

**TECHNICAL DRAWING**  
**LEAVING CERTIFICATE EXAMINATIONS 2001**

**PAPER II A**  
**“ENGINEERING APPLICATIONS”**

**ORDINARY LEVEL**

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**MARKING SCHEME**

QUESTION 1		100 MARKS
QUESTION 2		50 MARKS
QUESTION 3		50 MARKS
QUESTION 4		50 MARKS
QUESTION 5	SECTION A	50 MARKS
	SECTION B	50 MARKS

ANSWER QUESTION 1 AND ANY TWO OTHERS

MAXIMUM MARKS AWARDED 200

**QUESTION 1****100 MARKS****CONCEPTS**

(a)	Assembly	4 marks
(b)	Elevation	30 marks
(c)	Sectional Elevation	41 marks
(d)	Additional Requirements	25 marks

**1A ASSEMBLY****4 marks**

(i)	Pin to pulley	1
(ii)	Pin and pulley to bracket	1
(iii)	Washer to pin	1
(iv)	Hex. nut to pin	1

**1B ELEVATION****30 marks****1. Bracket****14 marks**

(i)	Right angle vertical	2
(ii)	Right angle horizontal	2
(iii)	Boss	2
(iv)	Rib	2
(v)	Left triangular face	2
(vi)	Right face	2
(vii)	Circular face	2

**2. Washer****2 marks**

(i)	Circle	2
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**3. Hex. nut****6 marks**

(i)	Six faces	3
(ii)	Top curves (circle)	3

**4. Pin****4 marks**

(i)	Outer circle (diam.)	2
(ii)	Screw Thread	2

**5. Pulley****2 marks****6. Centre lines (x2)****2 marks****1C SECTIONAL ELEVATION****41 marks****1. Bracket****7 marks**

(i)	Bottom Rectangle	1
(ii)	Holes x 3	1
(iii)	Right angle horizontal section	1
(iv)	Right angle vertical section	1
(v)	Triangular web	1
(vi)	Lower section of "eye"	1
(vii)	Top section of "eye"	1

2. Washer 2 marks  
(i) Rectangle 2

3. Hex nut 6 marks  
(i) Faces (in projection) 2  
(ii) Depth 2  
(iii) Top Curves 2

4. Pin 16 marks  
(i) Top Curves 2  
(ii) Flats 2  
(iii) Shoulder 2  
(iv) Pulley Length 2  
(v) "Eye" Length 2  
(vi) Thread before washer 2  
(vii) Thread after nut 2  
(viii) Dome 2

5. Pulley 8 marks  
(i) Boss x 2 2  
(ii) Flats diameter x 2 2  
(iii) Vee section 2  
(iv) Clearance 2

6. Centre Lines 2 marks

**1D ADDITIONAL REQUIREMENTS**

**25 marks**

(i) First or third angle projection 4 marks  
(ii) ISO Symbol 4 marks  
(correct 4 marks)  
(incorrect 2 marks)

(iii) Title Block 3 marks  
(a) Form 1  
(b) Width 1  
(c) Spacing 1

(iv) Dimensioning 4 marks  
(a) Projection lines 1  
(b) Dimension lines 1  
(c) Arrow heads 1  
(d) Figures 1

(v) Presentation 10 marks  
Excellent 10  
Very good 8  
Good 6  
Fair 4  
Poor 2

**QUESTION 2****50 MARKS**

<b>A.</b>	<b>Given view</b>			10 marks
<b>B.</b>	<b>Surface development of pipe B</b>			22 marks
<b>C.</b>	<b>Joint</b>			8 marks
<b>D.</b>	<b>Presentation</b>			10 marks
<b>2A</b>	<b>GIVEN VIEW</b>			10 marks
	(i) Top pipe outline	2		
	(ii) Transition pipe outline	2		
	(iii) Bottom pipe outline	2		
	(iv) Lines of intersection	2		
	(v) Centre line	2		
<b>2B</b>	<b>DEVELOPMENT OF PIPE B</b>			22 marks
	(i) Drawing of semi-circle	2		
	(ii) Division of semi-circle	2		
	(iii) Drawing of generators	2		
	(iv) Projection of diam. to development	2		
	(v) Marking out diam.	2		
	(vi) Projection of lengths of generators	2		
	(vii) Plotting of top curve	2		
	(viii) Drawing of Top Curve	2		
	(ix) Plotting of bottom curve	2		
	(x) Drawing of bottom curve	2		
	(xi) Seam on xx	2		
<b>2C</b>	<b>JOINT</b>			8 marks
	(i) External grooved seam	2		
	(ii) Left hand lap	2		
	(iii) Right hand lap	2		
	(iv) Sketch	2		
<b>2D</b>	<b>PRESENTATION</b>			10 marks
	Excellent	10		
	Very good	8		
	Good	6		
	Fair	4		
	Poor	2		

Note: Indexing to be taken account of under this heading.

