THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

CERTIFICATE IN MECHANICAL ENGINEERING – (PRODUCTION OPTION)

SEMESTER II EXAMINATIONS

APRIL/MAY 2010 SERIES

PLANT TECHNOLOGY

TIME: 2 HOURS

Instructions to Candidates

You need the following for this exam:

- Answer booklet
- Drawing instruments

This paper consists of **THREE** Sections **A, B** and **C.**
Attempt atleast **ONE** questions for each of the Section **B & C.**
All Questions carry equal Marks.

SECTION A

Question ONE

(a). (i). Define the term "Lubrication".

(ii). State **FIVE** safety precautions to be observed during lubrication.

(iii). Use sketches to differentiate between hydrodynamic and hydrostatic modes of lubrication.

(20 Marks)

(b). (i). Describe the procedure of trouble shooting a mechanical seal.

(3½ Marks)

(ii). Sketch a stuffing box and explain its working principles.

(6½ Marks)

SECTION B

Question TWO

(a). Define the following terms: -

(i). Refrigerant
(ii). Ventilation
(iii). Air conditioning

(3 Marks)

(b). (i). State **FOUR** examples and **FOUR** properties of refrigerants.

(ii). Use a flow diagram to describe the operation of the vapor-compression refrigeration system.

(11 Marks)

(c). (i). List **FOUR** fractions of ventilation.

(ii). Outline **FOUR** main components used in the air conditioning systems.

(6 Marks)

Question THREE

(a). (i). Define the term internal combustion engine and state TWO examples.

(ii). Describe the following with respect to the engine in (i).

(I). Crankshaft
(II). Cylinder
(III). Combustion chamber

(iii). Outline any **THREE** advantages and **THREE** disadvantages of the **TWO** stroke spark ignition engine as compared to the four-stroker spark ignition engine.

(12 Marks)

(b). Describe with a circuit diagram, the coil ignition system. **(8 Marks)**

Question FOUR

(a). Explain **THREE** reasons for boiler feed water treatment. **(6 Marks)**

(b). Explain the emergency operation procedure to be carried out in the event of loss of water in the boiler. **(6 Marks)**

(c). Describe the procedure of carrying out a hydraulic test on a boiler. **(8 Marks)**

Question FIVE

(a). (i). Explain **THREE** effects of cavitations on a pump.

(ii). State **THREE** ways/methods of minimizing cavitations on a pump. **(5 Marks)**

(b). Describe with the aid of a sketch the procedure of priming a pump using the evacuation. **(5 Marks)**

(c). Explain with the aid of sketches the procedure of aligning a pump and motor driver on a base plate. **(8 Marks)**