NAME: _____

YEAR: _____

<u>**QUESTION :1**</u>   (**15 marks**)

Given below is a sketch of a latest design **trophy** which will be used for Vunivilo Rugby Competition.

Draw and combine all the 5 members using the appropriate methods and skill learnt in class.

   a) Draw Part A which is **Elliptical** in shape.(Use points 10 - 11 for Major Axis &
       12 – 13 for Minor Axis. Locate Focal points F and F1   (7 marks)

   b) Label **Part B** and **C** as **EARS**.   (1 marks)

   c) Construct an **Equilateral** triangle for Part D.   (2 marks)

   d) Construct the **Regular Hexagon** for part E and **Reduce** it to a scale of **6:4**   (5 marks)

Elliptical

Circles B & C
RADIUS 7mm

Equilateral Triangle

Regular Hexagon

SKETCH : NTS

15
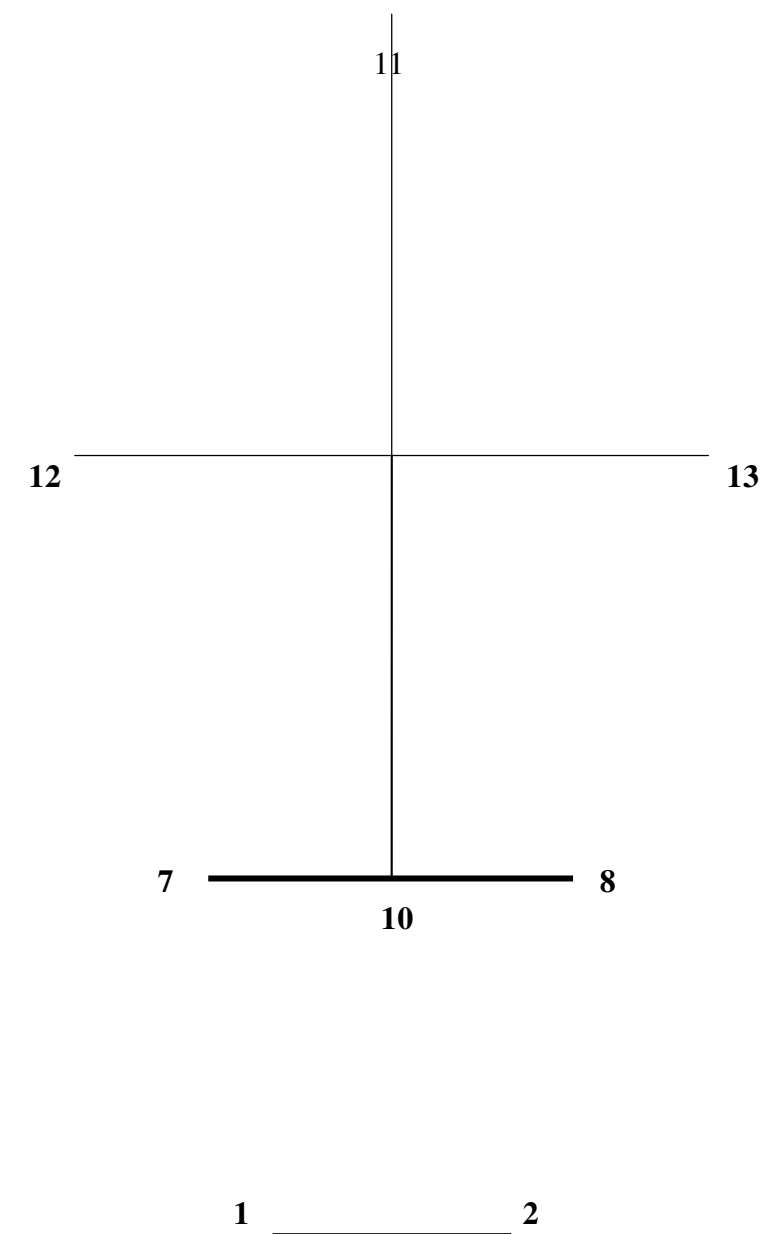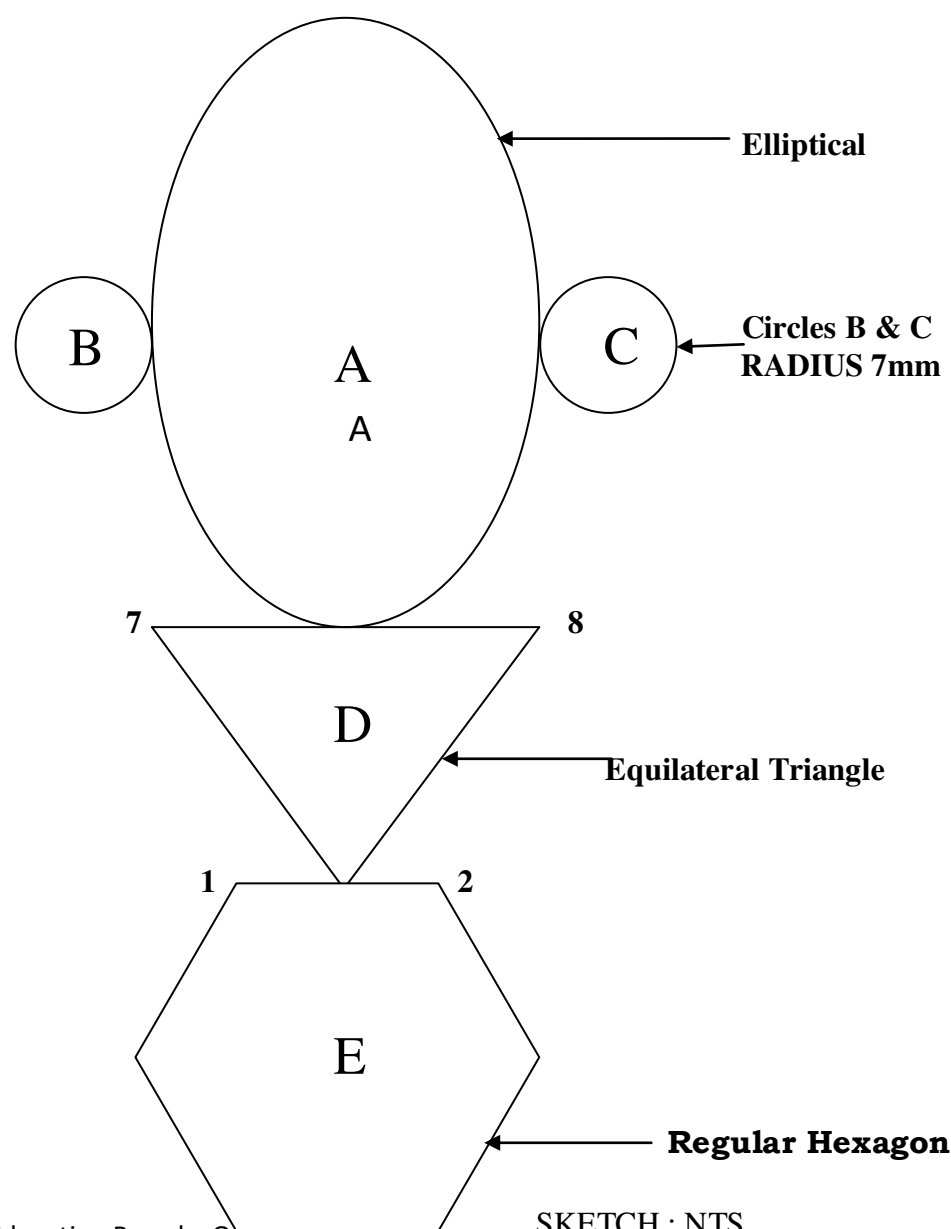
QUESTION 2   **(15 marks)**

