



KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS

2019/2020 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER

SPECIAL/SUPPLEMENTARY EXAMINATIONS

BACHELOR OF SCIENCE IN PHYSICS

COURSE CODE: SPH 321

COURSE TITLE: MATERIALS TESTING AND
EVALUATION

DATE: 2/02/2021

TIME: 2-4 Pm

INSTRUCTIONS TO CANDIDATES

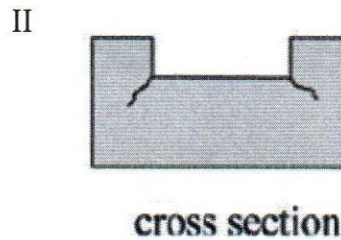
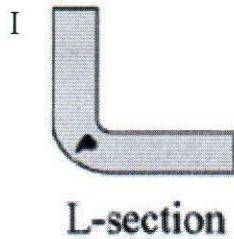
TIME: 2 Hours

Answer question ONE and any TWO of the remaining

KIBABII observes ZERO tolerance to examination cheating

QUESTION ONE (30MARKS)

- a) Differentiate between an ingot and a billet. (2marks)
- b) Discuss three defects found in forgings of metals (3marks)
- c) Identify and describe the following defects as applied to metal castings (4marks)



- d) Write down four causes of in-service defects in materials (4marks)
- e) Discuss the types of discontinuities found in materials (8marks)
- f) Discuss the advantages and limitations of the Eddy Current method of testing materials. (6marks)
- g) Give three examples of the destructive methods of testing materials (3marks)

QUESTION TWO (20MARKS)

- a) Describe by use of diagrams the functioning of various types of collimators used in Neutron Radiography. (4marks)
- b) Briefly explain the principle of working of the magnetic particle testing of materials. (3marks)
- c) Highlight the procedure used in testing materials when using magnetic particles. (8marks)
- d) Outline some properties of magnetic field lines. (5marks)

QUESTION THREE (20MARKS)

- a) Mention three areas where test coils in Eddy Current method are used in probing materials. (3marks)
- b) Define Infrared Thermography and distinguish between the various types of Thermography (3marks)
- c) Discuss the main common errors of scanners used in IR system. (6marks)
- d) Discuss some ways through which neutrons interact with matter in the Neutron Radiography equipment. (8marks)

QUESTION FOUR (20 MARKS)

- a) Outline the procedure carried when using the Liquid Penetrant Method of testing materials. (10marks)
- b) List some of the flaws that can be inspected by the Liquid Penetrant Method. (4marks)
- c) Highlight the advantages of the **NDT** method over the destructive ones (3marks)
- d) Differentiate between the following defects; Airlocks, Gas Holes and Blow holes. (3marks)

QUESTION FIVE (20 MARKS)

- a) Discuss the principle of ultrasonic inspection in Non destructive method of testing materials. (3marks)
- b) Describe the basic components that comprise an ultrasonic test system. (8marks)
- c) Differentiate between the acoustic emission and acoustic impact technique methods of testing materials. (4marks)
- d) State the advantages of using the laser induced high frequency method over other **NDT** methods. (5marks)