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Discover, Learn, and Innovate in Civil Engineering

CONTENTS

ENGINEERING DRAWING II

SHEET NO: 1

(ISOMETRIC DRAWING)

1. 1. DRAW THE ISOMETRIC DRAWINGS FROM THE GIVEN ORTHOGRAPHIC VIEWS IN *FIGURE T1.1A* TO *T1.1F*.

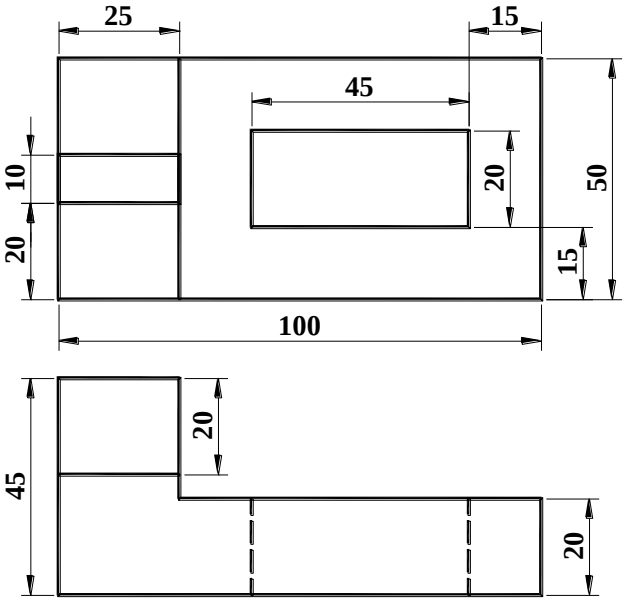


FIGURE T1.1A

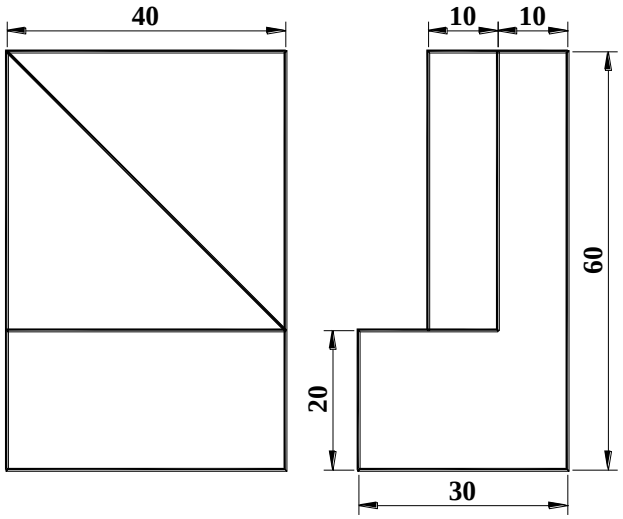


FIGURE T1.1B

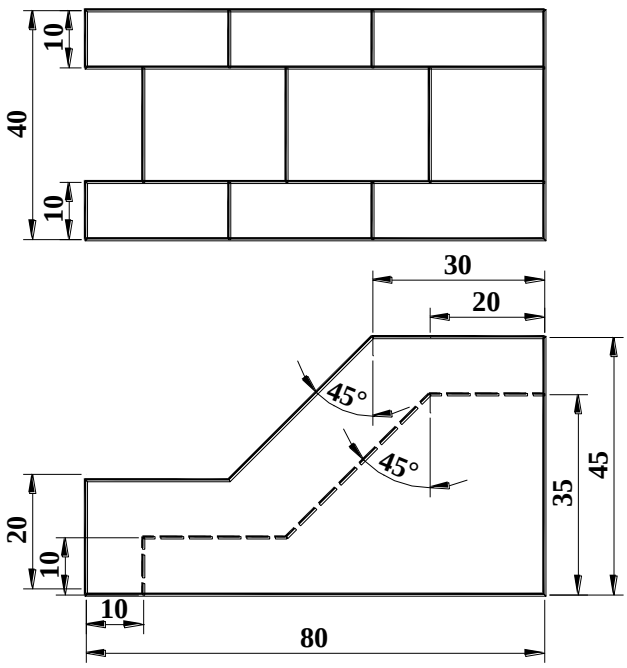


FIGURE T1.1C

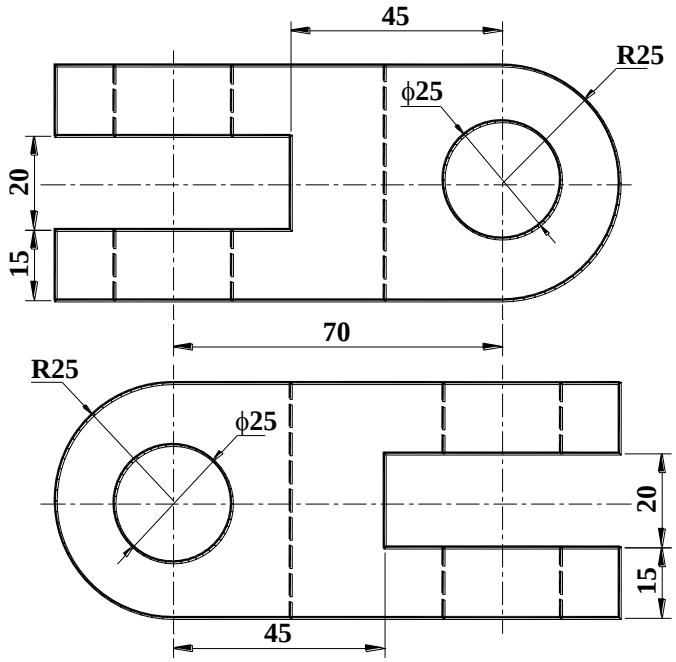


FIGURE T1.1D

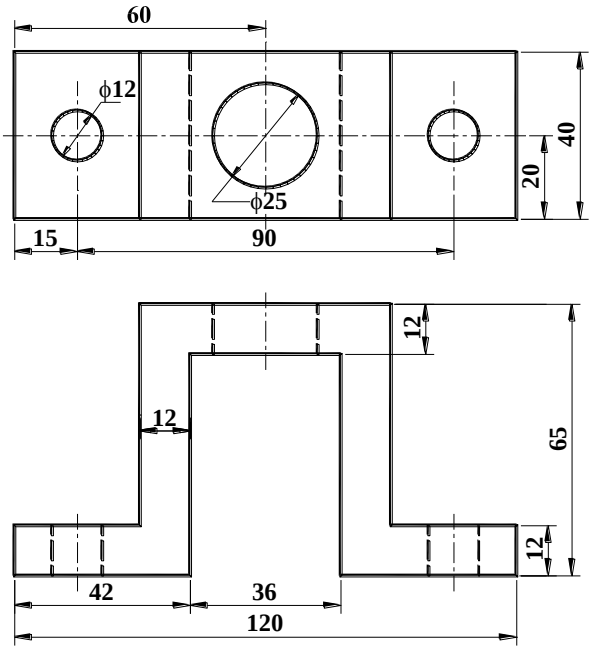


FIGURE T1.1E

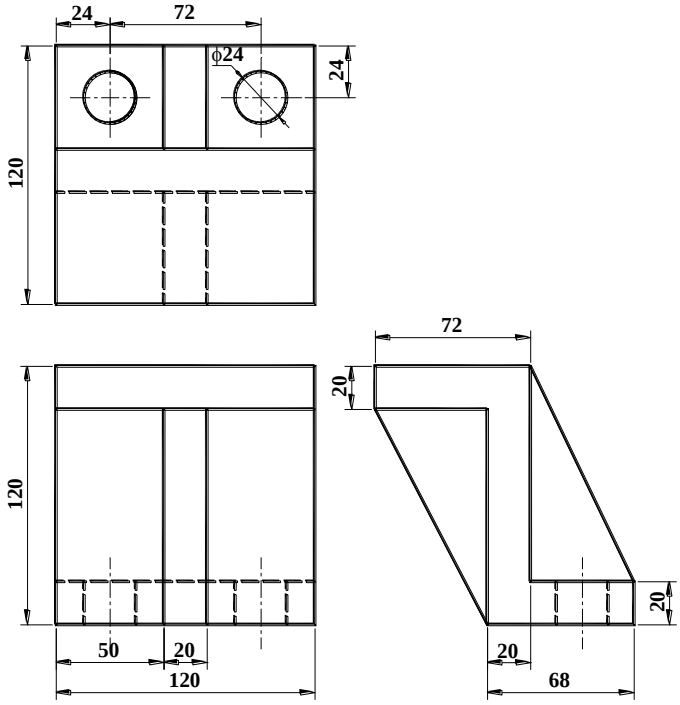


FIGURE T1.1F

2. 2. DRAW THE ISOMETRIC DRAWINGS IN SECTION FROM THE GIVEN SECTIONAL VIEWS IN *FIGURE T1.2A* AND *T1.2B*.

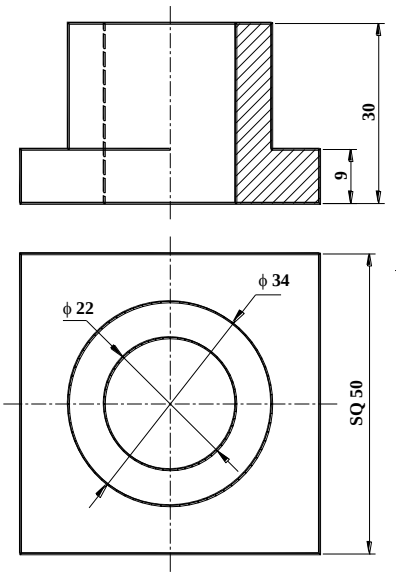


FIGURE T1.2A

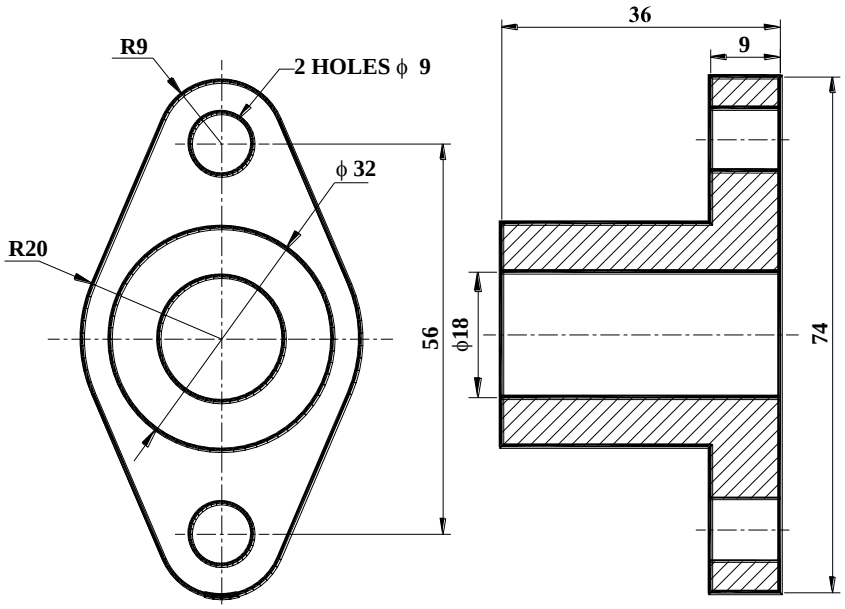


FIGURE T1.2B

3. 3. A CYLINDRICAL SLAB HAVING 75 MM AS DIAMETER AND 45 MM THICKNESS, IS SURMOUNTED BY A CUBE OF EDGE 38 MM. ON THE TOP OF THE CUBE RESTS A SQUARE PYRAMID OF ALTITUDE 38 MM AND SIDE OF BASE 25 MM. THE AXES OF THE SOLIDS ARE IN THE SAME STRAIGHT LINE. DRAW THE ISOMERIC VIEW OF THE COMBINATION OF THESE SOLIDS.

4. 4. A SPHERE OF DIAMETER 45 MM RESTS CENTRALLY OVER A FRUSTUM OF CONE OF BASE DIAMETER 60 MM, TOP DIAMETER 40 MM AND HEIGHT 60 MM. DRAW ISOMETRIC PROJECTIONS OF THE COMBINATION OF SOLIDS.

5. 5. A CYLINDRICAL SLAB OF 70 MM AS DIAMETER AND 40 MM THICKNESS IS SURMOUNTED BY A FRUSTUM OF A SQUARE PYRAMID OF BASE SIDE 45 MM, TOP BASE SIDE 25 MM AND HEIGHT 50 MM. THE AXES OF THE TWO SOLIDS ARE ON A COMMON STRAIGHT LINE. A SPHERE OF DIAMETER 40MM IS CENTRALLY PLACED ON TOP OF THE FRUSTUM. DRAW THE ISOMETRIC VIEW OF THE SOLIDS.

6. 6. A CUBE OF SIDES 60MM IS RESTING ON THE GROUND. A CYLINDER OF BASE DIAMETER 50 MM AND HEIGHT 60MM IS KEPT OVER THAT. ON TOP OF THE CYLINDER, A HEXAGONAL PYRAMID OF SIDE OF BASE 20 MM AND ALTITUDE 40 MM IS KEPT. THE AXIS OF THE THREE SOLIDS LIES IN THE SAME VERTICAL LINE. DRAW THE ISOMETRIC VIEW.

SHEET NO: 2

(OBLIQUE DRAWING)

DRAW OBLIQUE DRAWINGS FROM GIVEN ORTHOGRAPHIC PROJECTIONS.

