



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

DIPLOMA IN MARINE ENGINEERING (DMAE)

EMR 2216 ENGINEERING DRAWING & DESIGN IV

END OF SEMESTER EXAMINATIONS

SERIES: DECEMBER, 2013

TIME: 2½ HOURS

INSTRUCTIONS TO CANDIDATES:

1. You should have the following for this examination:
 - Answer Booklet
 - Scientific Calculator
 - Drawing Instruments
 2. This paper consists of **FIVE** Questions.
 3. Answer Question **ONE** is (**Compulsory**) and any other **TWO** Questions.
 4. **This paper consists of THREE printed pages.**
- Question ONE (Compulsory)

The details of each component part of a coil winding machine are shown in Figure 1. Draw full size in Third angle orthographic projection the following views of the unit completely assembled:

- (i) A sectional front elevation taken on the cutting plane YY. Shown in body detail part E.
- (ii) A plan projected from view (i).

Include symbol of projection, **SIX** major dimensions and parts list.

(30 marks)

Question TWO

- (a)
 - (i) Define the term ergonomics.
 - (ii) State the **TWO** groups of specialists that ergonomics brings together. **(4 marks)**
- (b)
 - (i) State and explain briefly the **THREE** types of display in instruments.
 - (ii) State **ONE** application for each of the named type of display in b(i). **(9 marks)**
- (c) With the aid of sketches explain the working a closed loop control system. **(7 marks)**

Question THREE

- (a)
 - (i) Define the term coupling.
 - (ii) Sketch and name the parts of the following types of couplings:
 - (I)** Oldham's
 - (II)** Universal cube type
 - (III)** Flexible**(13 marks)**
- (b) Explain briefly with the aid of a sketch, the operation of the friction coupling. **(7 marks)**

(Answer only **TWO** Questions)

Question FOUR

- (a) State and explain the **THREE** categories of steam traps. **(6 marks)**
- (b) Draw sectioned views of the following hydraulic valves:
- (i) Adjustable throttle valve
 - (ii) Non-return valve
 - (iii) Relief valve
- (9 marks)**
- (c) Illustrate the assemblies of the following types of seals in rotating shafts:
- (i) Split ring seal
 - (ii) Leather 'U' seal
- (5 marks)**

Question FIVE

- (a) State and explain the major areas to be considered in design. **(6 marks)**
- (b) Outline the design process in a design flow chart. **(6 marks)**
- (c) (i) State **FOUR** factors that can affect the value of a product.
- (ii) Discuss briefly **FOUR** factors that which when taken into consideration would reduce the overall product cost.
- (8 marks)**