

Tribhuvan University

Institute of Engineering

Thapathali Campus

Department of Automobile and Mechanical Engineering



ENGINEERING DRAWING II

ME 451



TUTORIAL SHEETS 2077

Engineering Drawing II Contents

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Figure T 1.3

Figure T 1.4









Figure T 1.15



2073 Question [10]

SHEET NO.: 2.

ISOMETRIC DRAWING (CONSISTING SECTIONS)

1. Draw the isometric drawings in section from the given sectional and truncated views



Figure T 2.1









Figure T 2.2





Figure T 2.5

- 2. A cylindrical slab having 80 mm as diameter and 50 mm thickness, is surmounted by a cube of edge 40 mm. On the top of the cube rests a square pyramid of altitude 50 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.
- **3.** A hemisphere of diameter 40 mm rests centrally over a frustum of cone of base diameter 60 mm, top diameter 30 mm and height 60 mm. Draw isometric projections of the combination of solids.
- **4.** A cylindrical slab of 70 mm as diameter and 40 mm thickness is surmounted by a frustum of a square pyramid of base side 50 mm, top base side 25 mm and height 40 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 isomeric view of the combination of these solids
- 5. 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 isomeric view of the combination of these solids.











Figure T 3.2









Figure T 3.7





Figure T 3.8



Figure T 3.9



Figure T 3.10



Figure T 3.12

SHEET NO.: 4. PERSPECTIVE PROJECTION I

1. Draw the Parallel perspective projection from the given orthographic views.



2. Draw the angular perspective projection from the given orthographic views.



SHEET NO.: 5. PERSPECTIVE PROJECTION II

- 1. A cube of side base 30 mm rests with it base on the ground and one of the faces inclined at 45° to the picture plane. The nearest vertical edges touch the PP. The station point is 50 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.
- 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.** Draw the perspective view of a cube of 25 mm edge, resting on ground with one of its faces. It has one of its nearest vertical edges is 10 mm behind 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.
- **4.** A model of steps has 3 steps of 15 mm tread and rise 10 mm. The steps measure 50 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.
- **5.** 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.



Figure T 6.1



Figure T 6.3



Figure T 6.2





Figure T 6.4













SHEET NO.: 7. LIMIT, FIT, TOLERANCES AND RIVET, NUT, BOLT, STUD

1. In freehand sketch, make the complete fit analysis of the following fit symbols.(indicate the type of fit ,the allowance, upper and lower limit , upper and lower deviation, and Hole of Shaft basis system)

a. 50H8/d9 b.100 H7/s6 c. 60S6/h12 d. 130 H7/u6 e.150 H7/n6 f. 180 S7/h6

Given Data

Fundamental Deviation (in mm) given by Tolerance position Letter

	50 mm	60 mm	100 mm	130 mm	150 mm	180 mm
н	0.000	0.000	0.000	0.000	0.000	0.000
h	0.000	0.000	0.000	0.000	0.000	0.000
d	-0.080	-0.100	-0.120	-0.145	0.145	0.145
S	-0.034	-0.042	-0.058			
S	0.043	0.053	0.071	0.092	0.100	0.108
n	0.017	0.02	0.02	0.020	0.023	0.023
u	0.070	0.087	0.124	0.170	0.190	0.210

International tolerance Grade given by the IT Number in mm.

Dia. steps in mm		Tolerance grades							
Over	to	5	6	7	8	9	10	11	
-	3	4	6	10	14	25	40	60	
3	6	5	8	12	18	30	48	75	
6	10	6	9	15	22	36	58	90	
10	18	8	11	18	27	43	70	110	
18	30	9	13	21	33	52	84	130	
30	50	11	16	25	39	62	100	160	
50	80	13	19	30	46	74	120	190	
80	120	15	22	35	54	87	140	220	
120	180	18	25	40	63	100	160	250	
180	250	20	29	46	72	115	185	290	
250	315	23	32	52	81	130	210	320	
315	400	25	36	57	89	140	230	360	
400	500	27	40	63	97	155	250	400	

2. Make top view and sectional front view of the following riveted joint

- a. Single row lap riveted joint
- b. Double row, chain lap riveted joint
- c. Double riveted zig-zag lap joint
- d. Single row, single strap riveted butt joint
- e. Single row, double strap butt riveted joint
- f. Double row, double strap zig-zag, riveted butt joint
- g. Double row, double strap chain riveted butt joint
 - 3. Make the conventional three views of Hex.M16 X3X40/60
 - 4. Make the conventional three views of stud M 20 20/60
 - 5. Make the conventional three views of SQ bolt of M20

6. Find (*i*) type of fit and (*ii*) tolerances of a 45 mm diameter shaft rotating at a normal speed.



Figure T 7.1

7. 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.



Figure T 7.2

8. 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 T 7.3

SHEET NO.: 8. FAMILIARIZATION WITH GRAPHICAL SYMBOLS

1.	Lap Weld	2.	Fillet	
3.	Square Butt	4.	Single V-Butt	
5.	Double V-Butt	6.	Single U-Butt	
7.	Double U- Butt	8.	Single J-Butt	
9.	Single Bevel Butt	10.	Double Bevel Butt	
11.	Double J-Butt	12.	Spot Weld	
13.	Bead or Edge Weld	14.	Seam Weld	
15.	Field Weld	16.	Weld all around	
17.	Fillet Weld on own side of joints	18.	Fillet weld on opposite side of joint	
19.	Fillet weld on both sides of joint			

1. Sketch freehand the graphical symbols for the following welding items.

2. Sketch free hand the graphical symbols for the following machining and surface roughness items.

- a. Surface may be produced by any method
- b. Material removal by machining is required
- c. Surface to be obtained without removal of material
- d. Surface to be obtained by –casting, milling, Nickel plated, precision grinding, fine turning.
- e. Surface to be coated.

3. Sketch the roughness grade symbols for the surfaces produced by



4. Sketch the lay symbols and different surface finish-conditions.









B. Structural Items



C. Other Engineering – Architecture, Civil, Agriculture, Topographic etc. item





SHEET NO.: 9. DETAIL DRAWING

SHEET NO.: 10. ASSEMBLY DRAWING I

SHEET NO.: 11. ASSEMBLY DRAWING II

SHEET NO.: 12. BUILDING DRAWING