Given: A Circle 'A' rolls on the base line as shown below. Point **'W'** is on the circle **'A'** and traces a curve as

       circle **'A'** makes three quarters of a revolution on the base line.   (7 marks)

Required: a) Divide the circle into twelve parts.   (1 marks)

         b) Draw the path traced by point **'W'** and **'X'** respectively   (5 marks)

         c) Name the curve traced by point **'W'**   _____   (1 mark)
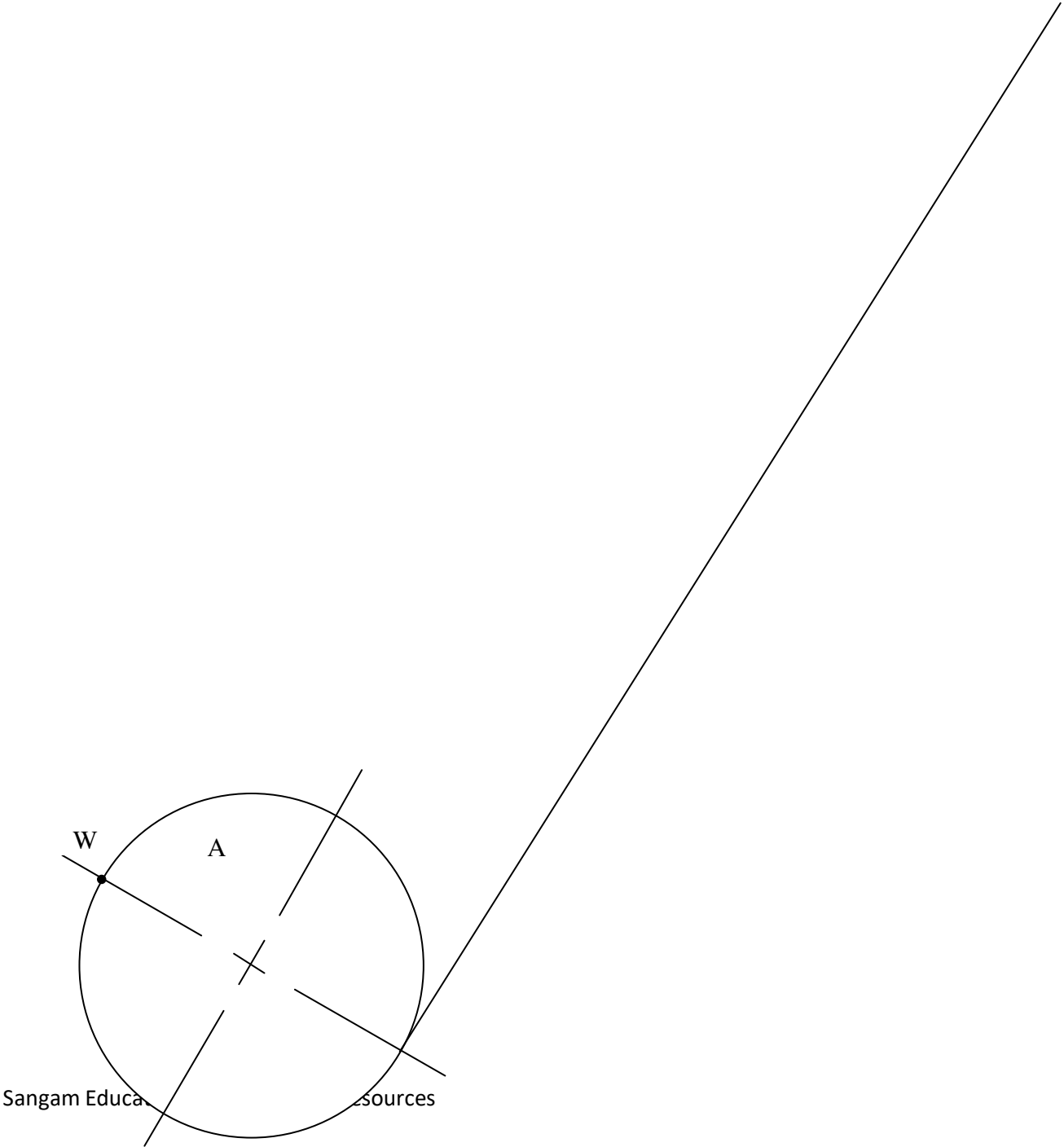
(b)**Given:** The sketch of a 'Bottle Opener is given below.

