



Dedan Kimathi University of Technology
University Examinations 2020/2021

First Year Second Semester for the Degree of Master of Science in
Machine Tool Design & Manufacturing Engineering

EMM 6105 CNC Programming

DATE:

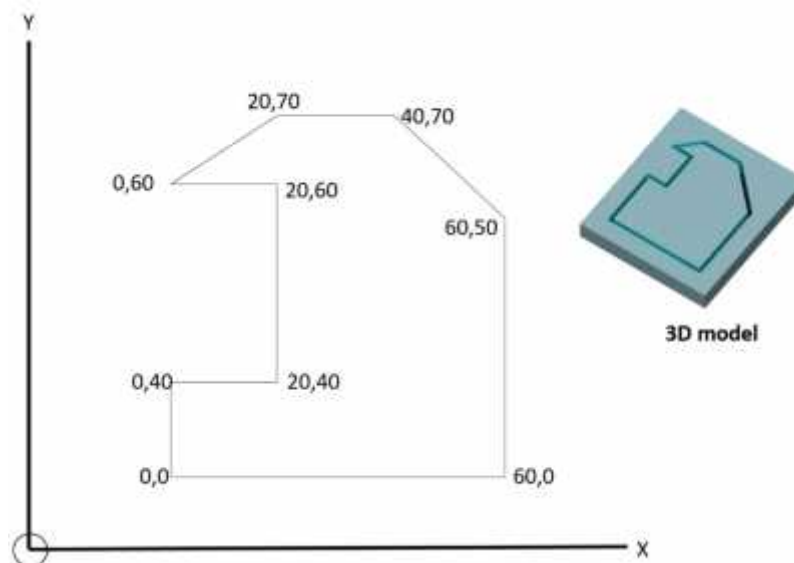
TIME: 3 Hours

Instructions:

1. Answer **Question ONE** and any other **TWO** questions
2. Use sketches, flow charts and illustrations where necessary
3. Marks will be awarded for detailed explanations to the questions, critical thinking and creativity.

QUESTION ONE (30 MARKS)-Compulsory

- a) Describe the two common methods of CNC part programming [4 Marks]
- b) Describe the following terms as relates to CNC programming: Character, word, block, and programme [4 Marks]
- c) Define the following terms as it relates to CNC programming: Zero point; machine zero; work zero; and zero shift. [4 Marks]
- d) Write a CNC program to machine the following profile on a CNC milling machine. Use absolute cartesian system and assume a thickness of 20 mm of the block. [7 Marks]



- e) The following is a sample CNC lathe programme. You are required to explain the meaning of each line of the programme. [11 Marks]

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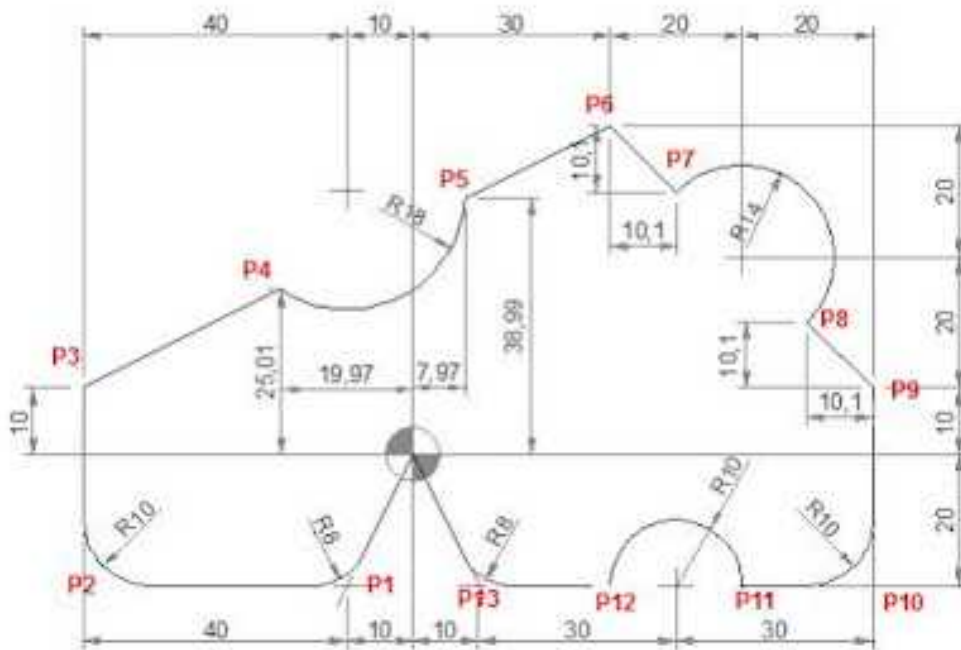
Programme