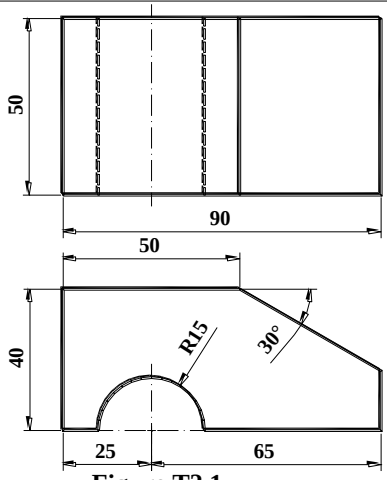


Figure T2.1

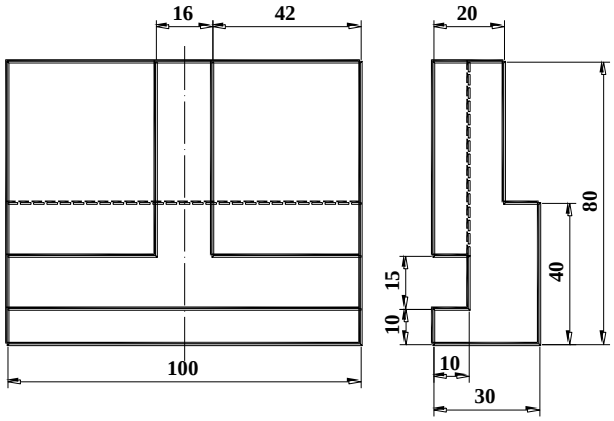


Figure T2.2

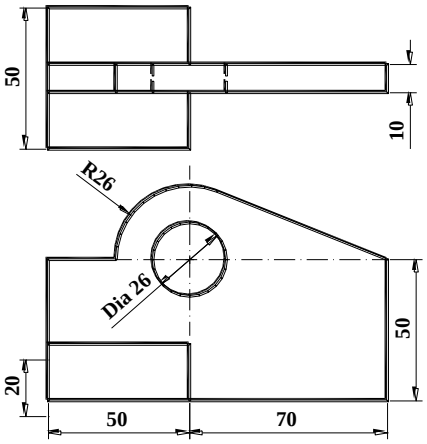


Figure T2.3

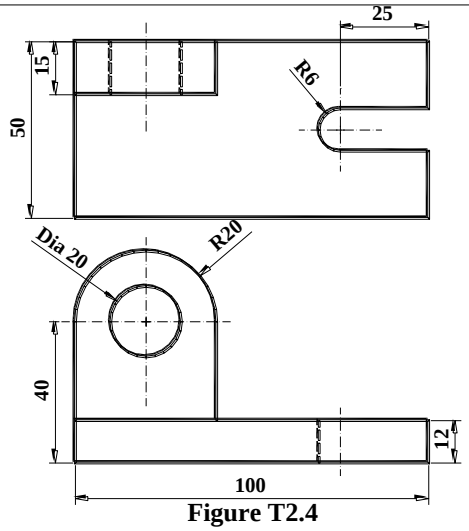


Figure T2.4

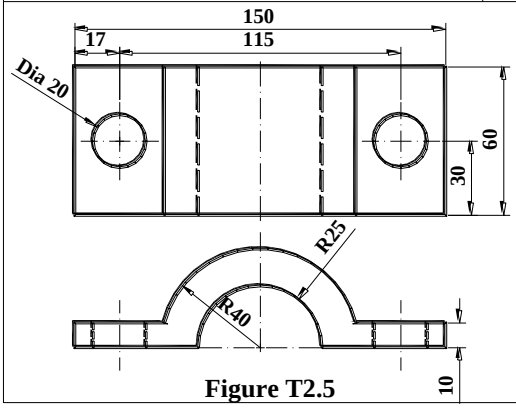


Figure T2.5

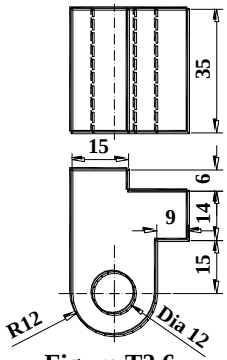


Figure T2.6

SHEET NO: 3

(PERSPECTIVE PROJECTION)

1. 1. DRAW THE PERSPECTIVE PROJECTION FROM THE GIVEN ORTHOGRAPHIC VIEWS IN *FIGURE T3.1A* TO *T3.1D*.

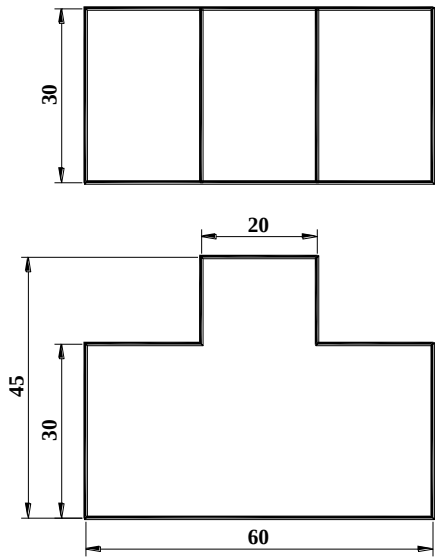


FIGURE T3.1A

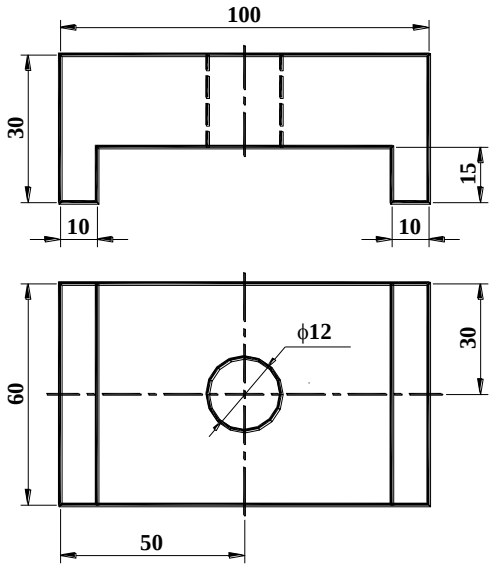
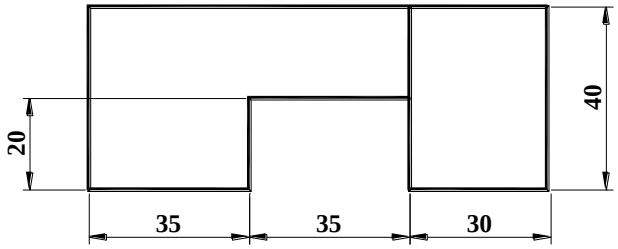
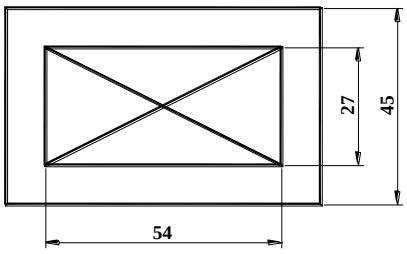


FIGURE T3.1B





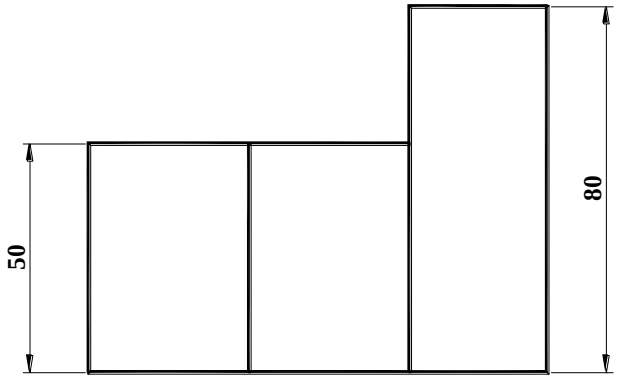


FIGURE T3.1C

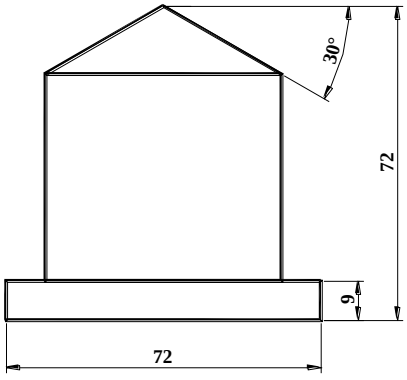


FIGURE T3.1D

2. A square prism of side base 30 mm and height 50 mm rests with it base on the ground and one of the rectangular faces inclined at 30° to the picture plane. The nearest vertical edges touches the PP. The station point is 45 mm in front of the PP, 60 mm above the ground an opposite to the nearest vertical edge that touches the PP. Draw the perspective view of the prism.
3. A hexagonal prism, side of base 25 mm and height 50 mm with its base on the ground plane such that one of its rectangular faces is inclined at 30° to the picture plane and the vertical edge nearer to PP is 15 mm behind it. The station point is 45 mm in front of the picture plane. 70 mm above the ground plane and lies in a central plane, which is 15 mm left to the vertical edge nearer to the picture plane. Draw the perspective projection of the prism.
4. Draw the perspective view of a cube of 25 mm edge, resting on ground with one of its faces. It has one of its vertical edges in the picture plane and all its vertical faces are equally inclined the picture plane. The station point is 55 mm in front of the picture plane, 40 mm above the ground and lies in the central plane, which is 10 mm left of the center of the cube.
5. A model of steps has 3 steps of 15 mm tread and rise 10 mm. The steps measure 60 mm wide. The vertical edge of bottom steps, which is nearer to the picture plane, is 25 mm behind PP and the width of steps recede to the left at an angle of 30° to PP. The station point is 100 mm in front of PP and 60 mm above the ground plane and 30 mm to the right of the vertical edge, which is nearest to PP. Draw the perspective view of the model.

SHEET NO: 4

(DIMENSIONING)

1. 1. FOR *FIGURE T4.1*, DIMENSION ITS ORTHOGRAPHIC VIEW BY ALIGNED SYSTEM OF DIMENSIONING.

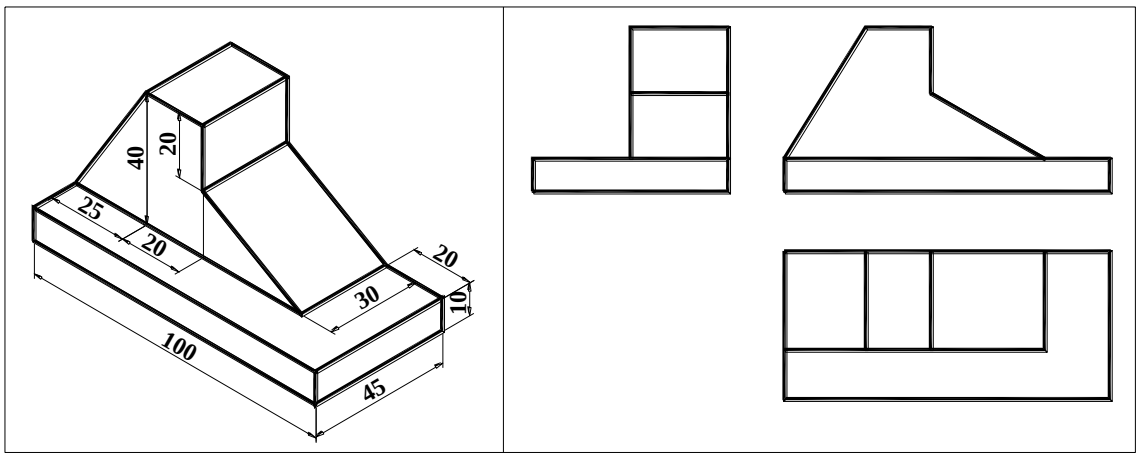


FIGURE T4.1

2. 2. FOR *FIGURE T4.2*, DIMENSION ITS ORTHOGRAPHIC VIEW BY UNIDIRECTIONAL SYSTEM OF DIMENSIONING.

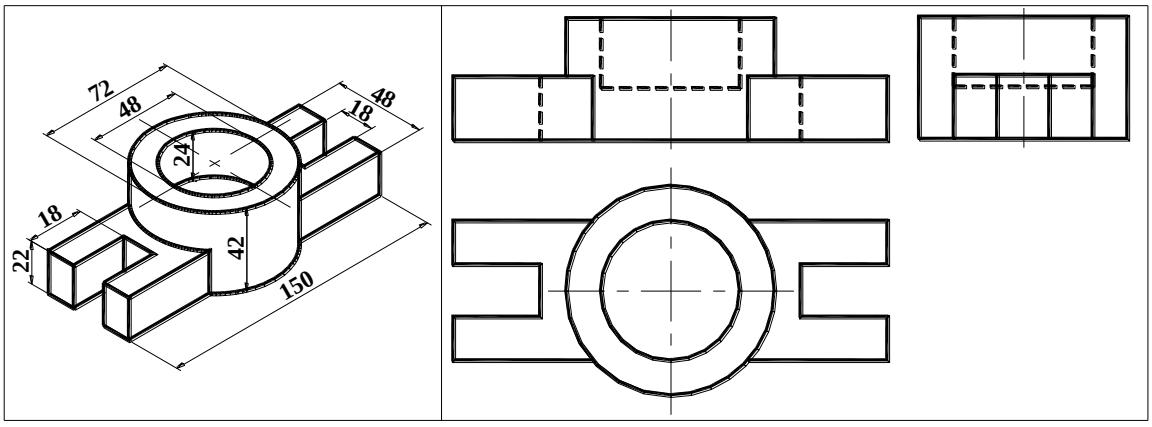


FIGURE T4.2

3. 3. MEASURE AND DIMENSION PROPERLY AS PER DIMENSIONING RULES FOR HOLES GIVEN IN *FIGURE T4.3 (A)* TO *FIGURE T4.3(C)*.

4. 4. MEASURE AND DIMENSION PROPERLY AS PER DIMENSIONING RULES FOR COUNTER SINKS AND COUNTER BORES GIVEN IN *FIGURE T4.4 (A)* AND *FIGURE T4.4 (F)*.

5. 5. DIMENSION THE CHAMFERS SHOWN IN *FIGURE T4.5 (A) & (B)*, EXTERNAL THREADS SHOWN IN *FIGURE T4.5(C)*, INTERNAL THREADS SHOWN IN *FIGURE T4.5 (D)*.

6. 6. DIMENSION THE TAPERED FEATURES SHOWN IN *FIGURE T4.6 (A) & (B)*.