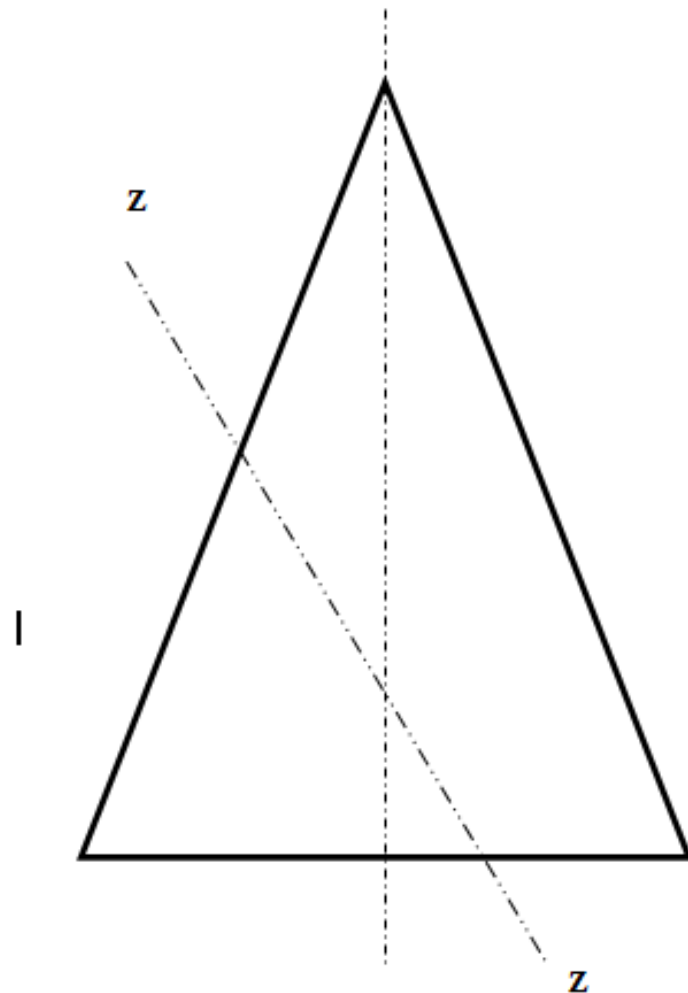   **Required**: Draw the Opener using the appropriate method of construction.   (8marks)
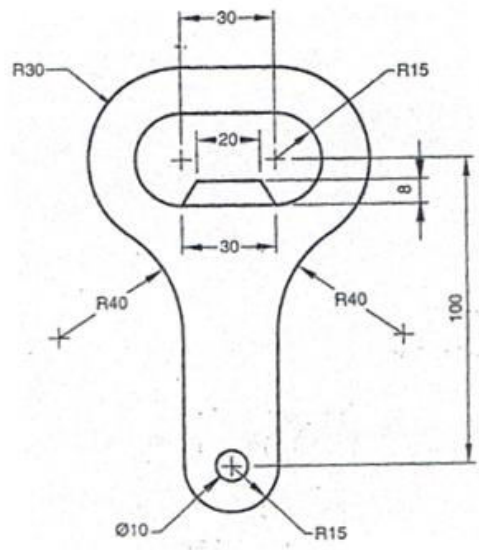
QUESTION 3   **(15 marks)**

(a) GIVEN   : The elevationof a cone cut by a cutting plane **Z-Z**.

     REQUIRED: (i)   Construct a **focal sphere**, **focal point**, **vertex** and directrix.   (3 marks)

                  (ii)   Project the true shape.   (4 marks)

                  (iii) Calculate the eccentricity and name the conic section

                      produced.   (2 marks)

(b). To construct a plain reduction scale of 1:50 that can read up to 4m.