**QUESTION 3****50 marks****3A. Cam Profile****30 Marks****3B. Linkage****20 Marks****3A CAM PROFILE****30 Marks**

(a) Cam Profile

15 marks

(b) Displacement Diagram

10 marks

(c) Presentation

5 marks

(a) **Cam Profile**

15 marks

(i) Minimum radius 2

(ii) Camshaft diameter 1

(iii) Maximum radius 2

(iv)  $0^{\circ}$  to  $180^{\circ}$  simple harmonic motion 2(v)  $180^{\circ}$  to  $270^{\circ}$  dwell 2(vi)  $270^{\circ}$  to  $360^{\circ}$  uniform velocity 2

(vii) Direction of rotation 2

(viii) Drawing of profile 2

(b) **Displacement Diagram**

10 marks

(i) Lift or travel 2

(ii)  $0^{\circ}$  -  $360^{\circ}$  divisions 1(iii)  $0^{\circ}$  -  $180^{\circ}$  simple harmonic motion 2(iv)  $180^{\circ}$  -  $270^{\circ}$  dwell 2(v)  $270^{\circ}$  -  $360^{\circ}$  uniform velocity 2

(vi) Drawing of curve 1

(c) **Presentation**

5 marks

Excellent 5

Very Good 4

Good 3

Fair 2

Poor 1

Note: Indexing to be taken into account under this heading.

**3B. LINKAGE****20 Marks**

(a) Line Diagram

3 marks

(b) Locus of D

11 marks

(c) Machine guard

3 marks

(d) Presentation

3 marks

(a) **Line Diagram**

3 marks

(i) Crank OA 1

(ii) Rod CD 1

(iii) Link BC 1

(b) **Locus of D**

11 marks

(i) Locus of A 1

(ii) Division of A 2

(iii) Locus of C 2

- (iv) Plotting of points on C 2
- (v) Plotting of points of D 2
- (vi) Drawing of locus of D 2

**(c) Machine Guard Profile** 3 marks

- Excellent (clearance 15) 3
- Good 2
- Fair 1

**(d) Presentation** 3 marks

- Excellent 3
- Good 2
- Fair 1

Note: Indexing to be taken into account under this heading

**QUESTION 4****50 MARKS**

- |            |                              |          |
|------------|------------------------------|----------|
| <b>(A)</b> | <b>Dimensioned Drawing</b>   | 38 marks |
| <b>(B)</b> | <b>Mechanism</b>             | 6 marks  |
| <b>(C)</b> | <b>Conventional Features</b> | 6 marks  |

**4A DIMENSIONED DRAWING 38 marks****(a) Shape Description 18 marks**

- |        |                |   |
|--------|----------------|---|
| (i)    | Dome on thread | 2 |
| (ii)   | Screw thread   | 2 |
| (iii)  | Under cut      | 2 |
| (iv)   | Taper          | 2 |
| (v)    | Keyway         | 2 |
| (vi)   | Diameter       | 2 |
| (vii)  | Screw thread   | 2 |
| (viii) | Small diameter | 2 |
| (ix)   | Square section | 2 |

**(b) Size Description 17 marks**

- |        |                      |   |
|--------|----------------------|---|
| (i)    | Diameters (x3)       | 3 |
| (ii)   | Lengths (x7)         | 4 |
| (iii)  | Keyway diameter      | 1 |
| (iv)   | Keyway depth         | 2 |
| (v)    | Screwthread metric   | 1 |
| (vi)   | Screwthread pitch    | 1 |
| (vii)  | Screwthread diameter | 1 |
| (viii) | Square Symbol        | 1 |
| (ix)   | Square Size          | 1 |
| (x)    | Undercut             | 2 |

**(c) Presentation 3 marks**

- |       |              |   |
|-------|--------------|---|
| (i)   | Use of datum | 1 |
| (ii)  | Centre lines | 1 |
| (iii) | Dimensions   | 1 |

