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 **THREE** printed pages
7. **Do not write on the question paper.**

Question ONE (30mks)

    i.   Define the following terms:

          a. Ergonomics

          b. Near miss

          c. Accident

          d. Welfare

          e. Safety policy **(5 mks)**

    ii.   Explain giving an example in each case the circumstance under which health and safety inspector may serve an improvement notices and prohibition notices(4mks)

    iii.   State two electrical hazard in a beverage manufacturing industries and atleast two controls needed to be in place (3mks)

    iv.   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)

    v.   Differentiate between Hazard and a risk giving examples in each case (4mks)

b.

    i.   Explain the following terms

          a) Maintainability

          b) Reliability

          c) Availability (6mks)

    ii.   State atleast three advantages of planning and scheduling (3mks)

    iii.   What are the roles of fire detection and alarm systems (1mks)

Question TWO (20mks)

    a. During a routine visit ,a health and safety enforcement officer has discovered an unguarded lift shaft left by a contractor ,whilst working on employers premises

        i.   State at least four power given to the enforcement officer under OSHA2007 act(4mks)

        ii.   Discuss the duties of the following people in workplaces

              i.   Occupiers

              ii.   Employees

               (10mks)

    b. Outline ways in which employers may motivate their employees to comply with health and safety procedures (6mks)

Question THREE (20mks)

    a.

          i.   Define the term TPM (2mks)

         ii.   State the 5S philosophy of TPM(5mks)

       iii.   State atleast three benefits of TPM(3mks)

    b. Describe with aid of diagram the bath tub curve model depicting clearly the three periods of failures of equipments (6mks)

    c. The time to repair a component is best described by the following probability density function:

$$h(t) = 0.083333t, \text{ with } 1 \leq t \leq 5hr,$$

        Determine

         i. The probability of completing repairs in 3 hours

        ii. MTTR (4mks)

Question FOUR (20mks)

    a. Outline Atleast FOUR particles which are boldly marked on every cylinder under occupational safety and health act (8mks)

    b. Describe atleast two requirements on ergonomics at the workplace as defined by the OSH 2007 act (2mks)

    c. Discuss the framework and components of health and safety management with a schematic flowchart (10mks)

Question FIVE

    a. Define the following terms

         i.   flash point

        ii.   fire point

      iii.   ignition temperature(3mks)

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

    c. State TWO methods of fire extinction / methods of attack (2mks)

    d. State TWO advantages of using water as fire extinguishers (2mks)

    e. What are effects of fire hazards (2mks)

    f. Outline various key aspects of fire protection based on structural fire protection and early fire detection(alarm and fire detections units) (9mks)

<p align="center">*The End*</p>