     Calculate the scaled length.   (1 mark)

                     Scaled length = ……………….

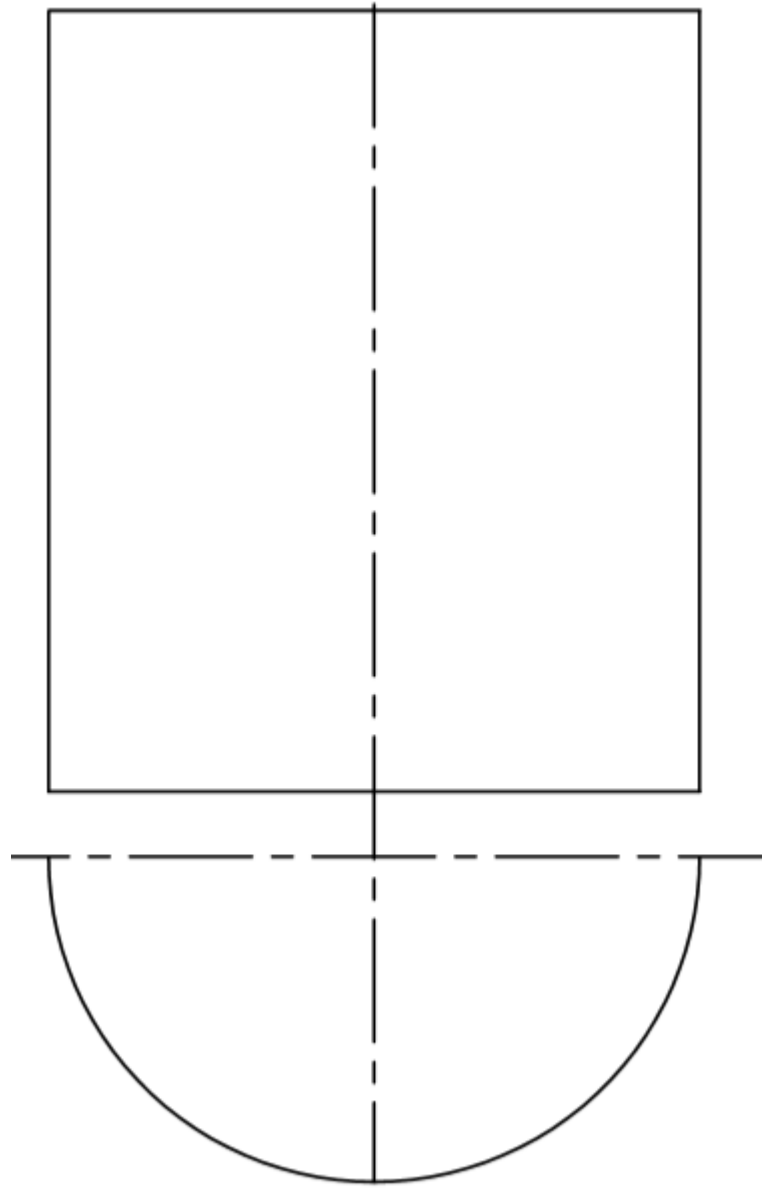(i)   Find the number of parts the length needs to be divided into.   (1 mark)

                     No: of parts = …………

(ii)   Complete the scale construction.   (4 marks)

QUESTION 4   **(15 marks)**

 Given: The plan and elevation of a helix.