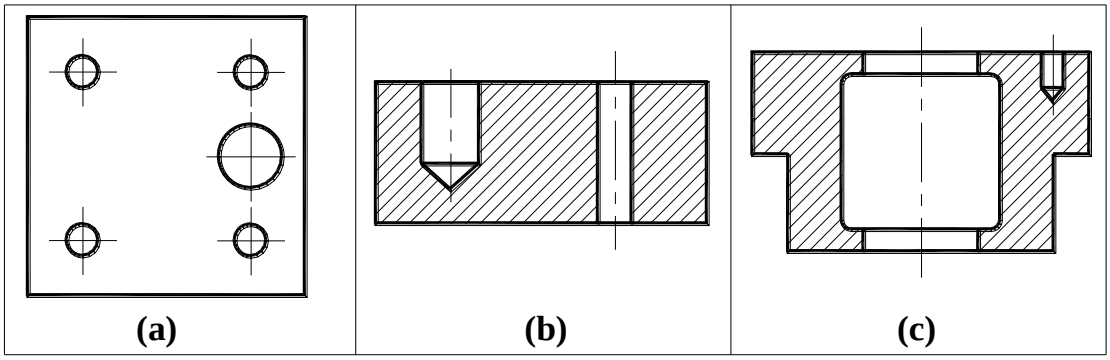


FIGURE T4.3

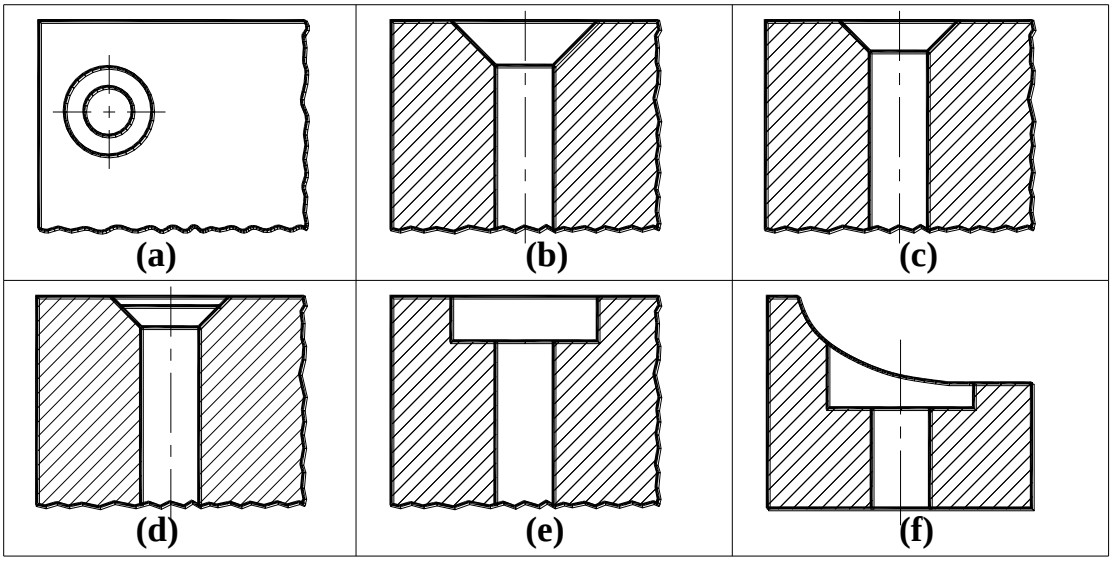


FIGURE T4.4

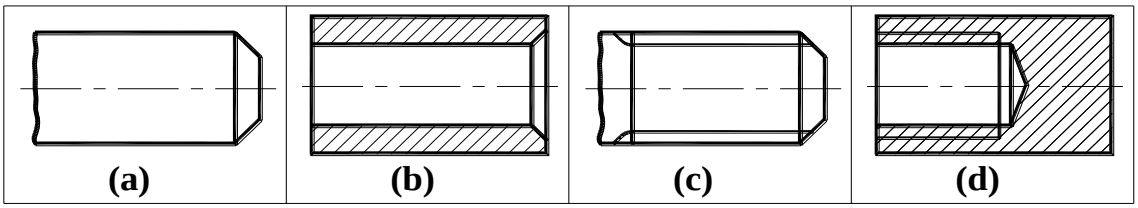


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FIGURE T4.5

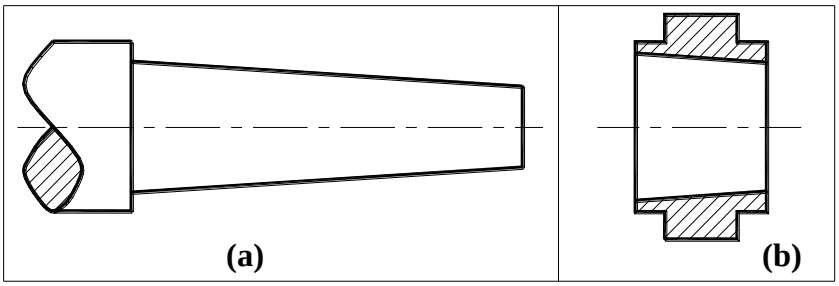


FIGURE T4.6

SHEET NO: 5

(LIMIT, FIT AND TOLERANCES)

1. 1. FIND (*I*) TYPE OF FIT AND (*II*) TOLERANCES OF A 45 MM DIAMETER SHAFT ROTATING AT A NORMAL SPEED.
2. 2. FIX THE LIMITS OF TOLERANCE AND ALLOWANCE FOR A 25 MM DIAMETER SHAFT AND HOLE PAIR DESIGNATED BY T6/H5. FIND THE TYPE OF FIT AND COMMENT ON THE APPLICATION OF THIS TYPE OF FIT.
3. 3. FIX THE LIMITS OF TOLERANCE FOR A 50 MM DIAMETER SHAFT AND HOLE PAIR DESIGNATED BY H8/P7. FIND THE TYPE OF FIT AND COMMENT ON THE APPLICATION OF THIS TYPE OF FIT.
4. 4. DRAW THE STANDARD SYMBOL FOR THE MACHINING PROCESSES:

- SURFACE TO BE OBTAINED WITHOUT REMOVAL OF MATERIAL.
- SURFACE TO BE COATED.
- SURFACE TO BE PRECISION GRINDING.
- SURFACE TO BE OBTAINED BY FINE TURNING.

5. 5. DRAW THE ROUGHNESS GRADE SYMBOLS FOR THE SURFACES OF AN OBJECT SHOWN IN *FIGURE T5.5*.

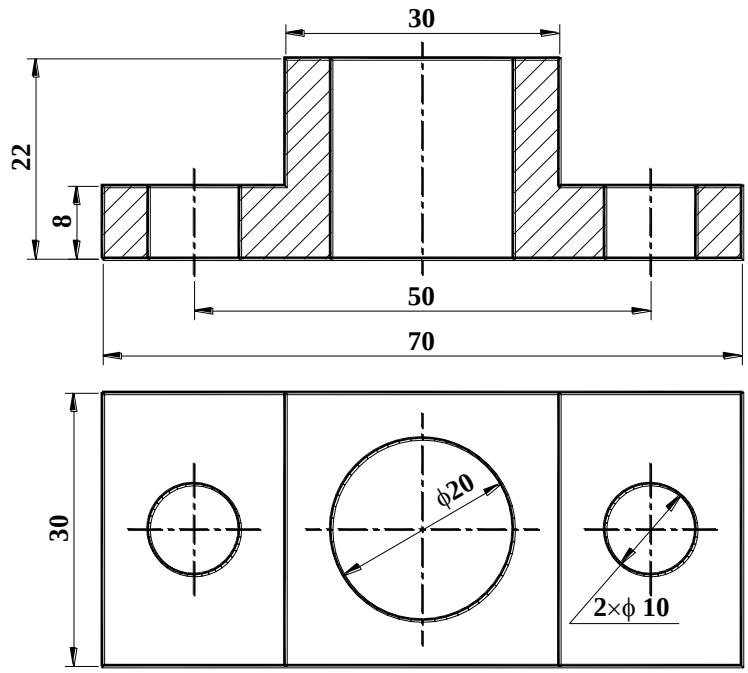


FIGURE T5.5

THE PLANE SURFACES OF THE OBJECT ARE PRODUCED FROM SHAPING MACHINE. HOLES ARE PRODUCED BY NORMAL DRILLING PROCESS. TOP SURFACES ARE ALSO SUPER FINISHED AND CENTRAL HOLE IS SUPER FINISHED BY LAPPING.

SHEET NO: 6

(SCREW/BOLT/THREAD/STUD/NUT)

1. 1. DRAW THE METRIC THREAD, AS SHOWN IN *FIGURE T6.*1, TAKING SUITABLE VALUE OF PITCH.

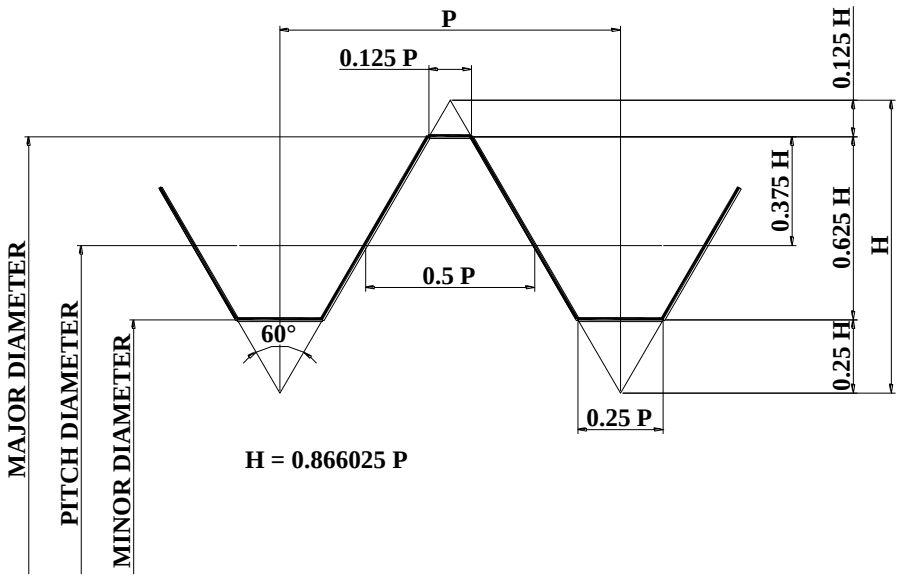


FIGURE T6.1: METRIC THREAD

2. 2. DRAW A SCREW FASTENING SHOWN IN *FIGURE T6.2* WITH SUITABLE VALUE OF DIMENSIONS.

3. 3. DRAW A STUD JOINT TO CONVENTIONAL RATIOS FOR THE PIECES SHOWN IN *FIGURE T6.3*.

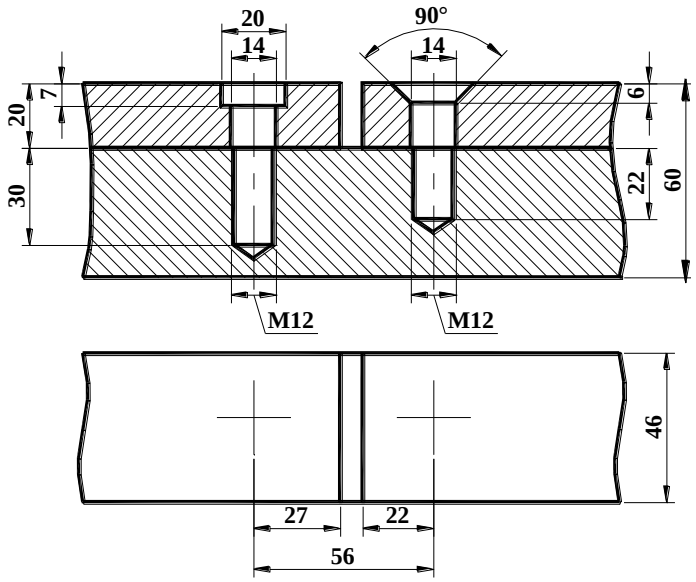


FIGURE T6.2

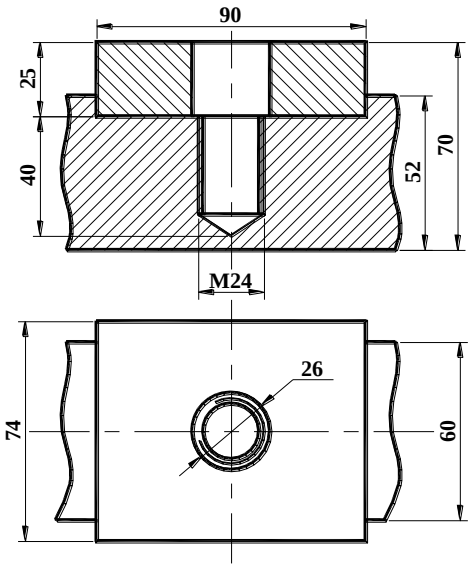
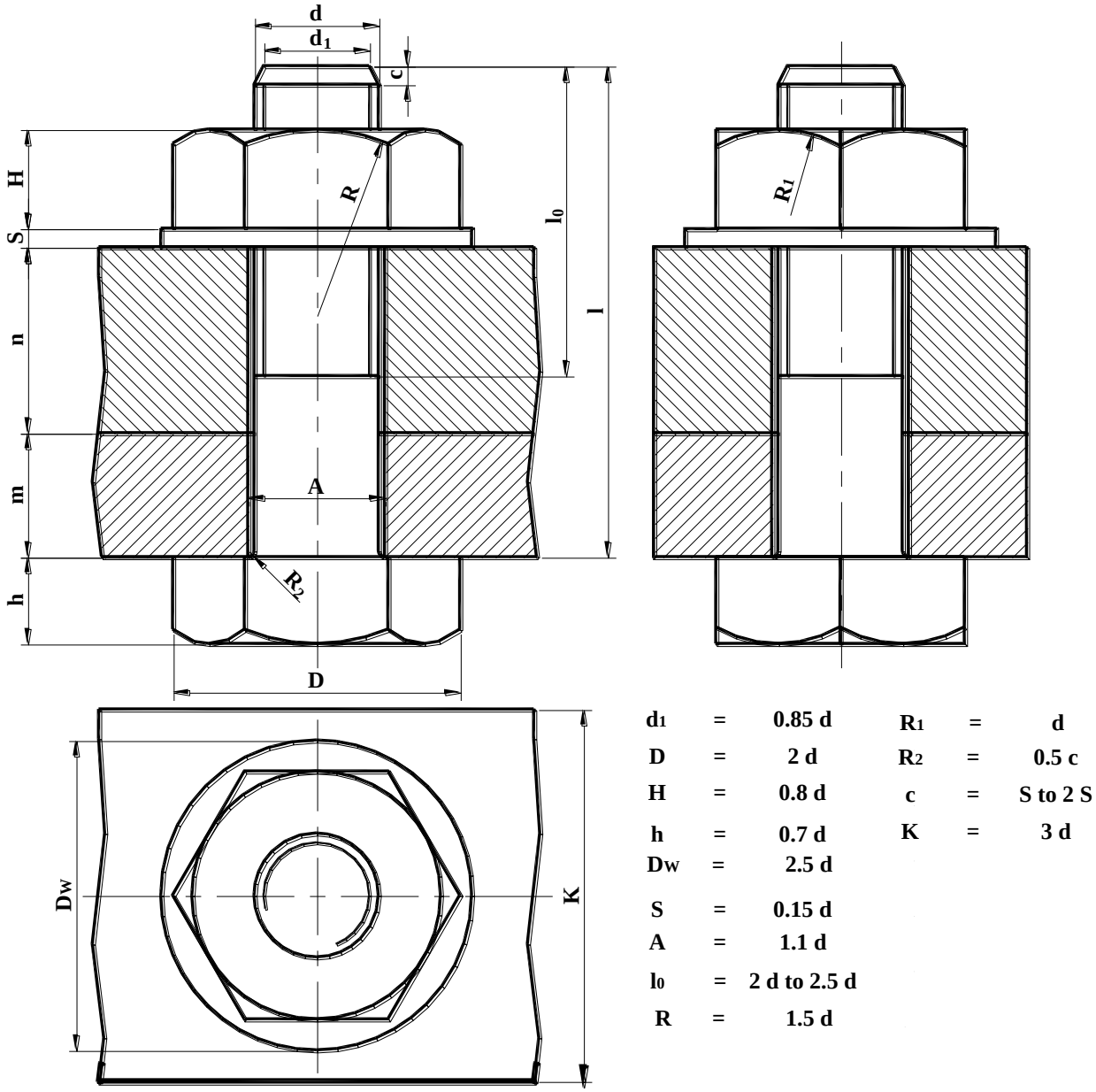