G28;
G53 G00 X-3. Z-4;
T101;
G50 S2000;
G97 S1146 M03;
G54 G00 X1.5 Z.02 M08;
G96 S450;
G00 Z1. M09;
G28;
G53 G00 X-3. Z-4. T0;
M30;

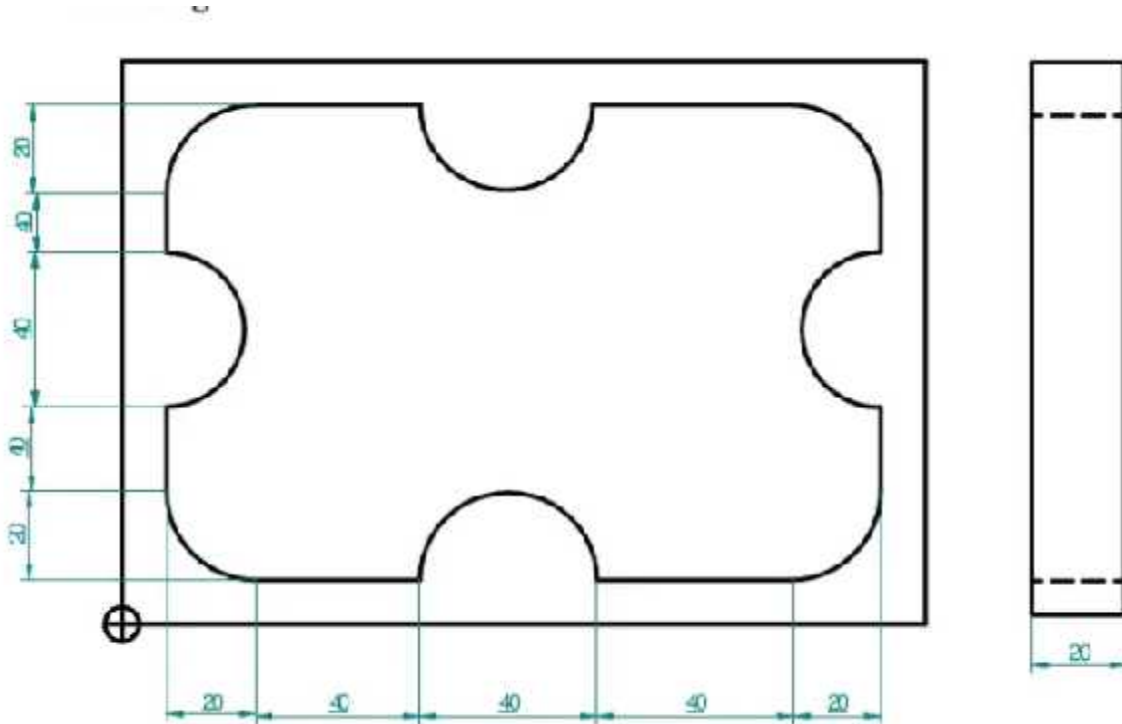
Explanations

QUESTION TWO (20 MARKS)

- a) Write a CNC program for the toolpath during CNC milling of the component below. Use the absolute CNC programming mode. P1 is the starting point of the tool while P13 is the last point of the tool. [10 Marks]



- b) Prepare a CNC part program to mill the component represented in the following drawing. [10 Marks]



