TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING
ECE 2213: CIVIL ENGINEERING MATERIALS II
SPECIAL SUPPLEMENTARY EXAMINATION
SERIES: SEPT 2017
TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination
-Answer Booklet, examination pass and student ID
This paper consists of five questions.
Answer question ONE (COMPULSORY) and any other TWO questions
Do not write on the question paper.

QUESTION ONE (COMPULSORY)

a) Describe the Edge dislocation type of dislocations when steel is stressed (4 marks)
b) Explain **FOUR** types of defects which occur during welding apart from residual stresses and distortion in the final assembly. (6marks)
c) Explain reaction wood and its effect on the structural properties of wood (4 marks)

d) Compare cold-working and warm working processes used in forming steel products highlighting the advantages and disadvantages of each (6 marks)
e) Describe glass transition temperature property of polymer (4 marks)
f) Briefly explain the following methods of heat treatment of steel
i) Annealing
ii) Tempering
iii) Hardening (6 marks)

ATTEMPT ANY TWO QUESTIONS

QUESTION TWO

a) Explain Bauschinger effect on the properties of steel (4 marks)
b) With the aid of a well labeled diagram illustrate how the blast furnace is used to extract iron from iron ore. (10 marks)
c) Explain any **FOUR** factors that are responsible for deterioration of polymeric materials (6 marks)

QUESTION THREE

a) i) State the effect of reduced moisture content in timber and outline how it is determined (4 marks)

ii) Calculate the moisture content of a sample of timber with net weight of 18.75g and which weighs 15g after it was dried (3 marks)

b) Briefly describe the following methods used in plastic moulding

i) Compression moulding (4 marks)

ii) Transfer moulding (4 marks)

c) Illustrate the notable characteristics of iron and its applications. (5 marks)

QUESTION FOUR

a) Describe the formation of the following steel alloys and their areas of application.

i) Stainless steel

ii) Titanium steel

iii) Manganese steel (9 marks)

b) Differentiate between Oxyfuel gas welding and Arc welding processes (3 marks)

c) With the aid of sketches, explain **THREE** methods of conversion of timber (6 marks)

d) Illustrate the Tangential following types of shrinkage in timber (2 marks)

QUESTION FIVE

a) Using clear sketches, describe the macroscopic structure of wood (8 marks)

b) Sketch a typical stress-strain curve for steel including the case of unloading and reloading and describe the distinct parts (7 marks)

c) i) define corrosion

ii) Briefly elaborate on the electrochemical process (5 marks)