FIGURE T6.3

4. 4. DRAW A BOLTED JOINT TO CONVENTIONAL RATIOS AS SHOWN IN *FIGURE T6.4*. TAKE D = 20 MM, M = 20 MM AND N = 30 MM.



d_1	=	0.85 d	R_1	=	d
D	=	2 d	R_2	=	0.5 c
H	=	0.8 d	c	=	S to 2 S
h	=	0.7 d	K	=	3 d
Dw	=	2.5 d			
S	=	0.15 d			
A	=	1.1 d			
l_0	=	2 d to 2.5 d			
R	=	1.5 d			

FIGURE T6.4: HEXAGONAL BOLT

5. 5. DRAW FRONT VIEW AND TOP VIEW OF PIECES FASTEN TOGETHER WITH 18 MM SQUARE BOLT AND NUT AS SHOWN IN *FIGURE T6.5*.

6. 6. TAKING SUITABLE VALUE OF 'D' DRAW THE EYEBOLT AS SHOWN IN THE *FIGURE T6.6*.

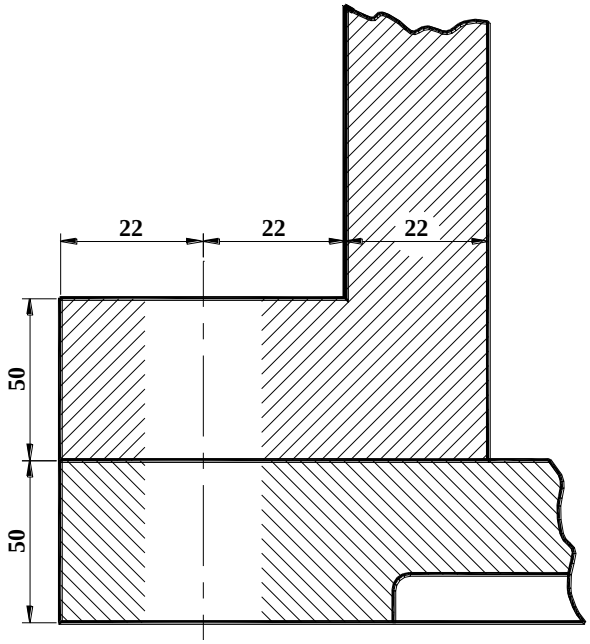


FIGURE T6.5: SQUARE HEAD BOLT

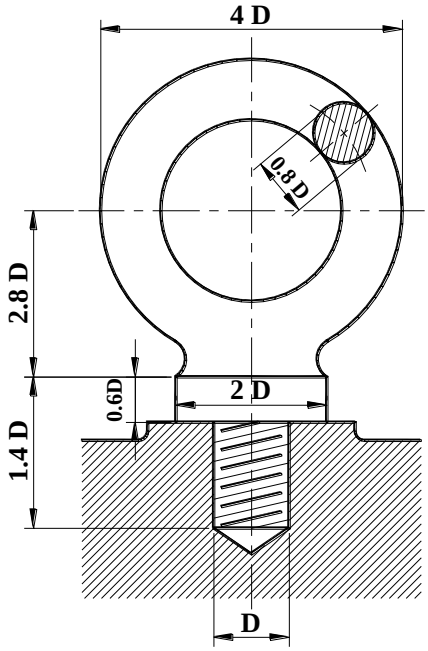


FIGURE T6.6: EYE BOLT

SHEET NO: 7

(RIVETING, WELDING & PIPING)

1. 1. Draw the plan and sectional elevation of the following riveted joints. Take the diameter of the rivet 24 mm.
   - Single riveted lap joint
   - Double riveted chain lap joint
   - Double riveted zig-zag lap joint
   - Single riveted, single strap butt joint
   - Single riveted, double strap butt joint
   - Double riveted, double strap chain butt joint
   - Double riveted, double strap zig-zag butt joint

2. 2. *Figure T7.2(a)* and *T7.2(b)* show the isometric of a machine part to be fabricated by the welding process. Draw its orthographic view. Choose suitable types of weld and represent it on the drawings through respective symbols.

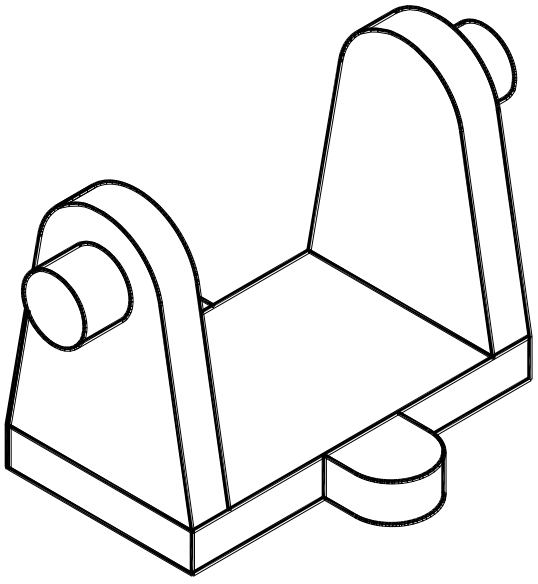


Figure T7.2(a)

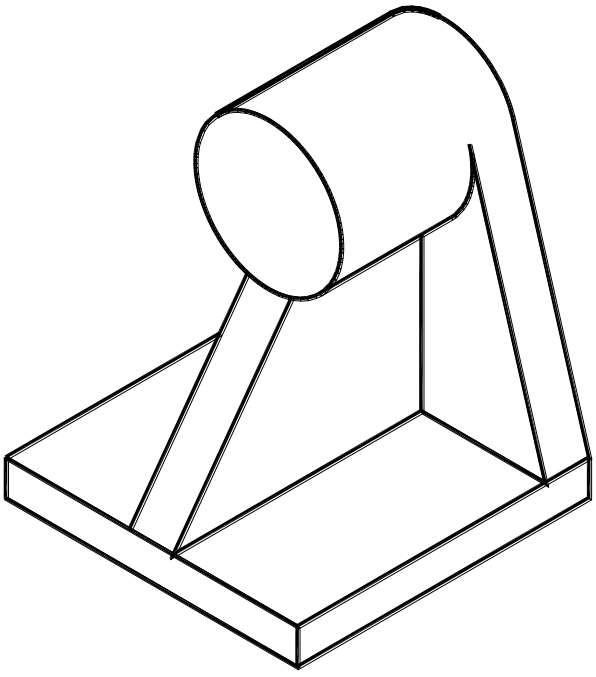


Figure T7.2(b)

3. 3. Sketch the symbol of the following joints and parts of piping:

- 90° elbow
- 45° bend
- Reducer
- Tee
- Cross
- Plug
- Union
- Nipple
- Cap
- Check valve

4. 4. Redraw a single line and a double line drawing of the portion of a piping system as shown in *Figure T7.4*.

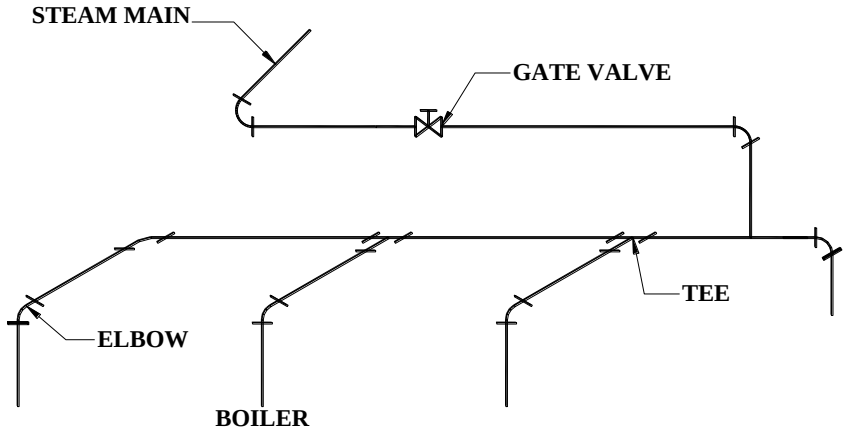


Figure T7.4

5. 5. *FIGURE T7.5* SHOWS A BUILDING DRAWING. SKETCH AN ISOMETRIC OF THE BUILDING AND DRAW DIAGRAMMATIC ISOMETRIC SHOWING A PIPING SYSTEM WITH OVERHEAD TANK, SOLAR WATER HEATER SYSTEM, SUPPLY FOR TOILET, KITCHEN AND INLET SUPPLY FROM UNDERGROUND TANK AND WATER PUMP.

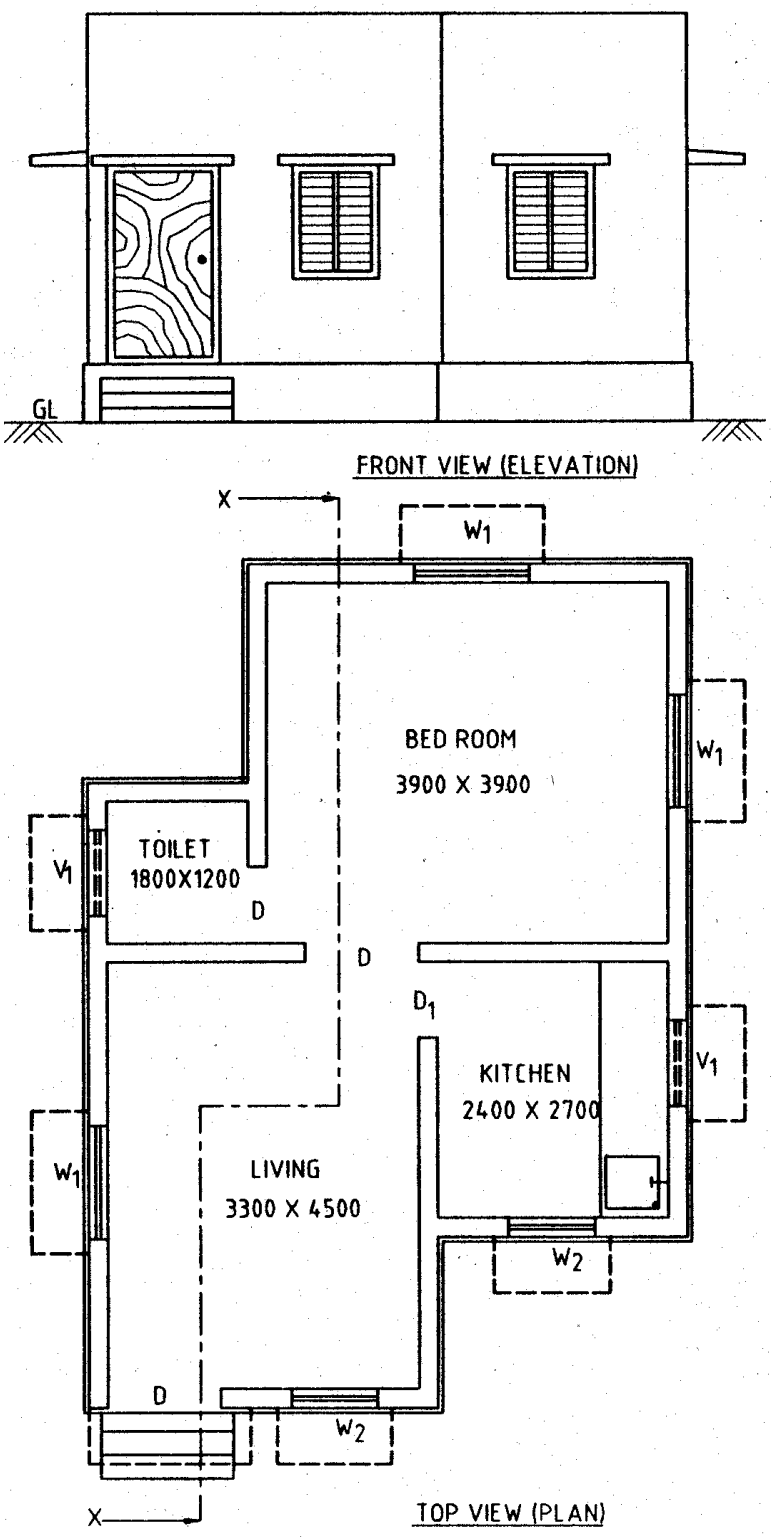

GL
FRONT VIEW (ELEVATION)
X
W1
BED ROOM
3900 X 3900
W1
V1
TOILET
1800X1200
D
D
D1
KITCHEN
2400 X 2700
V1
W1
LIVING
3300 X 4500
W2
D
W2
X
TOP VIEW (PLAN)

FIGURE T7.5

SHEET NO: 8

(DETAIL DRAWING)

1. 1. MAKE A COMPLETE SET OF WORKING DRAWINGS FOR A V-BLOCK CLAMP SHOWN IN *FIGURE T8.1*.