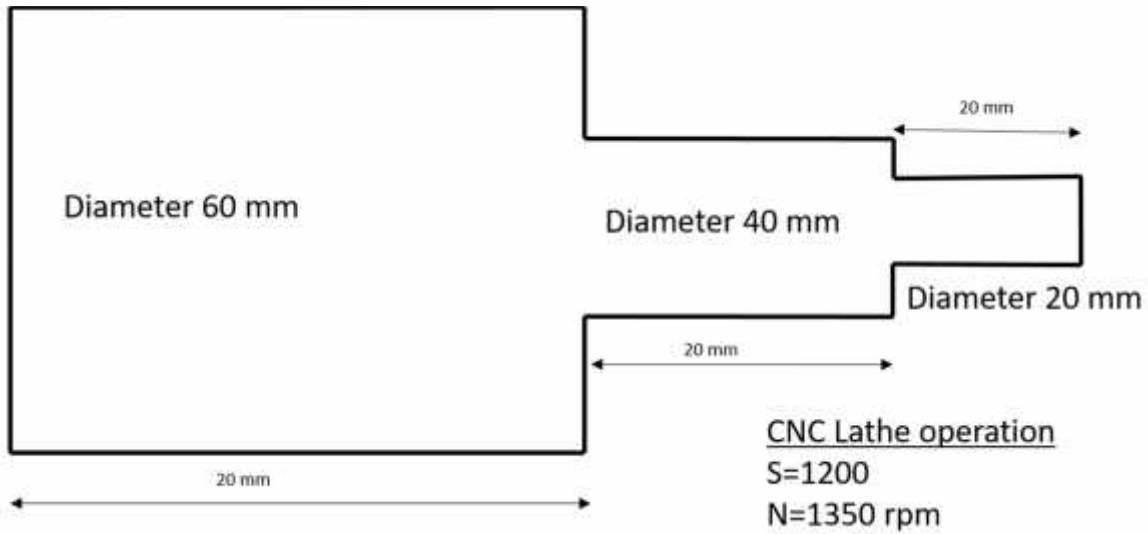
QUESTION THREE (20 MARKS)

Design a mold for injection molding of the plastic bottle cap shown below in any CAD software available. Then, describe the procedure of generating the CNC program for CNC part milling of the mold in a CAD software. Generate the CNC part program for the mold and provide it together with the mold design. [20 Marks]