Required:(a) Construct a simple Left hand helix for 1 ¼ revolutions.   **(8 marks)**

         (b) Find the Pitch Length: _____ mm   **(1 mark)**

(b).**GIVEN:** The Regular pentagon   **(6 marks)**
    REQUIRED :(i) Write down the **six** steps in constructing the regular pentagon

Step 1_____
_____

Step 2_____
_____

Step 3_____
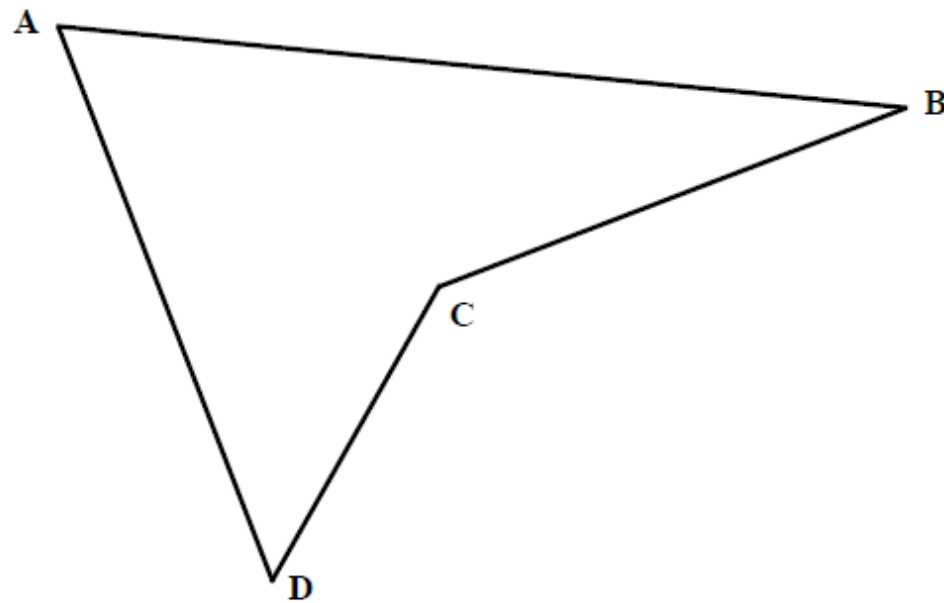_____

Step 4_____
_____

Step 5_____
_____

QUESTION 5
(a). **Given:** A quadrilateral **ABCD** is shown below.   (4 marks)
   Required: Find the centroid of the quadrilateral and label it **O**.

(b)**Given:** Circle **A** and circle **B** with unequal radius .   (4marks)
   Required: construct an internal tangent to circle A and B