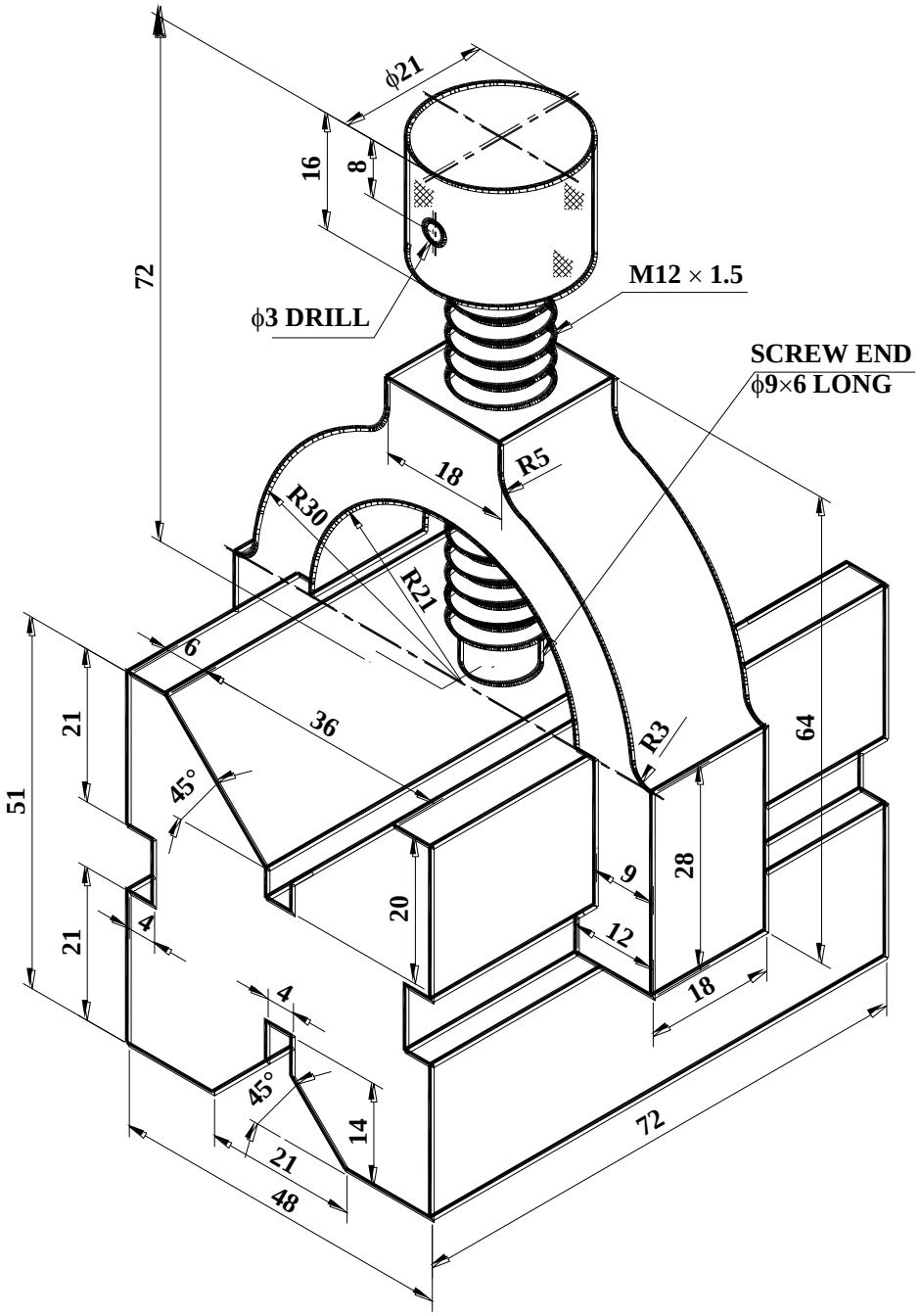
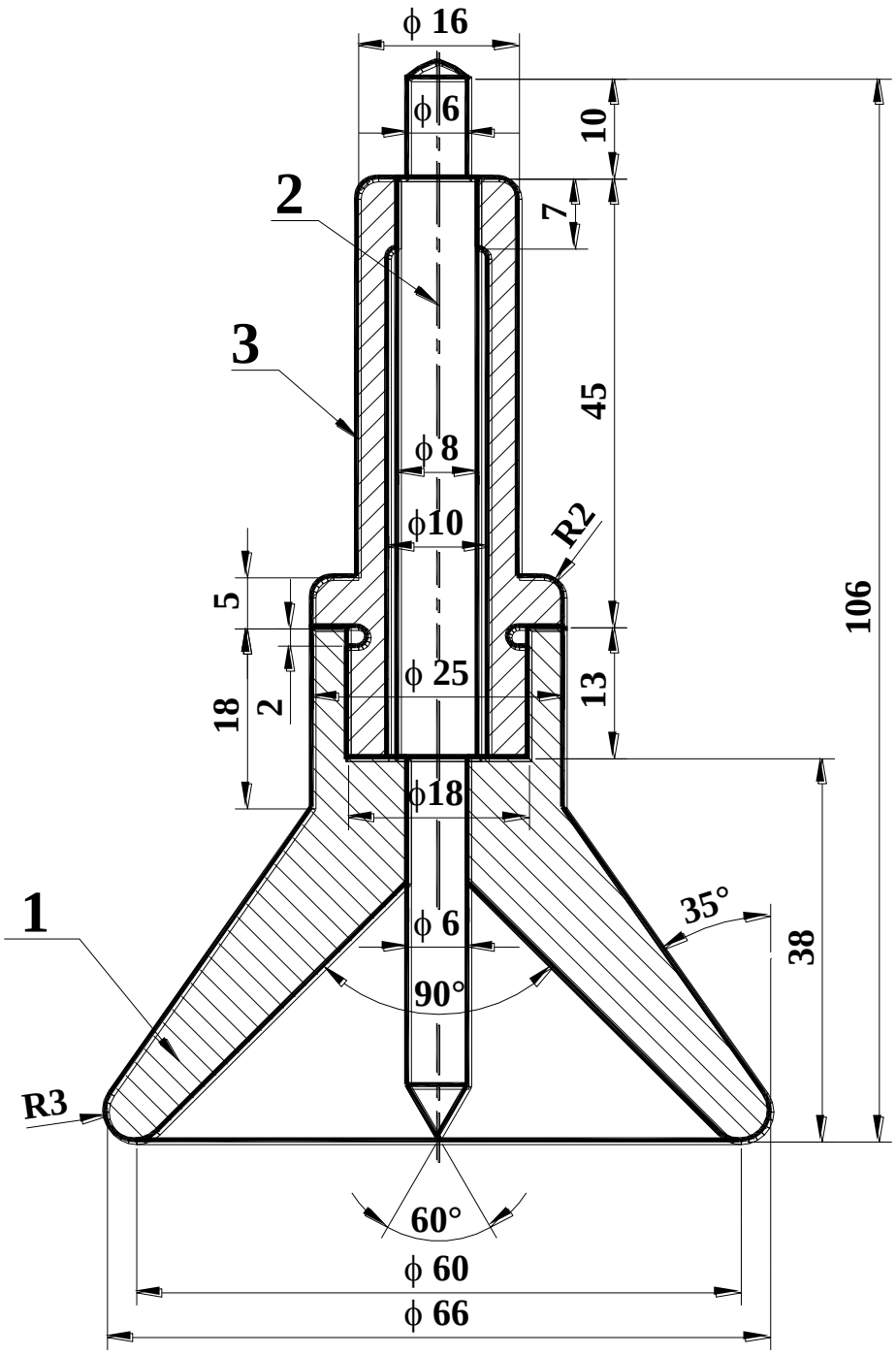


FIGURE T8.1: V-BLOCK CLAMP

2. 2. *FIGURE T8.2* SHOWS THE ASSEMBLY DRAWING OF A CENTERING CONE. MAKE A DETAIL DRAWING OF ALL PARTS.



1	GUIDE	ST 42	3		
1	CENTERING PIN	C60	2		
1	CENTERING	ST 42	1		

	CONE				
NOS. REQD.	NAME	MATERIAL	ST. NO.	WEIGHT	NOTES

FIGURE T8.2: CENTERING CONE

SHEET NO: 9

(ASSEMBLY DRAWING I)

1. 1. *FIGURE T9.1* THE DETAILS OF A SPLIT BEARING. DRAW THE ASSEMBLED FRONT VIEW WITH SECTION. *TAKE ANY LENGTH FOR THE SHAFT.*

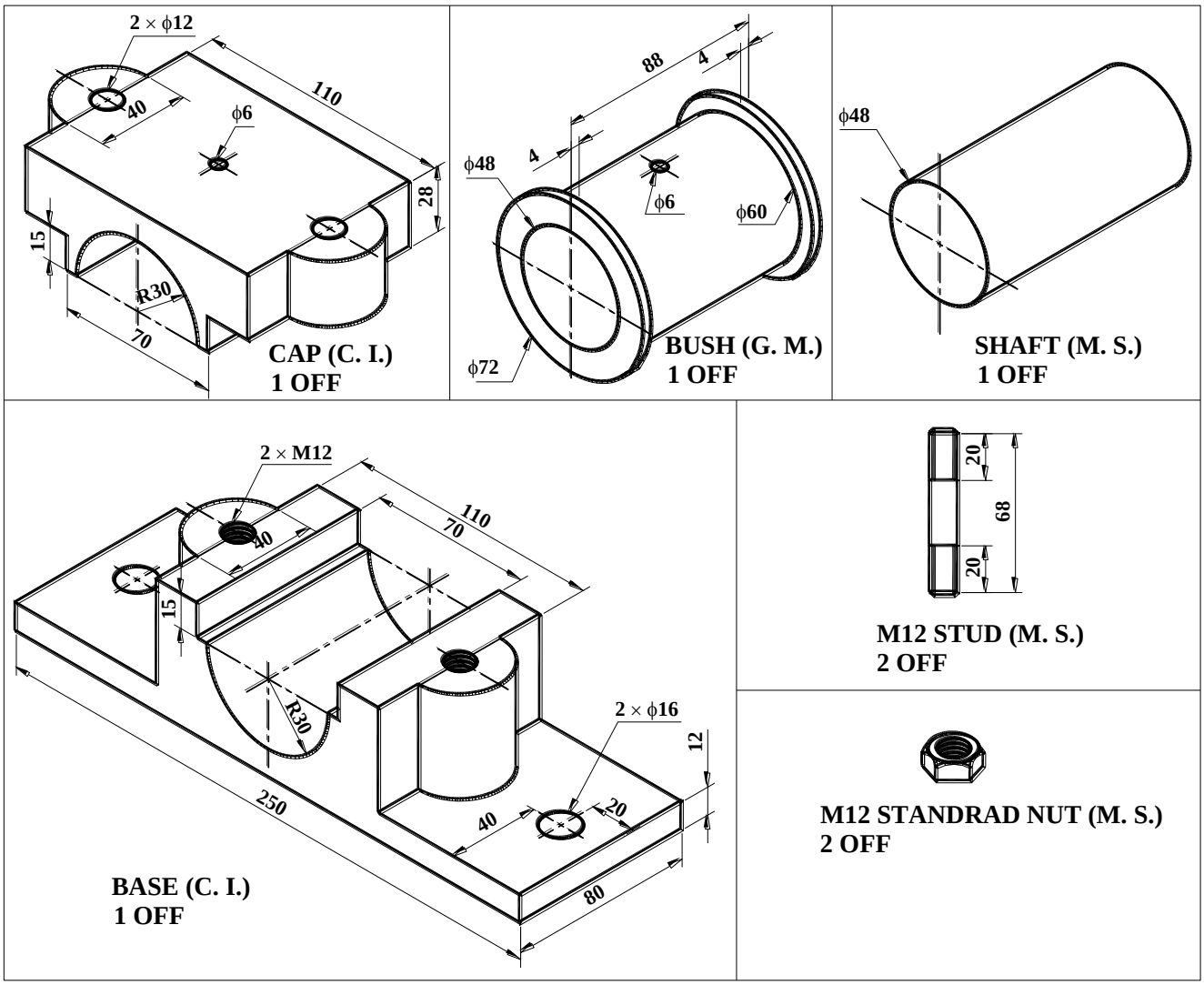
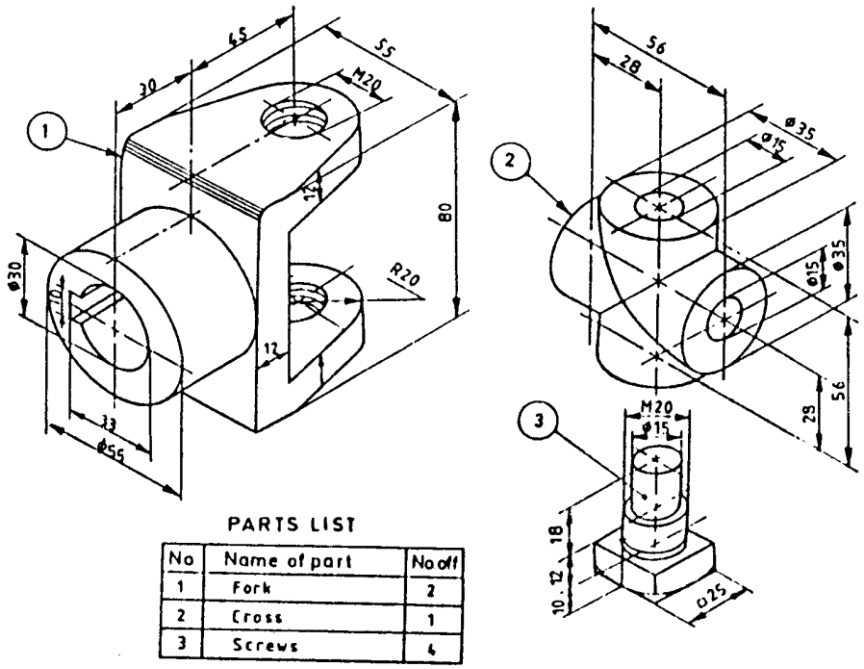


FIGURE T9.1: SPLIT BEARING

2. 2. *FIGURE T9.2* SHOWS THE DETAIL DRAWING OF A UNIVERSAL COUPLING FOR CONNECTING TWO SHAFTS. ASSEMBLE THE PARTS AND DRAW THE SECTIONAL FRONT VIEW AND THE TOP VIEW.



