

**MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL**

Paper Code : PE-AUE 812A Non-Destructive Testing Methods

UPID : 008352

Time Allotted : 3 Hours

Full Marks : 70

*The Figures in the margin indicate full marks.**Candidate are required to give their answers in their own words as far as practicable***Group-A (Very Short Answer Type Question)**1. Answer *any ten* of the following :

[1 x 10 = 10]

- (I) In which material is Magnetic particles testing most likely to find subsurface discontinuities?
- (II) Black light source is used for _____ penetration method.
- (III) What is Reluctance?
- (IV) Which equipment is used for inspection of inside portion of hollow chamber or narrow tube?
- (V) An oil-based emulsifier is called _____.
- (VI) Liquid penetrant testing is based which principle?
- (VII) The couplant _____ the transmission of ultrasonic energy from the transducer into the test specimen.
- (VIII) What is transducer?
- (IX) What is radiograph?
- (X) Give an example of passive testing?
- (XI) What is Coercive force?
- (XII) What is the wavelength of X-rays?

Group-B (Short Answer Type Question)Answer *any three* of the following :

[5 x 3 = 15]

2. What are the objectives of non-destructive testing? [5]
3. Write a short note on Dry particle testing. [5]
4. Discuss the various properties of materials. [5]
5. Explain the methods of demagnetization. [5]
6. How do you select the NDT methods for the testing? [5]

Group-C (Long Answer Type Question)Answer *any three* of the following :

[15 x 3 = 45]

7. a) Discuss the characteristics of X-ray and gamma ray. [7+8]
b) Briefly write about two methods of X-ray production.
8. a) Discuss the characteristics of penetrant and developers? [7+8]
b) Describe the post-emulsifiable inspection techniques.
9. a) Explain the working procedure of visual testing. [5+5+5]
b) Discuss the various types of visual testing.
c) List of any five instruments used for the visual inspection.
10. a) Write down the working principle of radiographic testing with neat sketch. [7+8]
b) Discuss the merits and demerits of radiographic testing.
11. a) How is the depth of penetration related to the frequency of the test in case of eddy current circuit? [5+5+5]
b) Write down the skin effect on eddy current testing?
c) Compute the depth of penetration in mm for eddy current testing using the following data: electrical conductivity – 50 mhos/m, magnetic permeability – 4×10^{-7} Henry/m, frequency – 1 MHz.

*** END OF PAPER ***