**4B. MECHANISM 6 marks**

- |                                  |   |
|----------------------------------|---|
| Relief Valve                     | 1 |
| Part 1 Compression Spring        | 1 |
| Part 2 Valve seat                | 1 |
| Part 3 Body                      | 1 |
| Part 4 Pressure adjuster (screw) | 1 |
| Part 5 Locknut                   | 1 |

**4C. ENGINEERING TERMS 6 marks**

- |       |       |   |
|-------|-------|---|
| (i)   | Bush  | 2 |
| (ii)  | Taper | 2 |
| (iii) | Lug   | 2 |

**QUESTION 5 SECTION A**

**50 Marks**

**5A Isometric View**

**38 Marks**

**5B Machine Parts**

**12 Marks**

**5A ISOMETRIC VIEW**

**38 Marks**

**(a) Sectioned View Front**

**13 marks**

- (i) Body left 2
- (ii) Body right 2
- (iii) Hole left 2
- (iv) Hole right 2
- (v) Inside hole 2
- (vi) Top of hole 2
- (vii) Centre lines 1

**(b) Sectioned View Top**

**13 marks**

- (i) Top left 2
- (ii) Top right 2
- (iii) Centre 2
- (iv) Web 2
- (v) Left hole 2
- (vi) Right hole 2
- (vii) Centre lines 1

**(c) Unsectioned View**

**8 marks**

- (i) Web side 1
- (ii) Web front 1
- (iii) Left front face 1
- (iv) Right front face 1
- (v) Left base top 1
- (vi) Right base top 1
- (vii) Side vertical 1
- (viii) Side angle 1

**(d) Presentation**

**4 marks**

- (i) Correct view 2
- (ii) Drawing 2
  - Excellent 2
  - Good 1

**5B MACHINE PARTS**

**12 marks**

**(a) End Cam**

**4 marks**

- (i) Cam face 1
- (ii) Follower 1
- (iii) Drawing 1
- (iv) Indicated movement 1



- (c) **Thread Terms** 4 marks
- (i) Pitch 1
  - (ii) Thread Angle 1
  - (iii) Root 1
  - (iv) Drawing 1

- (d) **Thrust Bearing** 4 marks
- (i) Bearing Surfaces 1
  - (ii) Race 1
  - (iii) Cage 1
  - (iv) Drawing 1

**QUESTION 5**

**SECTION B**

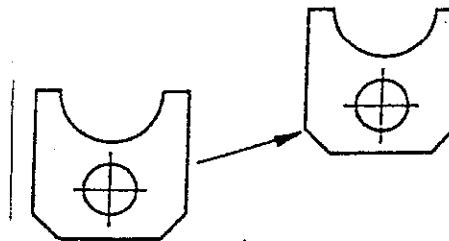
**50 Marks**

- (a) Circle, mirror, break, trim, zoom, fillet, rotate etc. etc. 6 x 2 12 marks
- (b) 0.5 4 marks
- (c)
  - (i) Keep away from magnets 4 12 marks
  - (ii) Store at correct temperature 4
  - (iii) Do not interfere with the metal shutter 4
- (d)
  - (i) Faster rate of producing drawings 10 marks
  - (ii) Constant quality of drawings
  - (iii) Greater accuracy of drawings
  - (iv) Less repetition of drawings 5 x 2
  - (v) Multicolour drawings
  - (vi) Creation of database and library
  - (vii) Less development required
  - (viii) Quicker design calculations and Techniques

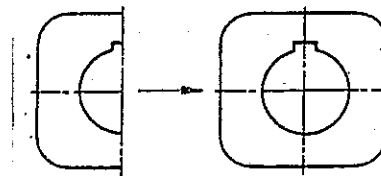
(e) **Commands** **12 marks**

- (i) **Translating:** is the capability to move parts of drawings and redrawing them in the new position to a selected scale. 4
- (ii) **Mirroring:** is the capability to create the reverse image of a feature about the chosen line of symmetry. 4
- (iii) **Duplicating:** is the capability of redrawing a feature or component many times and displaying it in an orderly manner linearly or rotationally. 4