PARTS LIST

No	Name of part	No off
1	Fork	2
2	Cross	1
3	Screws	4

FIGURE T9.2: UNIVERSAL COUPLING

3. 3. *FIGURE T9.3* SHOWS THE DETAIL DRAWING OF AN ANTIVIBRATION MOUNT. ASSEMBLE THE PARTS AND DRAW THE SECTIONAL FRONT VIEW AND THE SIDE VIEW.

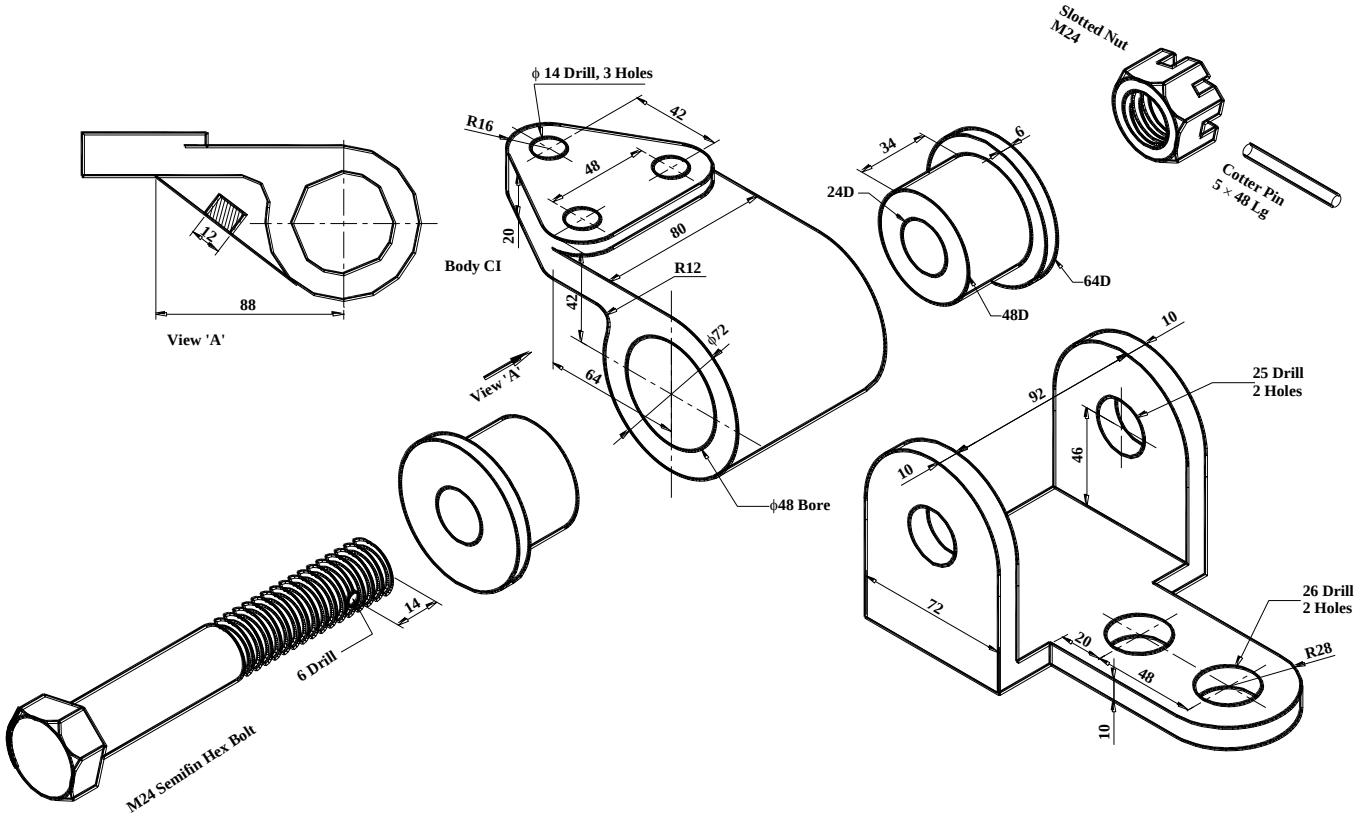


FIGURE T9.3: ANTIVIBRATION MOUNT

SHEET NO: 10

(ASSEMBLY DRAWING II)

4. 4. *FIGURE T10.1* SHOWS THE DETAIL DRAWING OF A SCREW JACK. ASSEMBLE THE PARTS AND DRAW THE HALF SECTIONAL FRONT VIEW (RIGHT HALF) AND THE TOP VIEW.

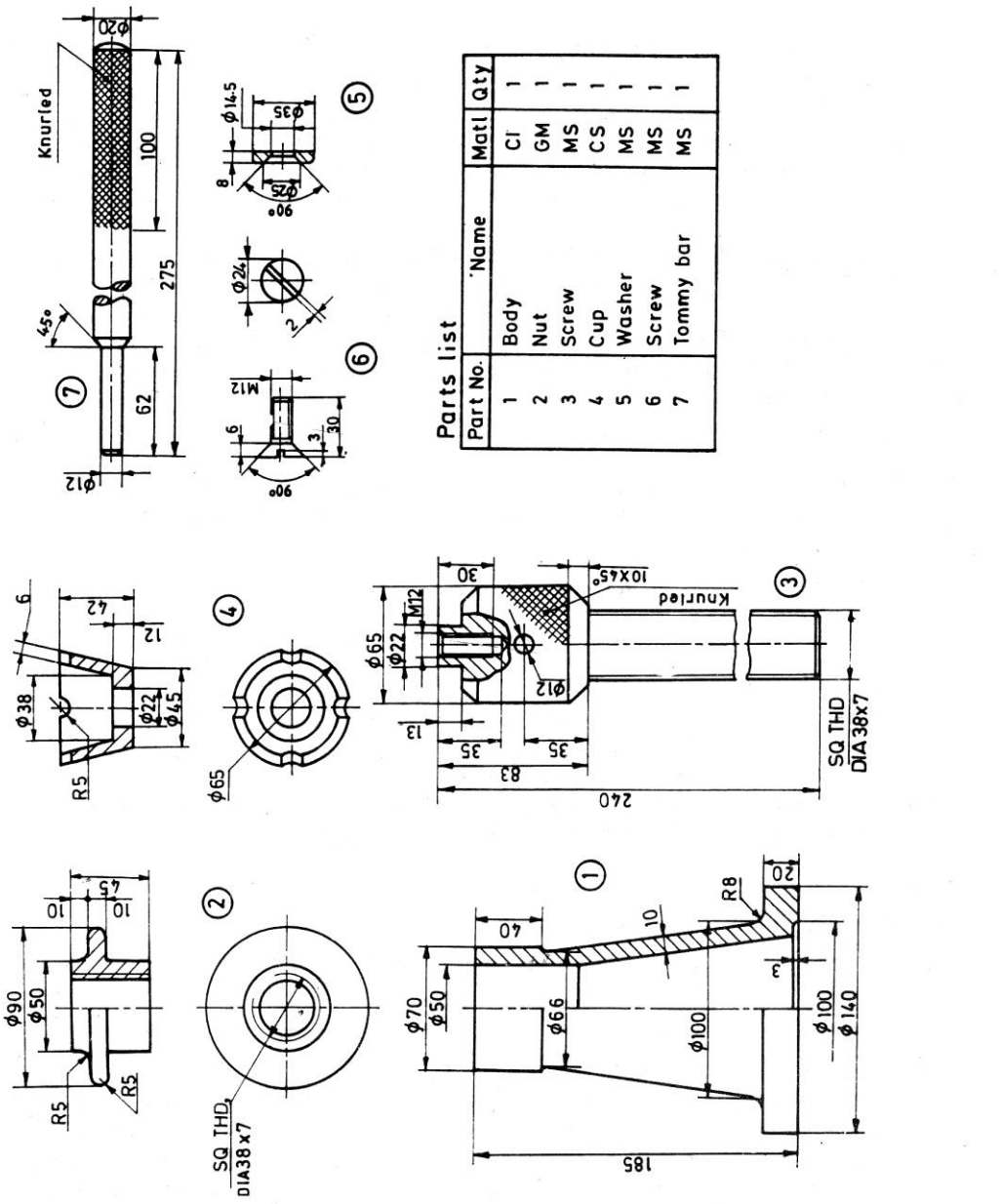
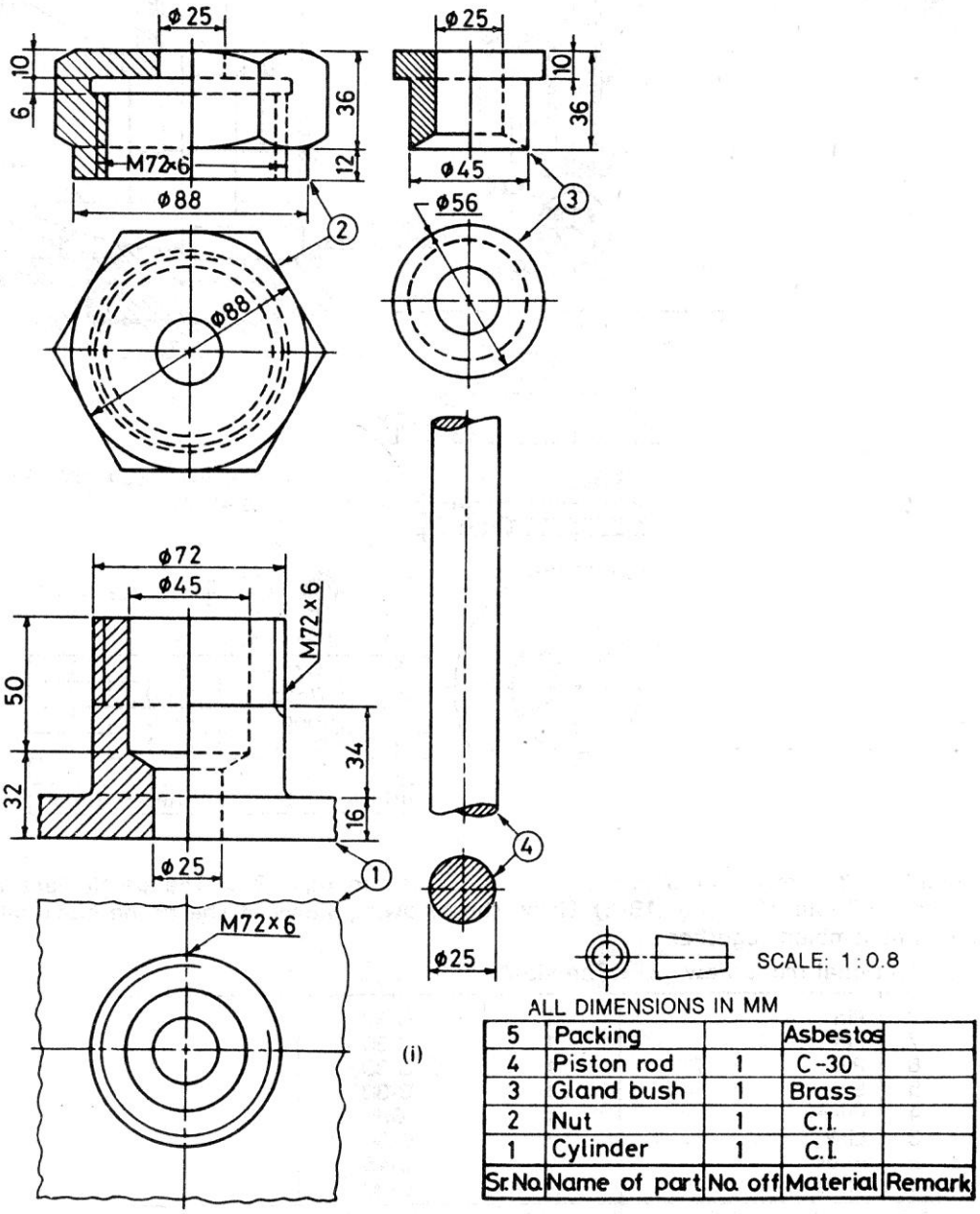


FIGURE T10.1: SCREW JACK

5. 5. *FIGURE T10.2* SHOWS THE DETAIL DRAWING OF A STUFFING BOX FOR A SMALL STEAM ENGINE. ASSEMBLE THE PARTS AND DRAW THE HALF SECTIONAL FRONT VIEW AND THE TOP VIEW.



Sr.No.	Name of part	No. off	Material	Remark
5	Packing		Asbestos	
4	Piston rod	1	C-30	
3	Gland bush	1	Brass	
2	Nut	1	C.I.	
1	Cylinder	1	C.I.	

FIGURE T10.2: STUFFING BOX

6. 6. *FIGURE 10.3* SHOWS THE DETAIL DRAWING OF AN ANTIVIBRATION MOUNT. DRAW FRONT VIEW OF THE ASSEMBLY.