(b).GIVEN: The figure shows the design of a remote control car. Also shown in a small graphic of a car and aerial. **AB** is the major axis of the ellipse and aerial is a normal to the ellipse at **P.**   **(5marks)**
REQUIRED: Construct the following:
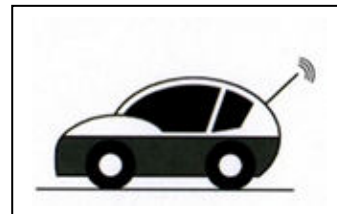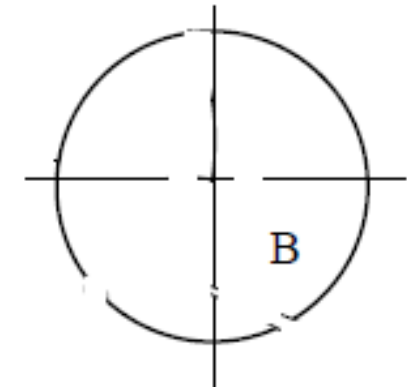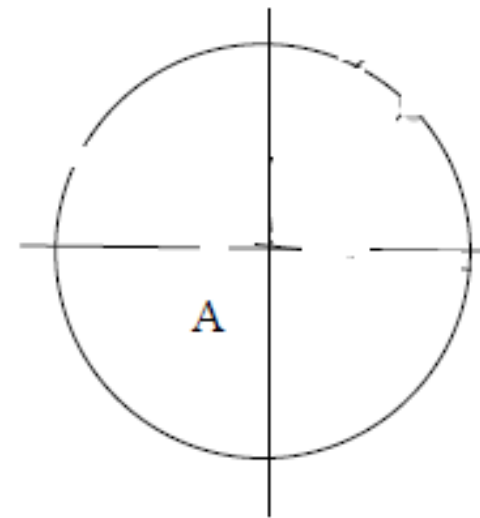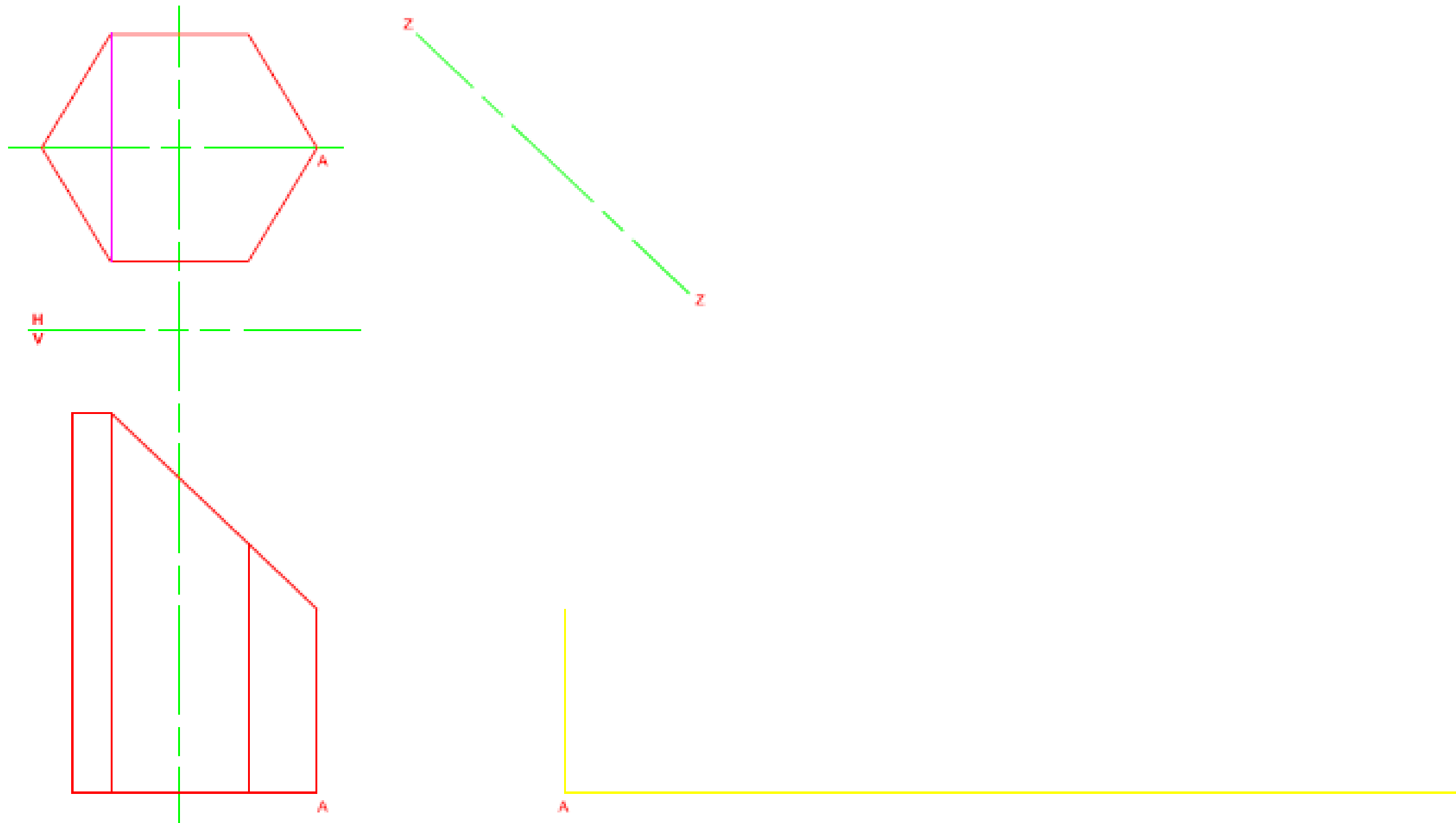   (i)   The Focal points.   **(1mark)**
      (ii)   The ellipse.   **(3marks)**
      (iii) A normal to the ellipse at point **P**.   **(1 marks)**