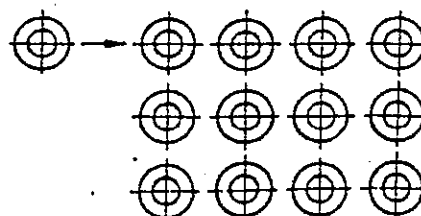
(i) **Translating:**



(ii) **Mirroring:**



(iii) **Duplicating:**



**AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA**

**LEAVING CERTIFICATE EXAMINATION, 2001**

**TECHNICAL DRAWING**

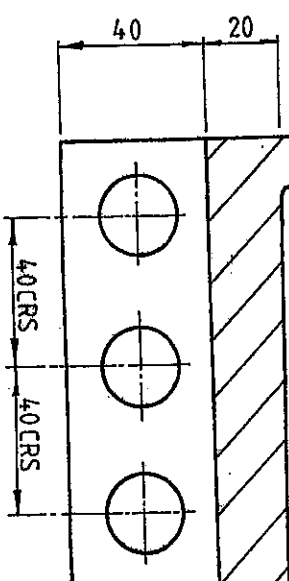
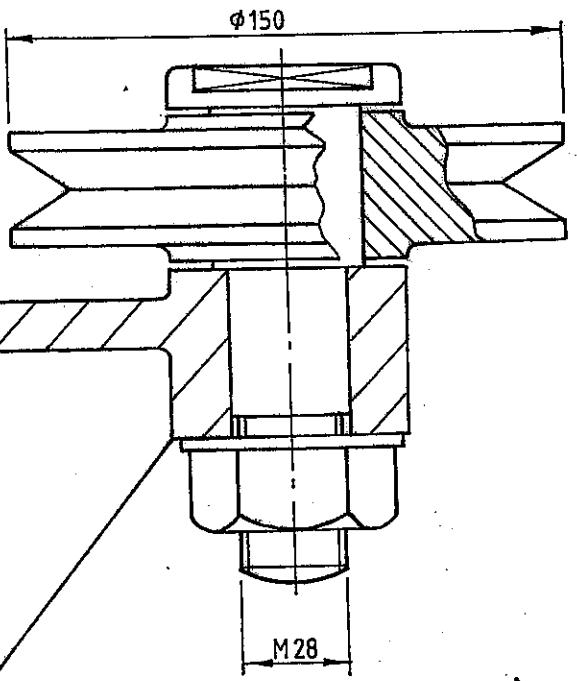
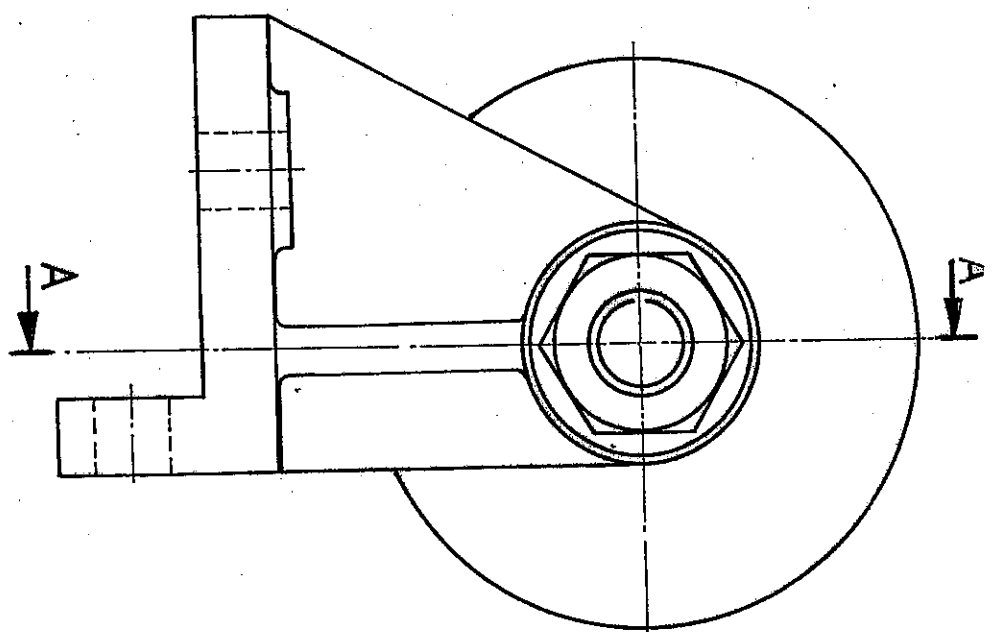
**ORDINARY LEVEL**

