TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN MECHANICAL & AUTOMOTIVE ENGINEERING

EMG 2519 : MAINTENANCE ENGINEERING & INDUSTRIAL SAFETY

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: AUGUST 2017

TIME: 2 HOURS

DATE: Pick Date Jul 2017

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt any THREE questions.

Do not write on the question paper.

Question ONE

a) Define maintenance. (2 marks)

b) Discuss 4 critical success factors that can be positively influenced by effective asset maintenance. (6 marks)

c) Briefly discuss the 3 main forms of maintenance. (6 marks)

d) Explain the following terms as used in maintenance engineering: (6 marks)

i. Quality,

ii. Maintenance concept,

iii. Inspection.

Question TWO

a) Define ageing in relation to equipment. (2 marks)

b) Differentiate deterioration from failure with regard to ageing of equipment. (4 marks)

c) Briefly discuss 4 factors related to equipment that are affected by deterioration. (8 marks)

d) Explain the following mechanisms of corrosion: (6 marks)

i. General corrosion.

ii. Localized corrosion.
iii. Velocity related corrosion attack.

Question THREE

a) Differentiate failure density from hazard rate. (4 marks)
b) In relation to MTBM (Mean Time between Maintenance actions) and M (Maintenance Mean down Time), list 4 ways to improve asset availability. (4 marks)
c) With regard to reliability analysis, discuss the 3 main stages of an equipment bathtub curve. (6 marks)
d) Historically, an equipment has a MTBF = 200 days. To improve 10% its reliability to operate on a 100 days run, what percent should MTBF be improved? (6 marks)

Question FOUR

a) Outline the 3 basic conditions needed to ensure successful maintenance of assets. (3 marks)
b) Discuss the concepts behind: (6 marks)
   i. Failure based maintenance
   ii. Use based maintenance.
   iii. Condition based maintenance.
c) Briefly discuss 6 rights of an employee with regard to OSHA. (6 marks)
d) List the 5 different types of inspections that may be undertaken by OSHA agents. (5 marks)

Question FIVE

a) Discuss the following concepts with regard to accidents prevention: (6 marks)
   i. Primary prevention,
   ii. Secondary prevention,
   iii. Tertiary prevention.
b) Outline three important factors that an engineer should be aware of in order to prevent occurrence of accidents resulting from fires and explosions. (3 marks)
c) With the aid of a well labeled diagram, illustrate the “fire triangle”. (6 marks)
d) Identify 3 types of fires and recommend the types of fire extinguishers that can be used to control them. (5 marks)