TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

Department of Mechanical &Automotive Engineering

UNIVERSITY EXAMINATION FOR 2015/2016

Bachelor of Science in Mechanical Engineering

EMG 2519: MAINTENANCE ENGINEERING AND INDUSTRIAL SAFETY

END OF SEMESTER EXAMINATION

SERIES: MAY 2015/2016

TIME: 2 HOURS

DATE: MAY 2016

Instructions to Candidates

1. You should have the following for this examination
   - *Answer Booklet,*
   - *Examination pass and student ID*
   - *Non –programmable calculator*
   - *Drawing Instruments*
2. This paper consists of **FIVE** questions.
3. Answer Question one is **COMPULSORY** and any other **TWO** Questions
4. All symbols have their usual meanings.
5. All relevant tables and formulae have provided on the question paper
6. This paper consist of **FOUR** printed pages
7. **Do not write on the question paper.**

Question ONE (30mks)

a)

i. The OSH act 2007 act sets out some requirements on fittings and attachment that should be affixed to boilers and steam receivers. Describe FOUR such mandatory requirements (4mks)

ii. Outline ways in which employers may motivate their employees to comply with health and safety procedures (3mks)

iii. State atleast two causes of accidents in industries? (2mks)

b)

i. State two advantages and two disadvantages of predictive maintenances policies (4mks)

ii. Differentiate between planning and scheduling of maintenance (4mks)

iii. Define TPM and state its main aim in maintenance(2mks)

c)

i. State two methods of fire extinction / methods of attack (4mks)

ii. State two advantages of using water as fire extinguishers (4mks)

iii. Use a sketch to illustrate the fire triangle (3mks)

Question TWO (20mks)

a. You have been appointed as a safety manager in a company that has not been implementing occupation safety and health act of 2007 .You are tasked with duties to set up a health and safety management system. Discuss the framework and components of health and safety management with a schematic flowchart (10mks)

b. A glassworks company produces covers for streetlights and industrial lighting. The process involves molten glass being blown by hand and shaped into moulds.

i. Identify four health effects that may be caused by working in the hot conditions of glass factory (4mks)

ii. Describe measures that could be taken in order to minimize the health effects of working in such hot environments(6mks)

Question THREE (20mks)

a. Explain why young people may be at greater risk from accidents at work (5mks)
b. Outline measures that could be taken to minimize the risk to young people at work places (5mks)
c. Outline the factors that should be considered when selecting individuals to assist in carrying out risk assessment in the workplaces (5mks)
d. Outline the five key stages in general risk assessment (5mks)

Question FOUR (20mks)

a. Define the following terms
    i. flash point
    ii. fire point
    iii. ignition temperature(6mks)
b. Explain how compartmentalization of spaces aids in fire controls (2mks)
c. Using the table below , indicate using(X) which type of fire extinguisher is suitable for the given class of fire .Leave the box blank where the combination of class of fire and extinguisher do not match.(the first row has been filled out for you)

Type of extinguisher :	Water	Foam	Vaporizing Liquid	C02	Dry powder
Class A fire	X	X	-	-	-
Class B fire					
Class C fire					
Class D fire					

(4mks)

d. Describe atleast two key aspects considered in the designing of horizontal escape routes and exists(4mks)
e. Highlight ways in which industrial accidents can be prevented (4mks)

Question FIVE

a) Explain the following terms

   i. Maintainability

   ii. Reliability(4mks)

b) State atleast three key features of a computerized maintenance management systems(CMMS) (3mks)

c) An engine fuel pump has to be repaired (or replaced) within 3 hr, 90% of the time. If repair time is to be lognormal, with s = 0.45, determine MTTR to achieve this goal.(5mks)

d) The time to repair a power generator is best described by the following probability density function:

$$h(t) = \frac{t^2}{333}; 1 \leq t \leq 10hr$$

Determine:

   i. the probability that a repair will be completed in 6 hours.

   ii. MTTR and

   iii. the median time to repair (8mks)

The End