**PAPER IIA**

**ENGINEERING APPLICATIONS**

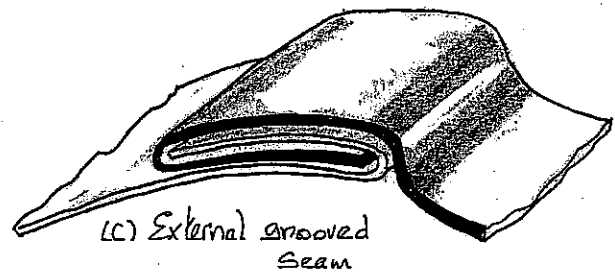
**MODEL ANSWERS**

PULLEY BRACKET

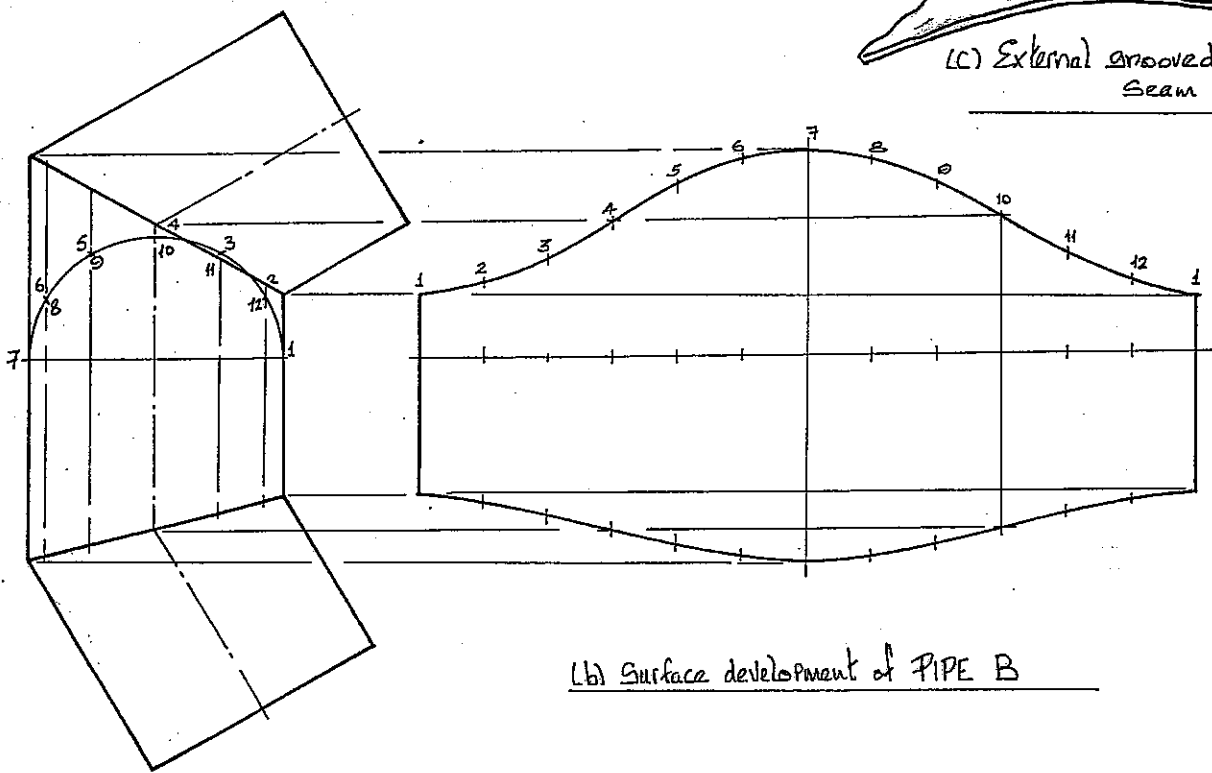


PROJECTION  
TEILGEAN





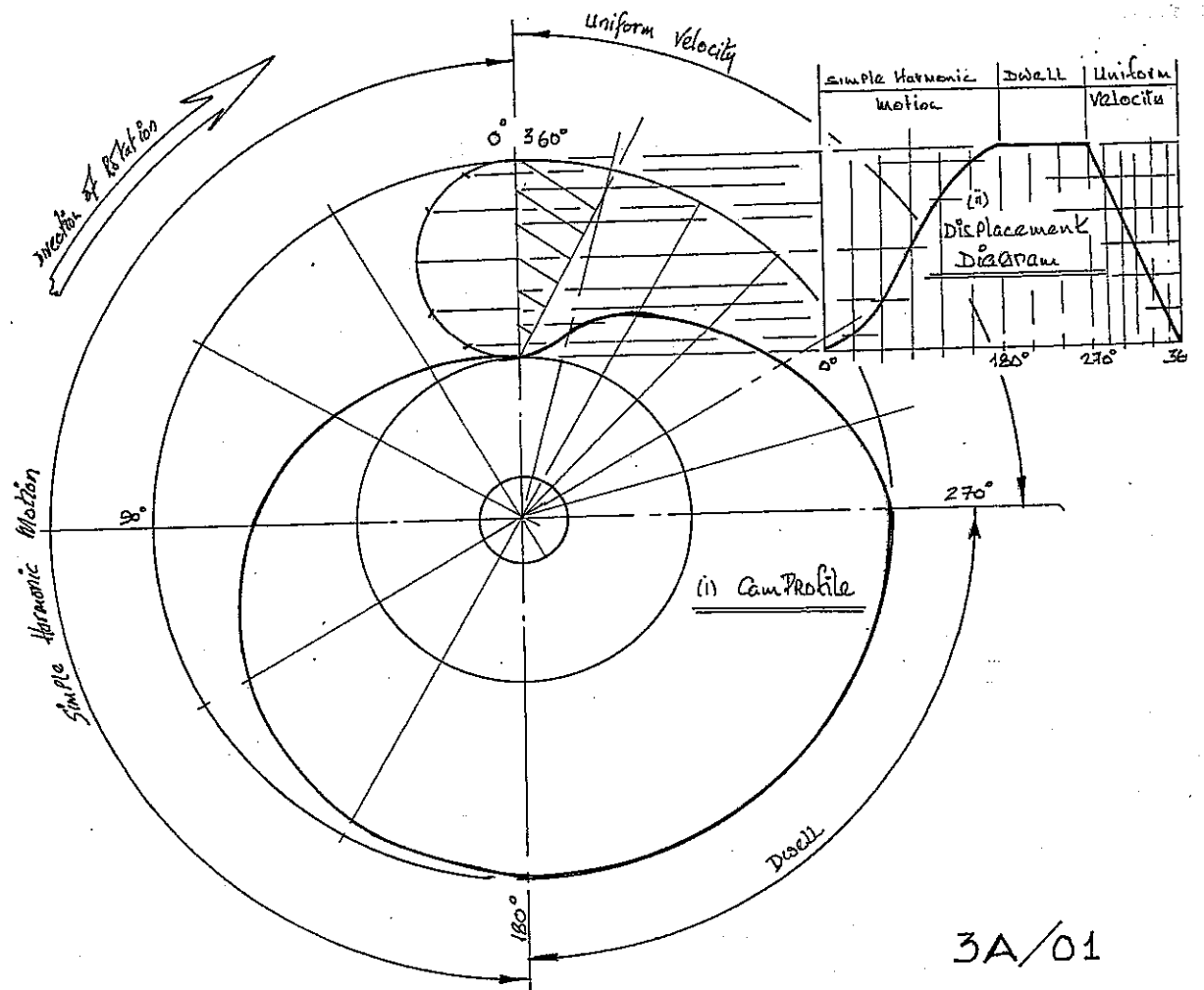
(c) External grooved Seam



(b) Surface development of PIPE B

