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KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR**

**THIRD YEAR FIRST SEMESTER
MAIN EXAMINATIONS**

FOR THE DEGREE OF BSC (PHYSICS)

COURSE CODE: SPH 321

**COURSE TITLE: MATERIALS TESTING AND
EVALUATION**

DURATION: 2 HOURS

DATE: 17TH JANUARY 2018 TIME: 9-11 AM

INSTRUCTIONS TO CANDIDATES

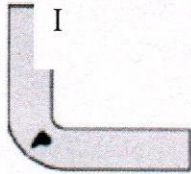
- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
 - Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page

This paper consists of 3 printed pages. Please Turn Over

KIBU observes ZERO tolerance to examination cheating

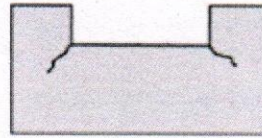
QUESTION ONE (30MARKS)

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



L-section

II



cross section

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

QUESTION TWO (20MARKS)

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

QUESTION THREE (20MARKS)

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

QUESTION FOUR (20MARKS)

- 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 (20MARKS)

- 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)