THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering & Technology

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

DIPLOMA IN MECHANICAL ENGINEEERING (PLANT OPTION)

STAGE II SEMESTER II EXAMINATIONS

APRIL/MAY 2010 SERIES

PLANT ELECTRICAL

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination:

- Answer Booklet
- Scientific Calculator
- Drawing Instruments

This paper consists of **FIVE** Questions.
Answer any **THREE** Questions.
All questions carry equal marks.

SECTION A: Answer TWO Questions

Question ONE

(a). (i). List any **THREE** industrial applications of electric water heaters.

(ii). List the **THREE** types of water heaters.

(iii). Briefly describe the construction features of a water heater element.
(4½ Marks)

(b). With the acid of sketch describe the features and operation of a dual element pressure-type water heater. **(6 Marks)**

(c). (i). Outline the procedure of flushing the water heater in (b).

(ii). Outline any **THREE** checks and their remedies carried out on the water heater (b) gives out water which is NOT hot.
(9½ Marks)

Question TWO

(a). Define the following terms as applied to illumination:

(i). Luminous flux
(ii). Luminous intensity
(iii). Coefficient of utilization
(3 Marks)

(b). (i). State **TWO** purposes for shades used in lighting fittings.

(ii). State the maintenance required on the shade in b(i). **(3 Marks)**

(c). (i). With aid of sketches describe the following types of lighting schemes:

(I). Semi-indirect
(II). General diffusing

(ii). Outline the main advantages and disadvantage of indirect lighting over other schemes stating any **ONE** area of their applications.
(8½ Marks)

(d). A play ground measuring 120m x 90m need to be illuminated for right matches by similar banks of equal 1Kw lamps supported on ten towers which are distributed equally around the ground to provide a roughly uniform illumination of the pitch. Assuming 50% of the total light emitted reaches the pitch and that an illumination of 1000 lux is required for filming purpose.
If the overall efficiency of (each lamp is 30/m/w. Calculate the number of lamps on each tower. **(5½ Marks)**

Question THREE

(a). (i). List any **FIVE** factors to be considered when selecting a space heater.
(ii). State **FIVE** advantages of electric heating over other methods.
(7½ Marks)

(b). With the aid of sketches describe the working of storage fan heater with controlled output. **(6 Marks)**

(c). With the aid of a sketch describe the features of embedded floor heating cables.
(6½ Marks)

Question FOUR

(a). List **FOUR** main types of electric finances. **(2 Marks)**

(b). With the aid of sketch explain the working of vertical core-type of furnace.
(8 Marks)

(c). (i). State any **FOUR** advantages of coreless furnace over the furnace in b(i).
(4 Marks)

(ii). List any **THREE** areas of application for furnaces in b(ii). **(3 Marks)**

(d). Outline **THREE** maintenance tasks carried out on electric furnaces**.(3 Marks)**

Question FIVE

(a). (i). Outline any **THREE** I.E.E regulations pertaining to 'Above low voltage' discharge lighting.

(ii). Outline **THREE** ways of reducing lighting cost in occupancies.
(6½ Marks)

(b). With the aid of a circuit diagram describe the operation of sodium discharge.
(5½ Marks)

(i). Outline any two tests to be carried out on the following units of a fluorescent lamp.
(I). Circuit
(II). Capacitors
(III). Lamp assembly

(ii). State the cause necessary remedy for each of the following problem in the lamp in c(i).

(I). Lamp falls to start-one glows brightly.
(II). Lamp falls to start – and glows dark and reddish.
(8 Marks)