

**UNIVERSITY COLLEGE TATI (UC TATI)****FINAL EXAMINATION QUESTION BOOKLET**

COURSE CODE	: DND 1012
COURSE	: INTRODUCTION TO NON-DESTRUCTIVE TESTING
SEMESTER/SESSION	: 1-2022/2023
DURATION	: 3 HOURS

**Instructions:**

1. This booklet contains **4** questions. Answer **all** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

**DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO**

**THIS BOOKLET CONTAINS 5 PRINTED PAGES INCLUDING COVER PAGE**

INTRODUCTION TO NON-DESTRUCTIVE TESTING (DND 1012)

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**QUESTION 1**

- a) NDT (Non-destructive Testing) test methods are used in manufacturing, fabrication and in-service inspections. According to ASNT there are fifteen NDT methods often refer to the type of penetrating medium or the equipment used to perform that test.
- i. Define NDT. (2 marks)
  - ii. List **three (3)** conventional NDT methods. (3 marks)
  - iii. List **two (2)** international schemes available in non-destructive testing. (2 marks)
  - iv. Classify **two (2)** conventional methods and **two (2)** advanced methods in non-destructive testing. (4 marks)
  - v. Determine the best NDT methods. Justify your answer. (3 marks)
- b) The eye needs assistance when visualizing the detail variety of surfaces that are normally accessible to the direct view.
- i. List **four (4)** technologies (industries) associated with Visual Testing and Remote Visual Testing. (4 marks)
  - ii. After welding process of plate, list **three (3)** weld defects can be detected by using direct visual testing. (3 marks)
  - iii. Explain **two (2)** factors affecting the visual testing (VT). (4 marks)

INTRODUCTION TO NON-DESTRUCTIVE TESTING (DND 1012)

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**QUESTION 2**

- a) In magnetic particle testing, objects that possess the property of magnetism are said to be magnetic or magnetized and magnetic lines of force can be found in and around the objects.
- i. Define magnetism. (2 marks)
  - ii. Describe types of discontinuity can be inspected by magnetic particle testing. (2 marks)
  - iii. Describe **three (3)** characteristics magnetic lines of force. (6 marks)
  - iv. Sketch the magnetograph of a bar magnet that showing polarity and flux direction. (3 marks)
- b) Metal can be classified in three categories according to their behavior to the magnetic field which are ferromagnetic, paramagnetic and diamagnetic.
- i. Define permeability. (2 marks)
  - ii. Describe **four (4)** basic procedure of Magnetic Particle Testing. (4 marks)
  - iii. Compare between ferromagnetic, paramagnetic and diamagnetic material in terms of definition. (6 marks)

**QUESTION 3**

- a) The basic principle of liquid penetrant testing is that when a very low viscosity (highly fluid) liquid (the penetrant) is applied to the surface of a part, it will penetrate into fissures and voids open to the surface.
- i. Define capillary action. (2 marks)
  - ii. List all **six (6)** basic steps in performing penetrant testing. (6 marks)
  - iii. State the most important step in penetrant testing. (1 mark)
  - iv. Describe **three (3)** most important characteristics that an effective penetrant should possess. (6 marks)
- b) Penetrants are also classified by the method of removing the excess penetrant.
- i. Write **three (3)** classifications of penetrant. (3 marks)
  - ii. List **three (3)** types of developer usually used in penetrant testing. (3 marks)
  - iii. Compare **two (2)** advantages between Penetrant Testing and Magnetic Particle Testing. (4 marks)

INTRODUCTION TO NON-DESTRUCTIVE TESTING (DND 1012)

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**QUESTION 4**

- a) Eddy Current Testing uses the fact that when an alternating current coil induces an electromagnetic field into a conductive test piece.
- i. State **two (2)** main factors that affecting the depth of eddy currents flowing in material. (2 marks)
  - ii. List **three (3)** inspection applications of eddy current testing. (3 marks)
  - iii. Describe **three (3)** advantages of eddy current testing. (3 marks)
  - iv. Describe how to obtain the deeper penetration of eddy current. (4 marks)
- b) Probes selection in Eddy Current Testing is critical to acquiring adequate inspection data.
- i. Define conductivity. (2 marks)
  - ii. List **two (2)** factors that affecting resistance. (2 marks)
  - iii. List **three (3)** common classifications of eddy current probes. (3 marks)
  - iv. Describe **three (3)** factors to be considered in probes selection. (6 marks)

-----End of question-----

