KUMARAGURU
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Register Number: ……..

B.E DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

Eighth Semester

AERONAUTICAL ENGINEERING

AER149: Nondestructive Testing

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Point defects causes due to
   a) Missing of atoms b) edge dislocations
   c) Atoms in irregular positions d) both b & c
2. NDE refers to _____
   a) Nondestructive examination b) Nondestructive equipment
   c) Nondestructive environment d) Nondestructive engineering
3. The common industrial Gamma-ray sources are
   a) Iridium-192 b) Colbalt-60.
   c) Thorium -56 d) both a & b
4. The penetrating power of an X ray machine is indicated by:
   a) The pulse generator b) The transducer
   c) The transformer d) The power supply
5. A second name for shear waves is:
   a) Lamb waves b) Longitudinal waves
   c) Transverse waves d) Surface waves
6. As ultrasonic frequency increases:
   a) Wavelength increases b) Wavelength decreases
   c) Sound velocity increases d) Sound velocity decreases
7. The most effective NDT method for locating surface cracks in ferromagnetic materials is:
   a) Ultrasonic testing b) Radiographic testing
   c) Magnetic particles testing d) liquid penetrant testing

8. 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
9. Sound velocity is described by which of the following relationships?
   a) Wavelength times frequency
   b) Wavelength divided by frequency
   c) Wavelength divided acoustic impedance
   d) Acoustic impedance divided by density
10. When a longitudinal wave sound beam passes through an acoustic interface at some angle other than zero degrees:
   a) Surface waves are generated
   b) Plate waves are generated
   c) Reflection, refraction and mode conversion will occur
   d) The first critical angle is reached

PART B (10 x 2 = 20 Marks)

11. What is the different between Defects and discontinuities?
12. List out the types of defects in composite materials.
13. Write down types of digital radiography.
14. Define the term radioactive decay.
15. List out the principles of Ultrasonic inspection.
16. What is A-Scan method?
17. List out any two properties of magnetic line of force.
18. Write down the important requirements for Liquid Penetrant Inspection (LPT).
19. Define the term Thermography.
20. Define the term wavelength and frequency of sound wave.

PART C (5 x 14 = 70 Marks)

21. a) Explain the importance of NDE in aircraft industry and write in detail about the factors influencing the reliability on the same.

(OR)

b) Define composite material and give some of its application in aerospace industry. Explain the different types of defects in composite material.

22. a) Define radiography. With neat sketch explain the process of X- ray production.

(OR)

b) With neat sketch explain crack detection in a material using gamma -ray radiography

23. a) With neat sketch explain the working principle of ultrasonic testing and also mention its advantages and disadvantages.

(OR)

b) What is Piezoelectric Transducers? Explain its characteristics with neat sketch.

24. a) Define the term Electromagnetism. With neat sketch explain the working principle of eddy current testing.

(OR)

b) With neat sketch explain the step by step process involved in Liquid Penetrant Inspection.

25. a) With neat sketch explain the working principle of thermal inspection used for NDT.

(OR)

b) Explain in detail about the Optical Holography inspection using appropriate sketches.

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