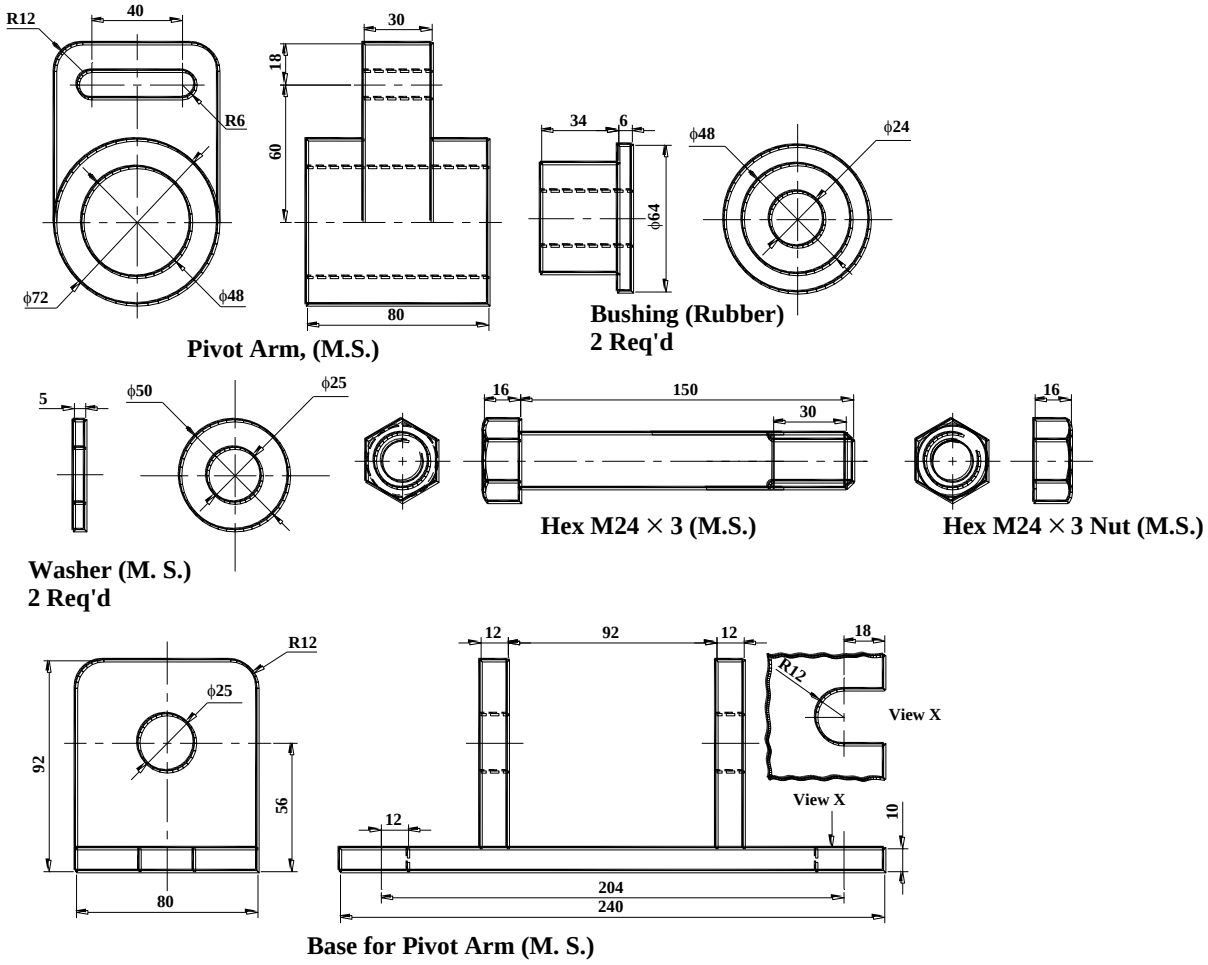


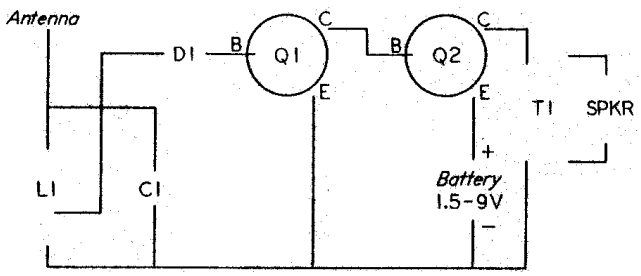
FIGURE T10.3: ANTIVIBRATION MOUNT

?

SHEET NO: 11

(ELECTRICAL AND ELECTRONOCS DRAWING)

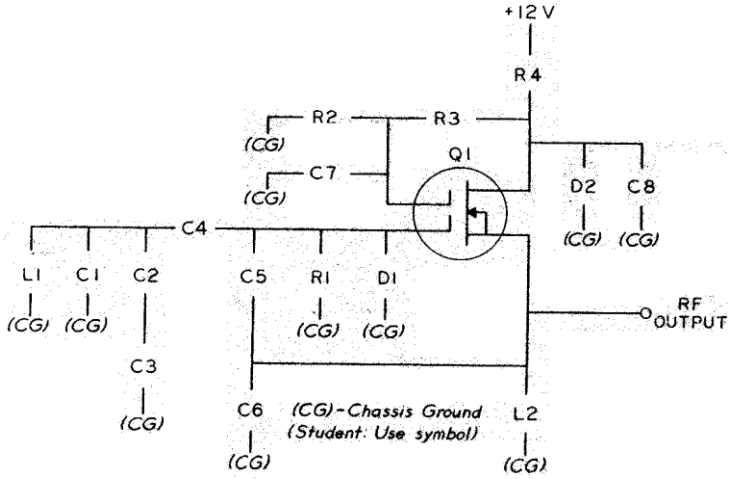
1. 1. COMPLETE THE CIRCUIT DIAGRAM SHOWN IN *FIGURE T1.1A* AND *FIGURE T1.1B* USING STANDARD SYMBOLS.



COMPONENT LIST

C1 10-365 PF VARIABLE CAPACITOR
D1 GERMANIUM DIODE
L1 LOOPSTICK ANTENNA COIL WITH CENTER TAP
T1 OUTPUT TRANSFORMER: 2500 Ω PRIMARY, 3 ? 4 Ω SECONDARY
Q1 NPN TYPE RF TRANSISTOR
Q2 PNP TYPE AUDIO TRANSISTOR

FIGURE T11.1A



COMPONENT LIST

CAPACITORS

C1 100 PF TRIMMER
C2 50 PF
C3 150 PF VARIABLE
C4 470 PF
C5, C6 1000 PF
C7, C8 0.1 μF

RESISTORS (Ω)

R1, R2, R3 22 K
R4 270

COILS

L1 6 μH CERAMIC OR AIR CORE
L2 1MH RF CHOKE

FIGURE T11.1B

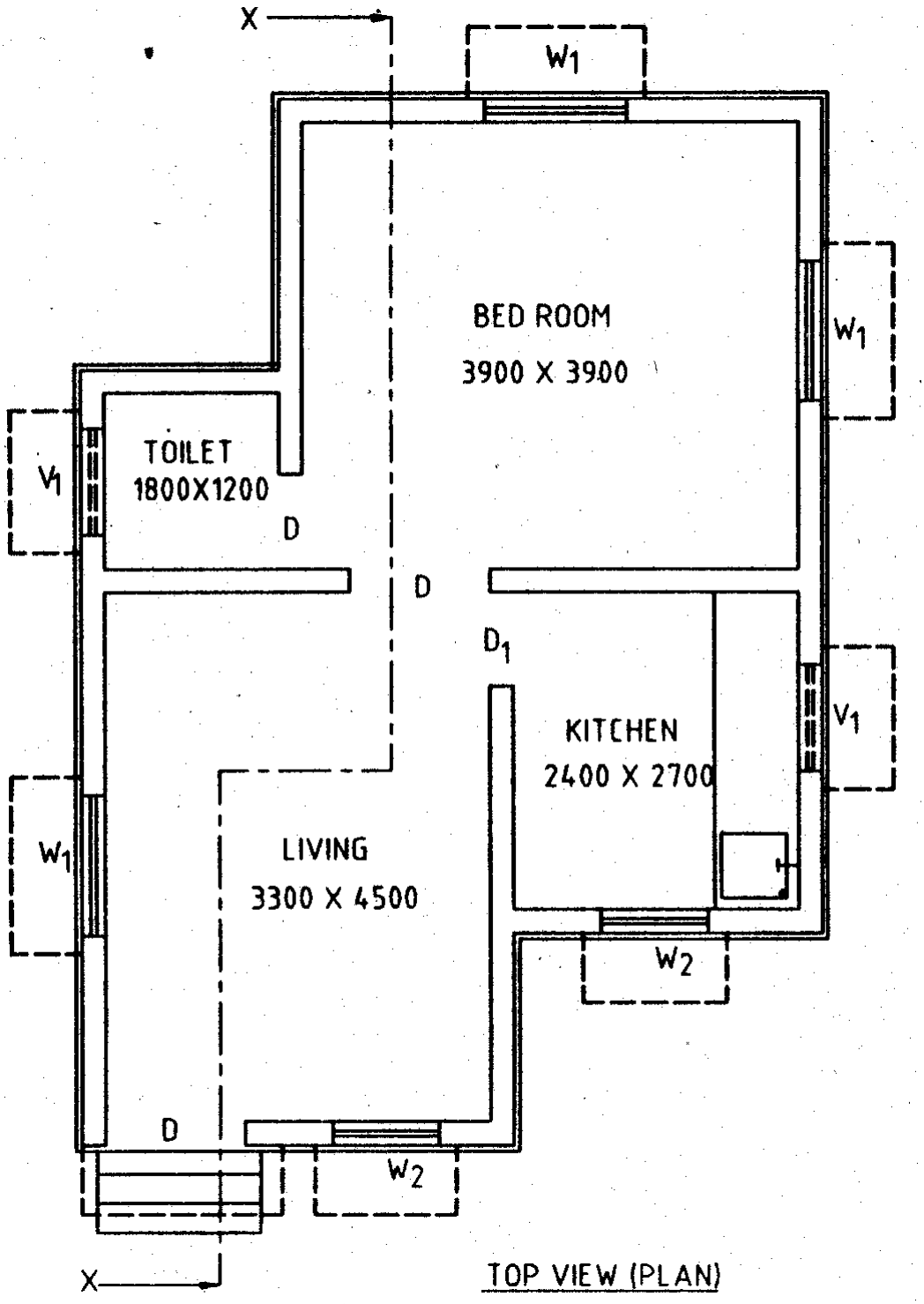
SEMICONDUCTORS

D1	1N914	SILICON DIODE
D2	6V, 1 W	ZENER DIODE
Q1	40673	DUAL GATE MOSFET

2. 2. DRAW THE SYMBOLS FOR THE FOLLOWING:

- AMPLIFIER
- CAPACITOR
- FUSE
- INDUCTOR
- RESISTOR
- THERMOCOUPLE
- TRANSFORMER
- GENERATOR
- MOTOR
- 3-PHASE WYE
- 3-PHASE DELTA

3. 3. DRAW A PLAN VIEW OF AN ELECTRICAL WIRING DIAGRAM (FOR ONE FLOOR), HAVING TWO BED ROOMS, ONE KITCHEN AND ONE BATH ROOM AS SHOWN IN *FIGURE T11.3*.



TOP VIEW (PLAN)

SHEET NO: 12

(STRUCTURAL DRAWING)

1. DRAW THE PART DRAWING FOR COMPONENT NO. 1, 3, 4, AND 6 OF THE FOLLOWING STRUCTURE SHOWN IN *FIGURE T12.1* WITH DETAIL DIMENSIONS.

PARTS LIST (STEEL STRUCTURE FRAME OF A TABLE)

COMPONENT NO.	*DESCRIPTION*	*QUANTITY*	*REMARKS*
8	NUT, BOLT WASHER (M 12 ? 40)	62	
7	M. S. P1.10 ? 150 ? 150	4	
6	M. S. P1.8 ? 250 ? 300	4	GUSSET PLATE
5	M. S. FLAT 8 ? 75	4	COMPUTE REQUIRED LENGTH
4	ISA 75 ? 75 ? 8	4	COMPUTE REQUIRED LENGTH
3	ISA 100 ? 100 ? 10	4	
2	ISMC 250 ? 2000	2	
1	ISMC 250 ? 4000	2	

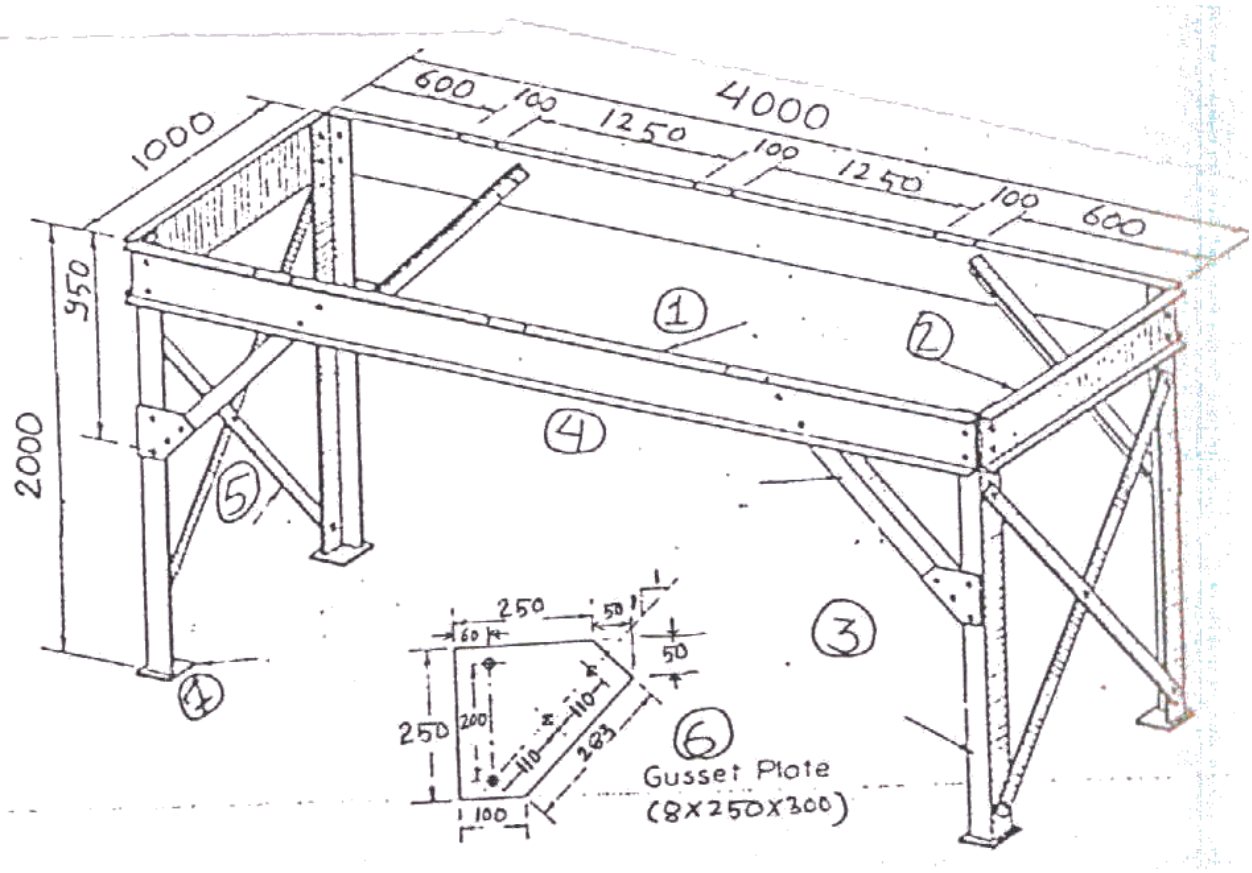


FIGURE T12.1

2. DRAW SYMBOLS OF SIX COMMON NATURAL SURFACES FEATURES (STREAMS, LAKES, ETC) AND SIX COMMON DEVELOPMENT FEATURES (ROADS, BUILDINGS, ETC.)
3. ?DRAW A TOPOGRAPHICAL MAP OF A COUNTRY STATE SIMILAR TO THAT SHOWN IN *FIGURE T12.3*.

