



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

**UNIVERSITY EXAMINATIONS FOR THE DIPLOMA IN MARINE
ENGINEERING (TVET)**

1ST YEAR 2ND SEMESTER 2023/2024 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TDM 2121

COURSE TITLE: ENGINEERING DRAWING

EXAM VENUE: STREAM: Dip Marine Eng

DATE: ../04/2024 EXAM SESSION:

DURATION: 2 HOURS

Instructions

- 1. Answer question 1 (Compulsory) and ANY other three questions**
- 2. Candidates are advised not to write on question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE (40 MARKS)

- a) Define the term CAM (2 Marks)
- b) State three classifications of profiles (3 Marks)
- c) State three types of curves as used in Engineering Drawing (3 Marks)
- d) Differentiate between major diameter and minor diameter of a screw thread. (4 Marks)
- e) State three types of rolling element bearings commonly used in machinery. (3 Marks)
- f) Differentiate between rolling element bearings and sliding bearings. (4 Marks)
- g) Define the term module in gear terminology. (2 Marks)
- h) Briefly describe the difference between circular pitch and diametral pitch. (4 Marks)
- i) State three importance of limits and fits (3 Marks)
- j) Describe how limits and fits are applied in mechanical engineering (3 Marks)
- k) Describe three types of marine plants (6 Marks)
- l) Draw a ladder diagram of a NAND Gate (3 Marks)

QUESTION TWO (20 MARKS)

a) Draw the cam profile with the following conditions:

- i. Follower type = Knife edged, in-line;
- ii. lift = 50mm;
- iii. base circle radius = 50mm;
- iv. out stroke with SHM, for 600 cam rotation;
- v. dwell for 450 cam rotation;
- vi. return stroke with SHM, for 900 cam rotation;
- vii. dwell for the remaining period.

Determine max. velocity and acceleration during out stroke and return stroke if the cam rotates at 1000 rpm in clockwise direction. (20 Marks)

QUESTION THREE (20 MARKS)

a) Draw a full-sectional view right-hand V-screw thread to scale 1:1 provided that the shank length is 60 mm with an M40 mm single-start internal of a 4 mm pitch. The outside diameter of the nut is 50 mm. (10 Marks)

b) Draw an outside front view of a right-hand square thread according to conventional representation and a scale of 1:1 using the following details:

- | | | |
|-------------------------------|--------|------------|
| i. Length of the screw thread | 140 mm | |
| ii. Nominal diameter | 60 mm | |
| iii. Pitch | 20 mm | (10 Marks) |

QUESTION FOUR (20 MARKS)

a) Explain the significance of thread angle in screw thread design. (2 Marks)

b) A pair of gears has been designed with a velocity ratio of 3.20. The pinion has 20 teeth and the circular pitch is 78.54 mm. Determine:

- i. The number of teeth on the driven gear.
- ii. The module for the gears.
- iii. The theoretical centre distance (6 Marks)

c) Sketch the symbols of the following electrical components

- i. Resistor
- ii. Capacitors
- iii. Inductors

- iv. Transformers
- v. Semi-conductor diodes
- vi. Bipolar junction transistor

(12 Marks)

QUESTION FIVE (20 MARKS)

- a) Redraw the following diagrams using AutoCAD and print using A4 paper size
(20 Marks)

