13. State and explain Fleming's right hand rule
14. State the heating effect of current joule's law
15. Explain faraday's law of electromagnetic induction
16. Photo electric effect
17. Explain the five type of luminescence?
18. Give a brief description about personnel monitoring systems?
19. What are the guidelines for using film badges?
20. Give the maximum permissible dose

Part B

1. Describe about x-ray tube and its working with the help of diagram?
2. Write brief account about magnetism?
3. Describe atom?
4. Draw a diagram of stationary anode x-ray illustrates and explain different parts?
5. Give the working principle of AC and DC dynamo or generator?
6. Explain magnetic flux, ammeter and voltmeter?
7. Explain about conductors and insulators?
8. State the types of magnetic materials and explain them in detail?
9. State and explain faradays laws of electrolysis?
10. Give the Lenz's law and explain it with Fleming's right hand rule?

Unit 5 Ultrasonic and Acoustic Emission Techniques

1. How ultrasonic waves are produced?
2. What are the different types of waves?
3. What are principles of acoustic emission techniques?
4. What are the advantages of Ultrasonics?
5. What is surface waves?
6. What is Lamb Waves?
7. What is measuring gauge tools?
8. What are the general principles including ultrasonic waves?
9. What is piezo electric?
10. What is wavelength?
11. What is ultra sound?
12. What are applications of ultra sound?
13. What are principles of ultrasonic sensing?
14. Define sound velocity?
15. What is piezo electric effect?
16. Define reflection?
17. Define refraction?
18. What is diffraction?
19. What is ultrasonic measuring Principles?
20. What is electromagnetic interference?

Part B

1. Explain briefly on production of Ultrasonic waves?
2. Explain the different types of waves?
3. Explain the general characteristics of waves?
4. Explain briefly Pulse method?
5. Elaborate the principles of acoustic emission techniques?
6. What are instruments used for acoustic emission techniques?
7. **Electromagnetic Interference**
8. Explain briefly effects of liquid sloshing?
9. Write briefly on slosh compensation by damping methods?
10. Explain briefly on tilt sensor?