GIVEN: The sketch and 3rd angle orthographic of a truncated hexagonal prism
which has been cut at 45°

REQUIRED: (i). complete the sectional plan.   **(4marks)**
(ii) Project the true shape on the given Centre line. **(4marks)**
(iii)Draw the development of the truncated Prism.   **(7marks)**

QUESTION:7

(a) **Given:** The **axis, focal points** and a **point P** which falls on the ellipse.
      Required:(i) Find the **major and the minor axis**.   (2 marks)
              (ii) Construct the ellipse.   (3 marks)
              (iii) Draw a **Tangent** and **Normal** at **point P**.   (2 marks)
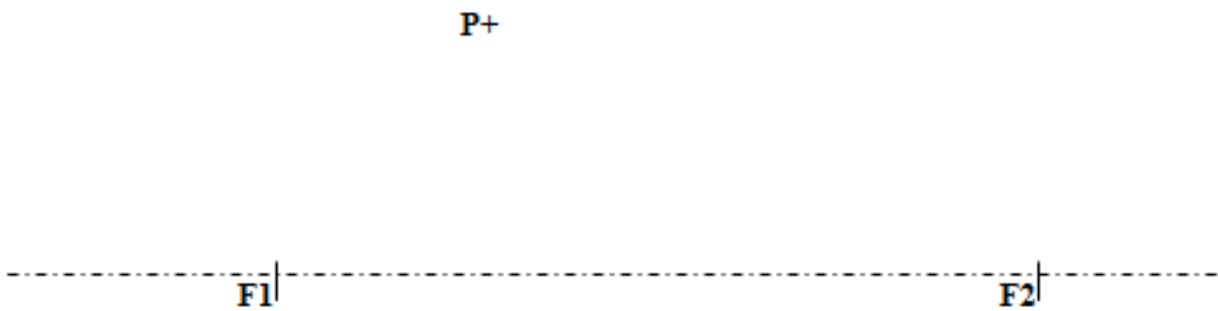
(b) GIVEN: The ellipse and Point X on the ellipse
      REQUIRED: Construct the following :
                (i) the Major and Minor axis of the given ellipse.
                (ii) a tangent and normal to the ellipse at point **X**. **(4 marks)**

P+

F1   F2

X
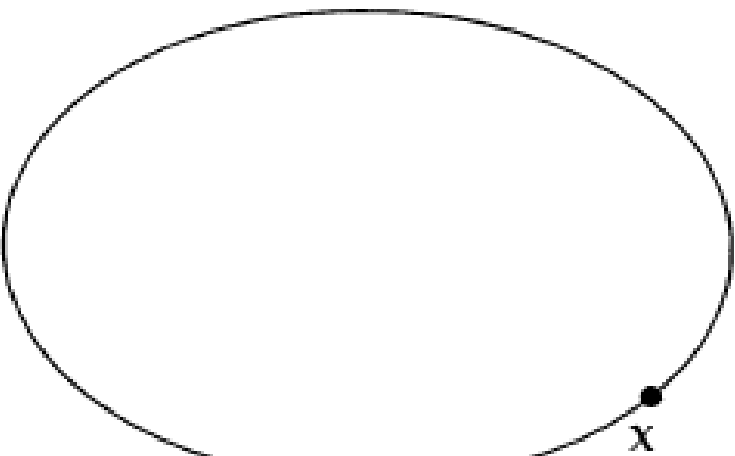
(C). **GIVEN:** :The incomplete elevation of a truncated right cone and the cutting plane X-X
      REQUIRED:(i) Complete the elevation.   **(1 mark)**
                    (ii) Locate and label the focal point and the directrix.   **(2 marks)**
                    (iii) Draw and label the focal sphere.   **(1 mark)**

O

X

X

15