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Question Paper Code : 11103

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Elective

CAD/CAM

CC 9255/CC 955/10222 CDE 43 — METROLOGY AND NON DESTRUCTIVE TESTING

(Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the chief applications of the tool room microscope.
2. Differentiate between CMM and UMM.
3. What is meant by process capability?
4. Define reliability. State its significance.
5. List out commonly used NDT methods.
6. Name few defects that can be identified using NDT methods in casting.
7. Name a few High energy X-Ray source machines.
8. Define film density.
9. What is piezoelectric effect?
10. List the limitations of acoustic emission testing.

PART B — (5 × 16 = 80 marks)

11. (a) List out the various probes used in CMM and explain the working of them in detail.

Or

- (b) (i) With the aid of a neat sketch, explain the working of tool maker's microscope. (8)
- (ii) Discuss on the role of microprocessors in metrology. (8)

12. (a) (i) Mention the various types of control charts and discuss their characteristics and applications. (8)
- (ii) Describe the various methods of pictorial presentation of data. (8)

Or

- (b) In a double sampling plan 2% AOQL acceptance rectification plan:

$$n_1 = 32 \quad c_1 = 0 \quad n = 1000$$

$$n_2 = 38 \quad c_2 = 2$$

Determine

- (i) the probability of acceptance of 2% defective lot,
- (ii) the average total inspection (16)
13. (a) (i) Discuss the essential characteristics of liquid penetrants. (6)
- (ii) Discuss in detail the following steps in Liquid-penetrant testing:
- (1) Surface preparation
 - (2) Penetrant application
 - (3) Application of developer and
 - (4) Surface inspection. (10)

Or

- (b) (i) Explain with the help of neat sketches the eddy current method of detection of a flaw with
- (1) Circular magnetisation and (5)
 - (2) Longitudinal magnetization (5)
- (ii) Distinguish between the following in connection with magnetic particle test:
- (1) Prod and Yoke method and (3)
 - (2) Dry and wet method. (3)
14. (a) Explain the factors responsible for distinguishable image in a radiograph.

Or

- (b) (i) Explain the principle of microfocal radiography along with its applications: (10)
- (ii) Write short notes on safety in industrial radiography. (6)

15. (a) Discuss the various procedures for performing ultrasonic testing and also explain the Pulse-echo technique with sketches. (16)

Or

- (b) State the principle of Acoustic Emission Testing and illustrate the simple experimental test up for it. (16)