UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2020

Course: Quality inspection and NDT techniques **Semester: 8th**
Program: B.Tech.(Mechanical) & B.Tech.(Mechanical + Specializations) **Time 03 hrs.**
Course Code: MTEG 353 **Max. Marks: 100**

SECTION A (30 X 1=30 Marks)

Multiple Choice Questions:

1. Generation of eddy currents depends on the principle of:

    a. wave guide theory.

    b. electromagnetic induction.

    c. magneto-restrictive forces.

    d. all of the above

2. The discovery of electromagnetic induction is credited to:

    a. Arago.

    b. Oersted.

    c. Maxwell.

    d. Faraday.

3. All of the following parts can be tested by the liquid penetrant method except:

    a. an iron casting

    b. an aluminum forging

    c. a part made from a porous plastic material

    d. a part made from a non-porous material

4. Visible penetrant may be applied by:

    a. brushing

b. spraying

c. dipping

d. none of the above

5. "Magnetic particle" is a nondestructive examination method used for:

a. locating surface discontinuities

b. locating near surface discontinuities

c. both a and b

d. detecting material separation

6. If a crack exists in a circular magnet, the attraction of magnetic particles to the crack is caused by a:

a. coercive force

b. leakage field

c. Doppler effect

d. high reluctance at the crack

7. Magnetic flux lines which are parallel to a discontinuity produce:

a. strong indications

b. weak indications

c. no indications

d. fuzzy indications

8. Attenuation in ultrasonic testing is a:

a. test display characteristic

b. test material parameter

c. transducer characteristic

d. form of testing

9. Cross-section of weld display on CRT is an illustration of a typical:

a. A-scan presentation

b. B-scan presentation

c. C-scan presentation

d. D-scan presentation

10. What is an important wave mode in AE testing:

a. longitudinal wave

b. transversal wave

c. Lamb wave

d. none of the above

11. Which among the following is not a type of Non-destructive testing?

a. compression testing

b. visual testing

c. ultrasonic testing

d. eddy current testing

12. The profilometry method of laser include:

a. stylus profilometry

b. optical profilometry

c. white light inferometery

d. All of these

13. The abbreviation of LVDT is

a. Linear Variable Differential Transformer

b. Linear Variable Differential Transducer

c. Logarithmic Variable Differential Transformer

d. Logarithmic Variable Differential Transducer

14. Inductance is analogous to:

a. force

b. volume

c. inertia

d. density

15. Non-destructive testing is used to determine

a. location of defects

b. chemical composition

c. corrosion of metal

d. All of these

Fill in the blanks:

16. _____test is used to determine dimensions of any object.
17. _____test can be performed without skilled labor.
18. _____ is the last step in magnetic particle test method.
19. _____type of screen presentation displays the amount of received ultrasonic energy as a function of time.
20. _____NDT methods to detect internal weld defect/discontinuities.

True/False:

21. Working conditions and location are the factors affecting the choice of NDT method.
22. The flux within and surrounding a magnetized part or around a conductor carrying a current is known as magnetic field.
23. Moving a transducer over a test surface either manually or automatically is referred to as resonating.
24. Conductivity of a material shall be detected by eddy current testing method.
25. During radiography test, high density region absorbs less radiation and transmits more.

Match the following:

26. Visual Inspection	a. conductor of sound
27. Radiography	b. only for ferromagnetic materials

28. Acoustic emission	c. Smallest defect detectable
29. Magnetic Particle	d. Difficult to interpret
30. Ultrasonic	e. Macroscopic surface flaws

SECTION B (5 X 10 = 50)

1. With the help of suitable examples, differentiate between destructive and nondestructive testing techniques.
2. Discuss about defects in casting, forging and welding.
3. Explain the principles in Acoustic Emission method and also explain the defect location calculation based on time differences.
4. Explain any 3 applications of eddy current testing method and list the advantages of ECT.
5. Explain the profilometry methods in Laser testing method.

OR

6. In details, explain the different types of BUBBLE Leakage testing method.

SECTION C (1 X 20 = 20)

7. (a) Explain different Magnetic Field Orientation and Flaw Detectability in Magnetic particle testing.
   (b) Write a short note on Basic radiographic physics and interaction of radiation with matter in Radiographic Testing method.

OR

(a) What are different types color change thermometry in thermal testing?
(b) Define the following:
- i. Nominal Frequency
- ii. Peak Frequency
- iii. Bandwidth center frequency
- iv. Bandwidth
- v. Pulse width.