

OLLSCOIL NA hÉIREANN, GAILLIMH
NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS, 1999

FIRST ENGINEERING
CIVIL, INDUSTRIAL, MECHANICAL, ELECTRONIC, BIOMEDICAL,
And UNDENOMINATED

ENGINEERING GRAPHICS

Professor A. Cusens;
Professor P. E. O'Donoghue;
Dr. P. Ó hEachteirn.

Time allowed : *Three* hours

Answer *three* questions, including Question 1

Answer all questions on drawing sheets **only**

Use **both** sides of drawing sheets

Do *not* erase construction lines

Inked work is *not* required

3. Draw, full size, the given views of the **TELECOMS BOX** shown in Figure Q3. Draw also the following: (i) an auxiliary view of the inclined surface, (ii) a development of the surface of the **BOX**. Dimension fully.

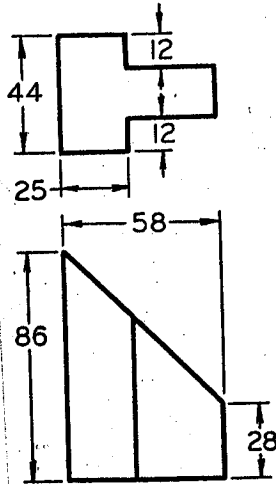


Figure Q3. **TELECOMS BOX**

(25 marks)

4. Draw, full size, the profile of a radial plate cam, rotating anticlockwise, which will cause an overhead vertical follower to reciprocate as follows :

- 000°-060° : 30mm Rise with uniform acceleration
- 060°-120° : 30mm Rise with uniform deceleration
- 120°-150° : Dwell
- 150°-210° : 20mm Rise with near-uniform velocity
- 210°-240° : Dwell, and
- 240°-360° : 80mm Fall with uniform simple harmonic motion

Use a minimum cam radius of 50mm. Use a follower roller diameter of 40mm. The vertical line of the follower is offset 30mm to the right of the cam centre of rotation. Use a smoothing radius of 5mm at the ends of the near-uniform velocity displacement diagram.

(25 marks)

5. (a) With regard to menu-driven 2D computer-aided draughting (CAD) software, explain *briefly* the following commands :

(i) **MIRROR**, (ii) **OFFSET**, (iii) **LAYER**, (iv) **TRIM**, (v) **OBJECTSNAP**.

(b) List the **AutoCAD** commands required to produce the following on screen : an isosceles triangle inscribed in a semicircle, whose diameter is the 200mm horizontal base of the triangle. Place the midpoint of the triangle base at coordinates (100,100).

(c) Distinguish between **2D CAD** and **3D geometrical modelling CAD**.

(d) For each of the various **3D** geometrical model types, show (using sketches and appropriate terminology) the different techniques used to generate them.

(25 marks)