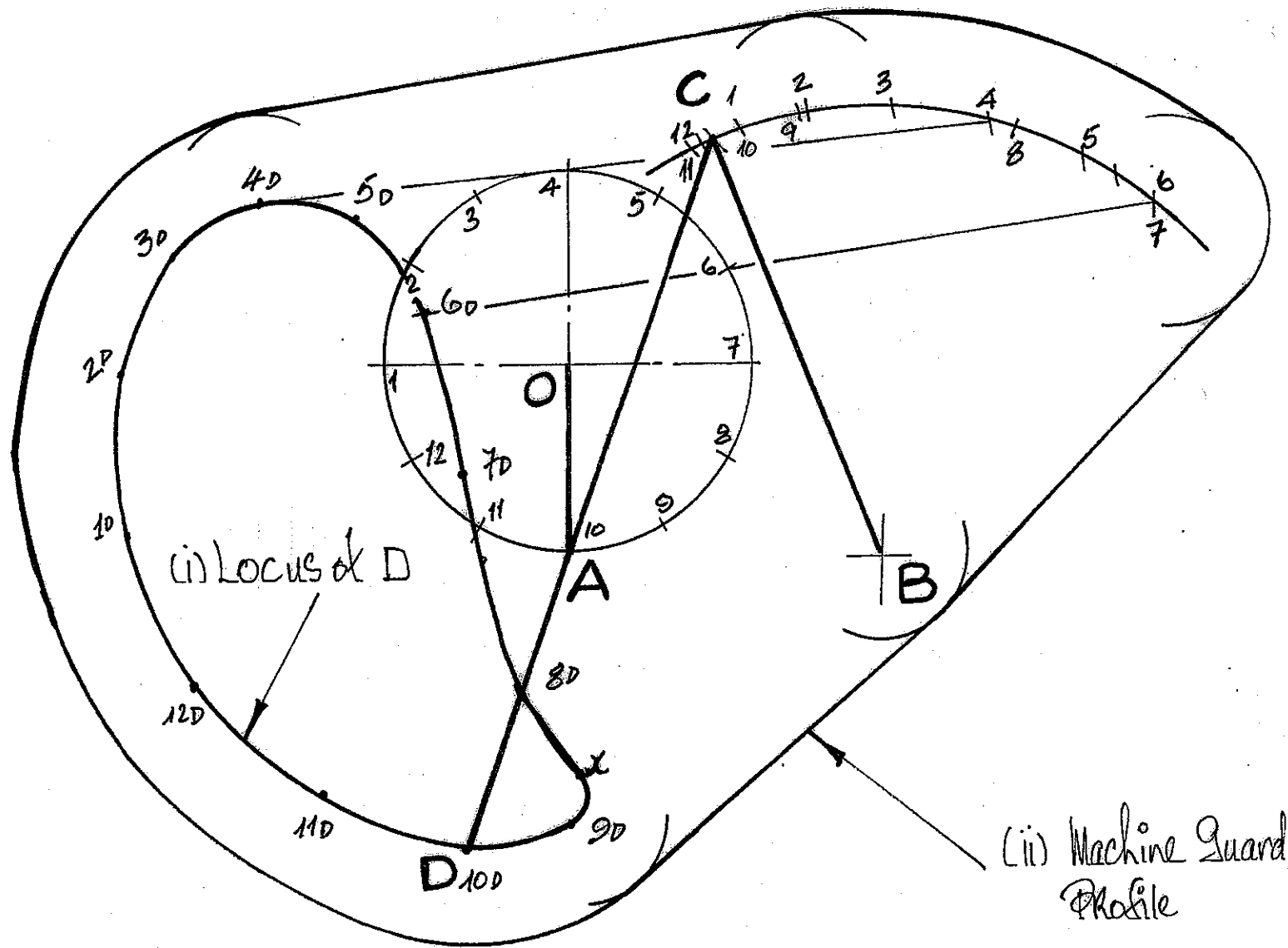
(a) Given View

2/01

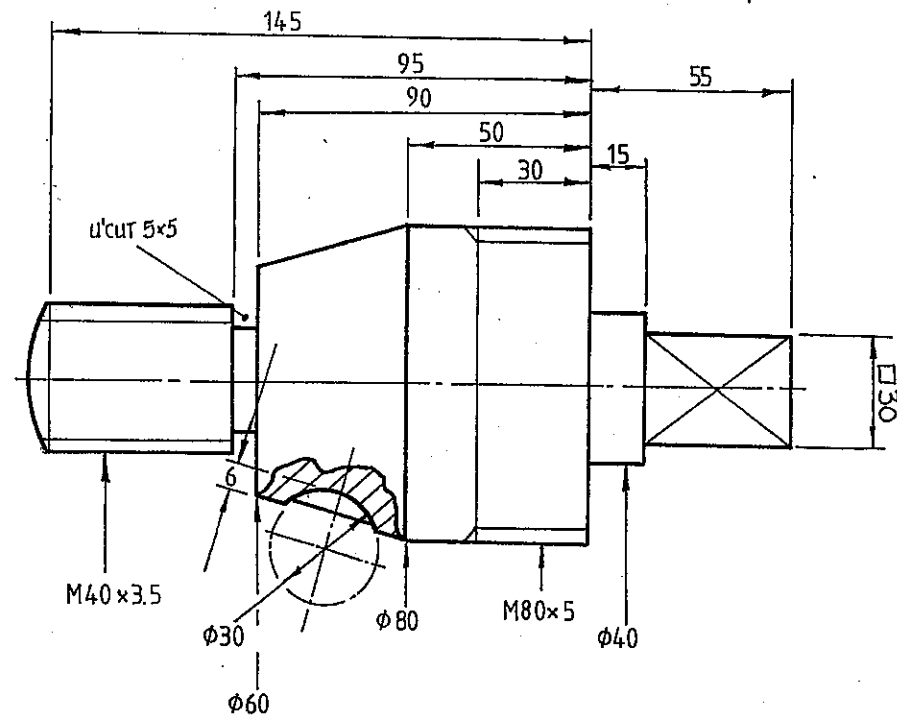


3A/01

3B/01



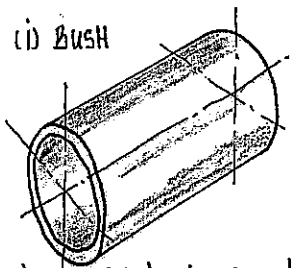
4A/01



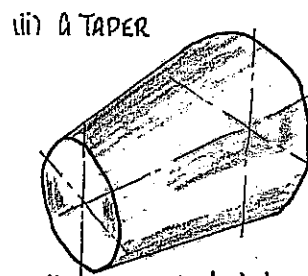
(i) VALVE (RELIEF)

4B/01

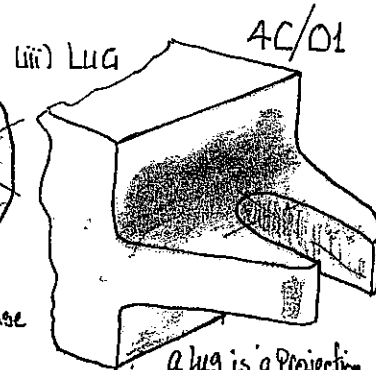
- (ii) 1 - COMPRESSION SPRING
- 2 - VALVE SEAT
