

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

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| COURSE CODE | : DND 1012 |
| COURSE | : INTRODUCTION TO NON-DESTRUCTIVE TESTING |
| SEMESTER/SESSION | : 2-2022/2023 |
| 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)

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)

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)

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-----