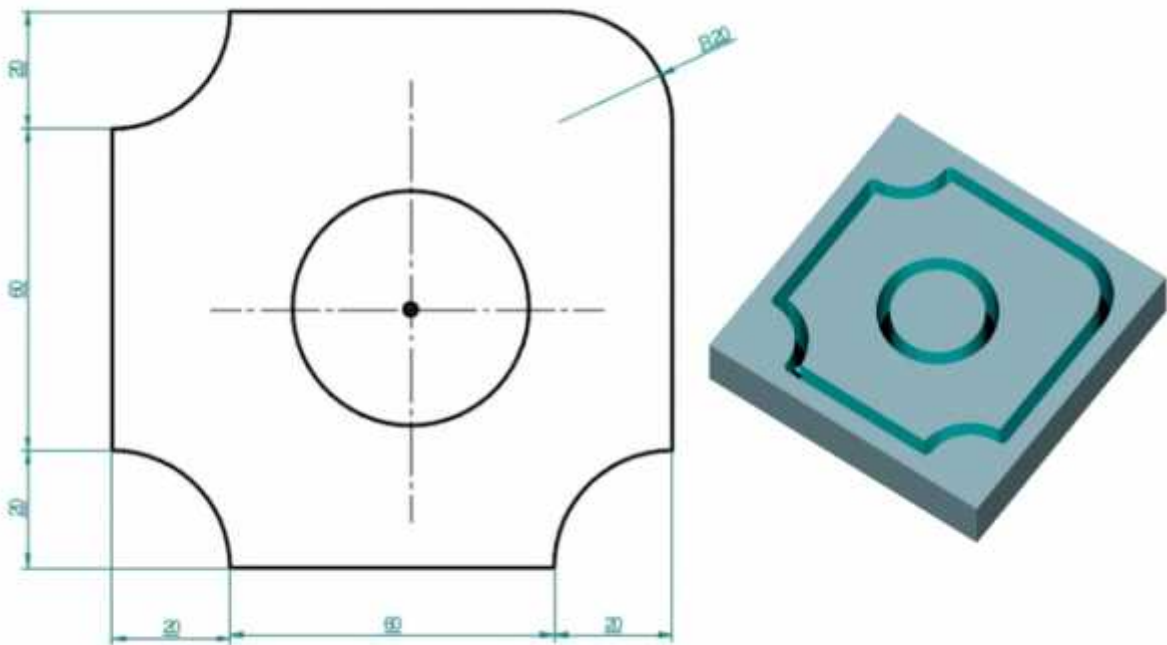


QUESTION FOUR (20 MARKS)

(a) Write a CNC part program for machining of the stepped shaft shown in the figure below on a lathe machine. [10 Marks]

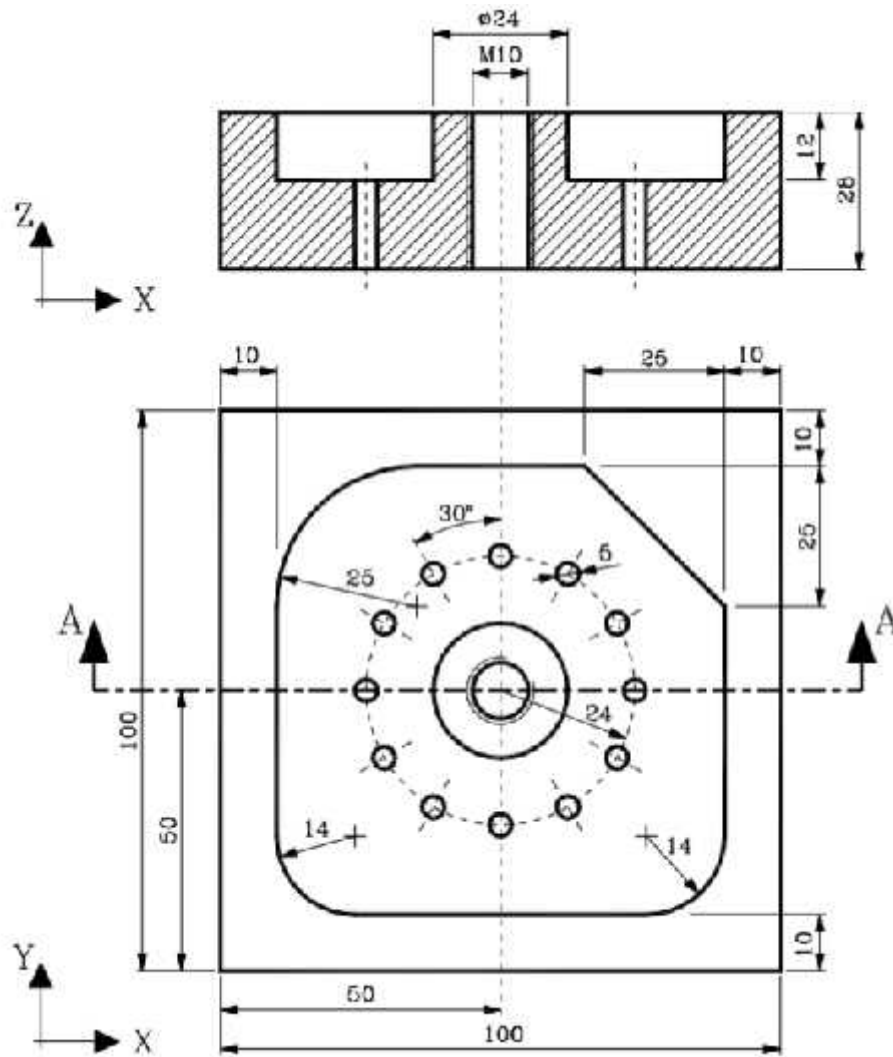


(b) Write a CNC program for the milling of the part shown below. The 3D model of the part is also shown.



QUESTION FIVE (20 MARKS)

Write a CNC part program for machining of the 2D pocket shown in the Figure below on a CNC milling machine. The dimensions are clearly indicated on the drawing.



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