MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

ARTISAN CERTIFICATE IN:

MOTORCYCLE MECHANICS,

ELECTRICAL INSTALLATION,

GARMENT MAKING,

FOOD AND BEVERAGE

APPLIED GEOMETRY

DATE: 15/12/2020 **TIME: 11.30-2.30 PM**

INSTRUCTIONS TO CANDIDATE

You should have drawing papers size A3 and drawing instruments for this examination.
This paper consists of FIVE questions.
Answer ALL the questions.
All dimensions are in millimeters.
Do NOT erase construction lines.
All questions MUST be answered on the paper provided.

1. a) Construct a regular pentagon with a circle of radius 70 mm. The corners of the pentagon must lie on the circumference of the circle. (6 marks)

   b) Draw an ellipse whose major and minor axes are 80 mm and 50 mm respectfully. (6 marks)

   c) Draw a cycloid for a circle 60 mm diameter rolling on a straight line for one revolution. (6 marks)

   d) Construct an equilateral triangle with a base length of 50 mm. (2 marks)

2. Figure 1 shows views of a machine block drawn in First angle projection. Draw the isometric view of the block, taking corner X as the lowest point. (20 marks)

3. Figure 2 shows the elevation and an incomplete plan view of a pentagonal based pyramid which is cut as shown. Copy the given views and:
   a) complete the plan,
   b) construct the surface development of the lower part of the cut pyramid. (20 marks)

4. Figure 3 shows an isometric view of a machine component. Draw full size, orthographic views of the component in first angle projection. (20 marks)

5. a) Figure 4 shows views of component drawn in Third angle projection. Make a free-hand sketch of the component. (10 marks)

   b) Figure 5 shows an irregular pentagon. Draw a similar pentagon with the sides increased in the ratio of 5:7 of the original side length. (5 marks)

   c) Draw a common external tangent line to two circles of diameters 40 mm and 60 mm and whose centres are 90 mm apart. (5 marks)