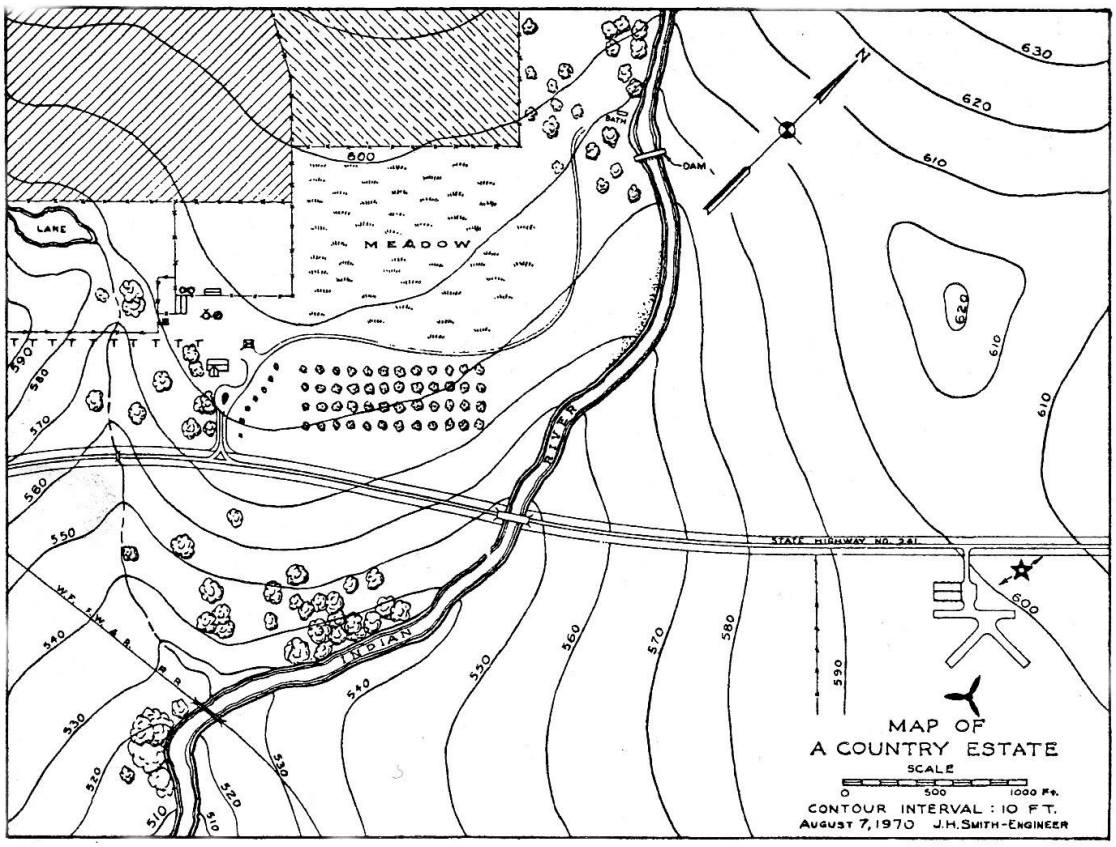


FIGURE T12.3

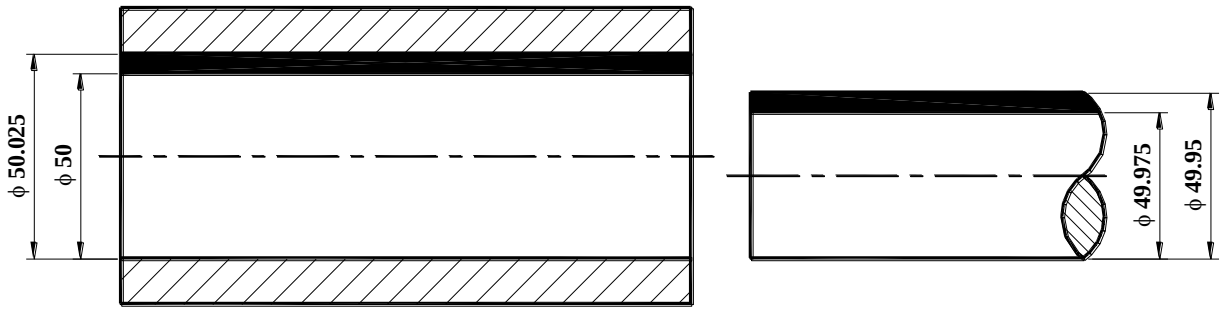
FIGURE T11.3

MODEL SOLUTION ONLY

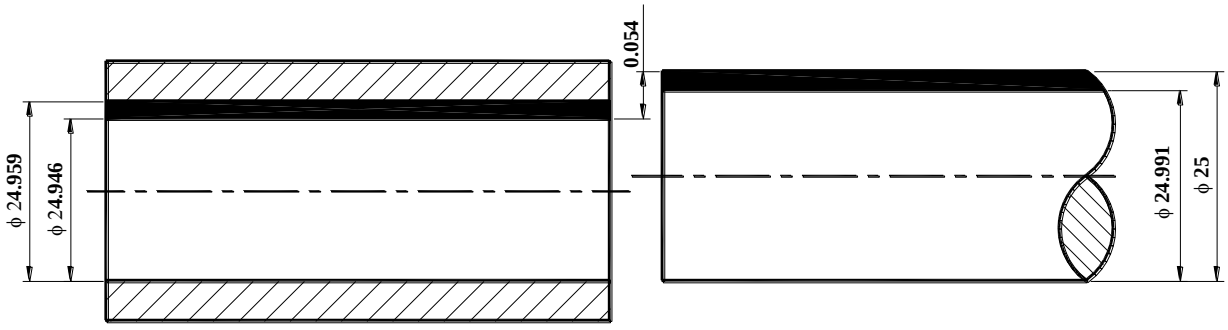
SHEET NO: 5

(LIMIT, FIT AND TOLERANCES)

6. 1. FIND (*I*) TYPE OF FIT AND (*II*) TOLERANCES OF A 45 MM DIAMETER SHAFT ROTATING AT A NORMAL SPEED.



6.2. FIX THE LIMITS OF TOLERANCE AND ALLOWANCE FOR A 25 MM DIAMETER SHAFT AND HOLE PAIR DESIGNATED BY T6/H5. FIND THE TYPE OF FIT AND COMMENT ON THE APPLICATION OF THIS TYPE OF FIT.



6.3. FIX THE LIMITS OF TOLERANCE FOR A 50 MM DIAMETER SHAFT AND HOLE PAIR DESIGNATED BY H8/P7. FIND THE TYPE OF FIT AND COMMENT ON THE APPLICATION OF THIS TYPE OF FIT.

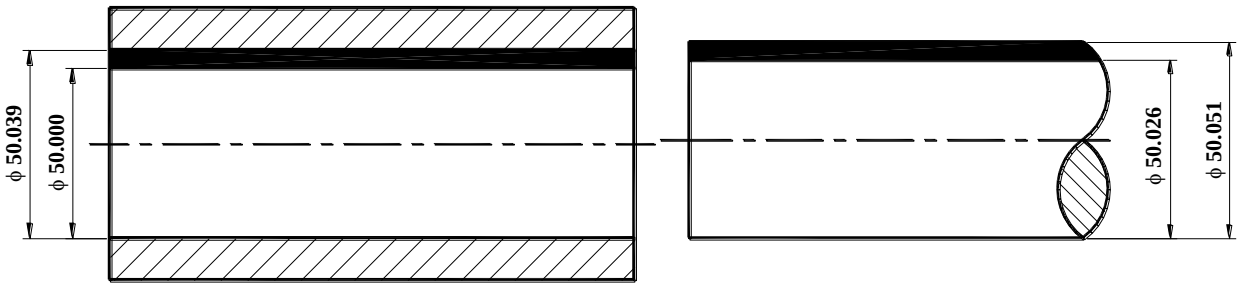


FIGURE T5.4

6. 5. DRAW THE ROUGHNESS GRADE SYMBOLS FOR THE SURFACES OF AN OBJECT SHOWN IN *FIGURE T5.6*.

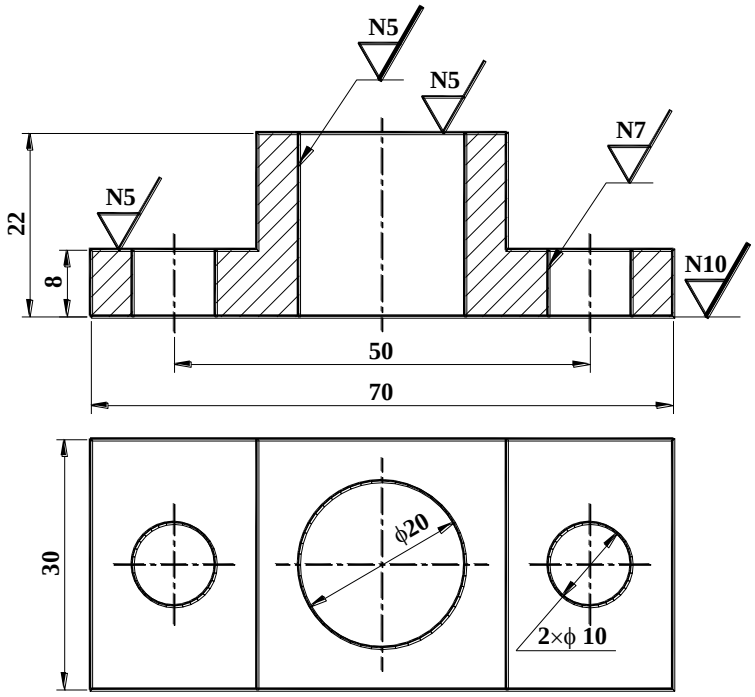
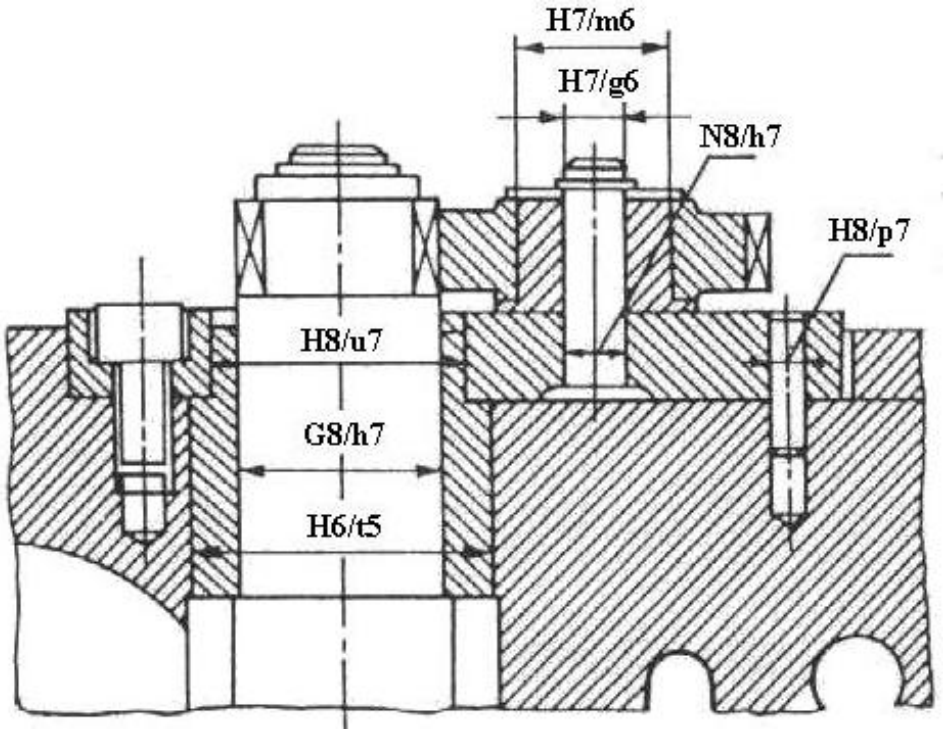


FIGURE T5.6

6.6. Suggest suitable fits and their letter and tolerance grades for the components shown in *Figure T5.4*.



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