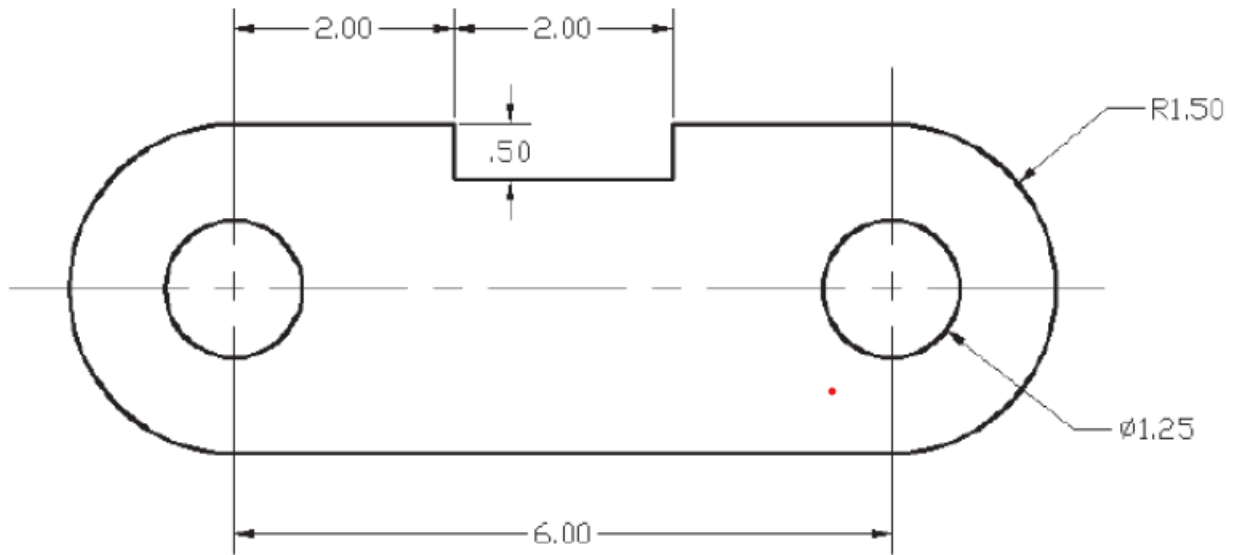


Figure 1

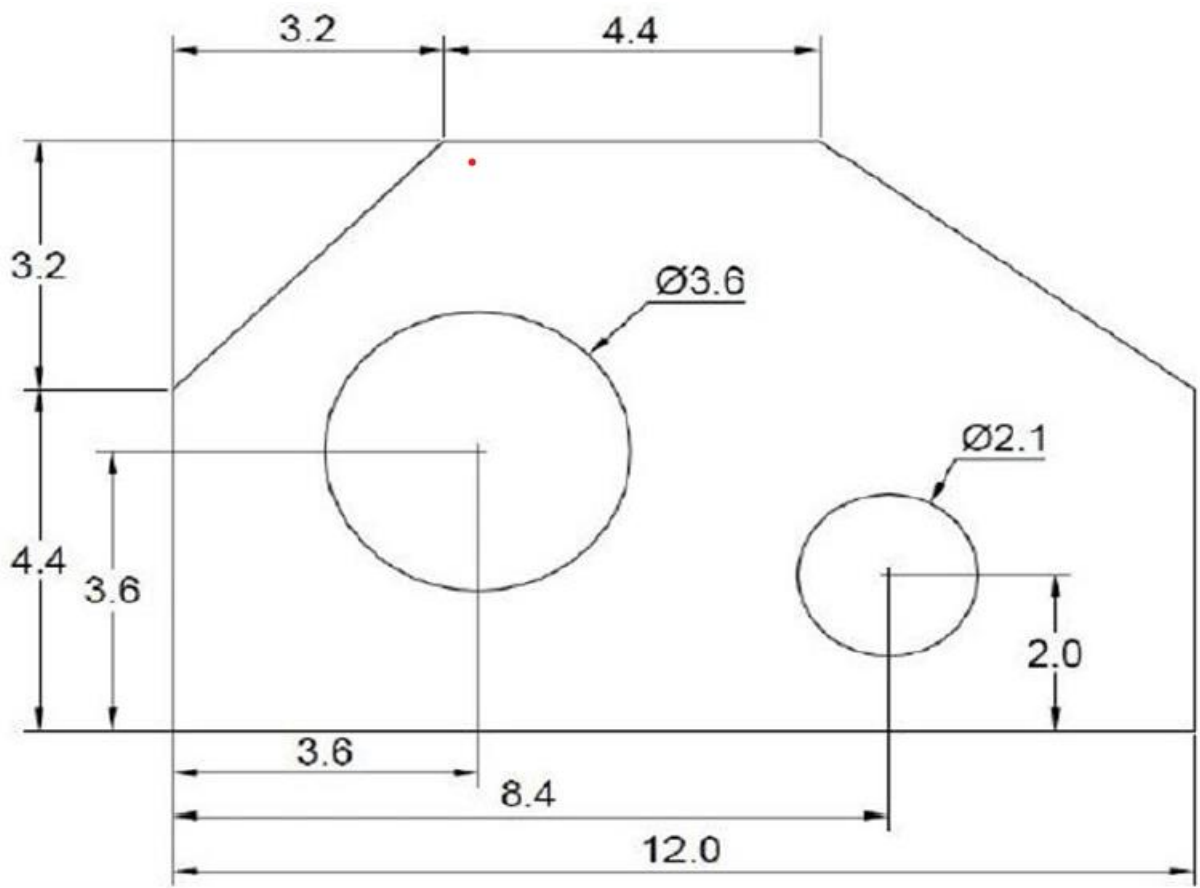


Figure 2