2502/204
PLANT ENGINEERING DRAWING
Oct./Nov. 2022
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN MECHANICAL ENGINEERING (PLANT OPTION)

MODULE II

PLANT ENGINEERING DRAWING

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
- *Answer booklet;*
- *Drawing instruments;*
- *A2 Drawing papers.*

*This paper consists of **TWO** sections; **A** and **B**.*
*Answer **BOTH** questions in section **A** (**Compulsory**) and **TWO** questions from section **B**.*
Maximum marks for each part of a question are indicated.
Candidates should answer the questions in English.

This paper consists 5 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated as printed and that no questions are missing.

SECTION A (Compulsory)

Answer ALL questions in this section.

1. Figure 1 shows details of each component of a coil winding machine. Draw a full size view in their angle projection of:

   (a) a sectional front elevation along the cutting plane Y-Y;

   (b) plan of the unit completely assembled. Do not show hidden details.

   Include any six major dimensions;
   Use balloon reference to identify the parts and provide a parts list.

   (30 marks)

Fig. 1

2. (a) Draw a sectional view of each of the following components used in steam plant.:

(i) lever loaded safety valve;
(ii) spring loaded safety vale;
(iii) feed check valve;
(iv) blow off cock.

(18 marks)

(b) Draw:

(i) a horizontal in-line filter;
(ii) an automatic revolving viscous filter.

(6 marks)

(c) Draw sectional view of a:

(i) flush fire hydrant;
(ii) dry powder fire extinguisher.

(6 marks)

SECTION B (40 marks)

Answer TWO questions from this section.

3. (a) Draw a sectional view of a:

(i) sliding expansion joint;
(ii) screw flanged joint;
(iii) socket and spigot joint;
(iv) callard joint;

Used in pipe joints.

(13 marks)

(b) Draw each of the following components used in machine mounting.

(i) through bolt;
(ii) "J" bolt;
(iii) "U" bolt;
(iv) expander.

(7 marks)

4. (a) Draw a

(i) flat face cam follower;
(ii) swinging cam follower.

(6 marks)

(b) Draw the profile of a cam operating a roller reciprocating follower given the following data:

Minimum radius of cam	= 25 mm;
lift	= 30 mm;
roller diameter	= 15 mm

The cam lifts the follower for 120° in simple harmonic motion, followed by a dwell period of 30°. Then the follower lowers down during 150° of the cam rotation with uniform acceleration and deceleration followed by a dwell period. The cam rotates at a uniform speed of 150 rpm.

(14 marks)

5. (a) Draw a sectional view of a:

(i) stuffing box unit;
(ii) frictional coupling unit.

(8 marks)

(b) Draw a:

(i) radial;
(ii) thrust;
(iii) combination radial and thrust types of bearing load application.

(6 marks)

(c) Sketch a spur gear and indicate the following:

(i) addendum;
(ii) dedendum;
(iii) circular pitch;
(iv) top land;
(v) bottom land;
(vi) flank.

(6 marks)

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