- 3 - BODY
- 4 - ADJUSTER SCREW (PRESSURE)
- 5 - LOCK NUT



A bush is a plain bearing supporting a rotating shaft and can easily be replaced when worn out.

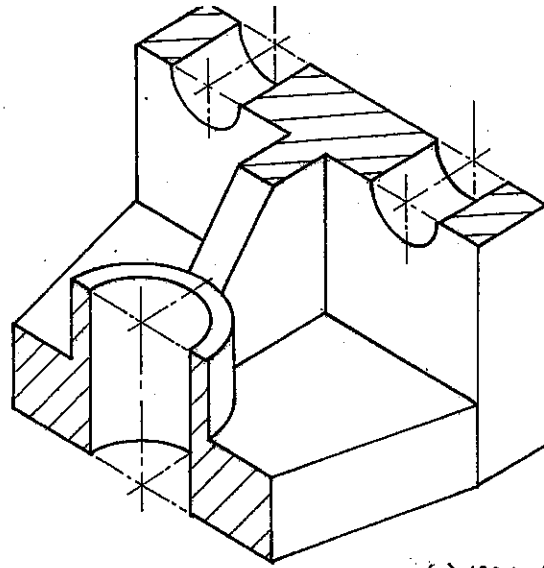


A taper is a gradual change in diameter of a shaft along its length.



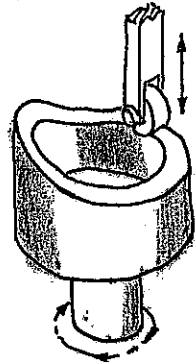
A lug is a projection from a casting - used for fastening and adjusting purposes.



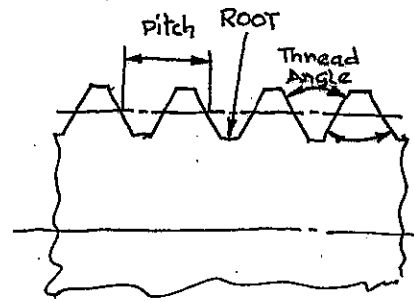


(i) ISOMETRIC VIEW

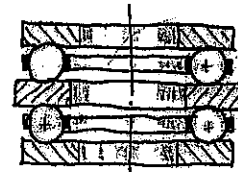
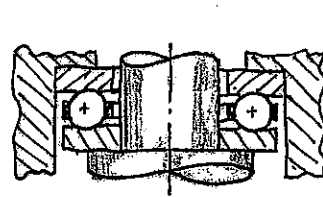
5B/01 (A)



(i) End Cam



(ii) Thread Terms



(iii) Thrust Bearings