2018

Mechanical Engineering,
Indian institute of Technology Kanpur

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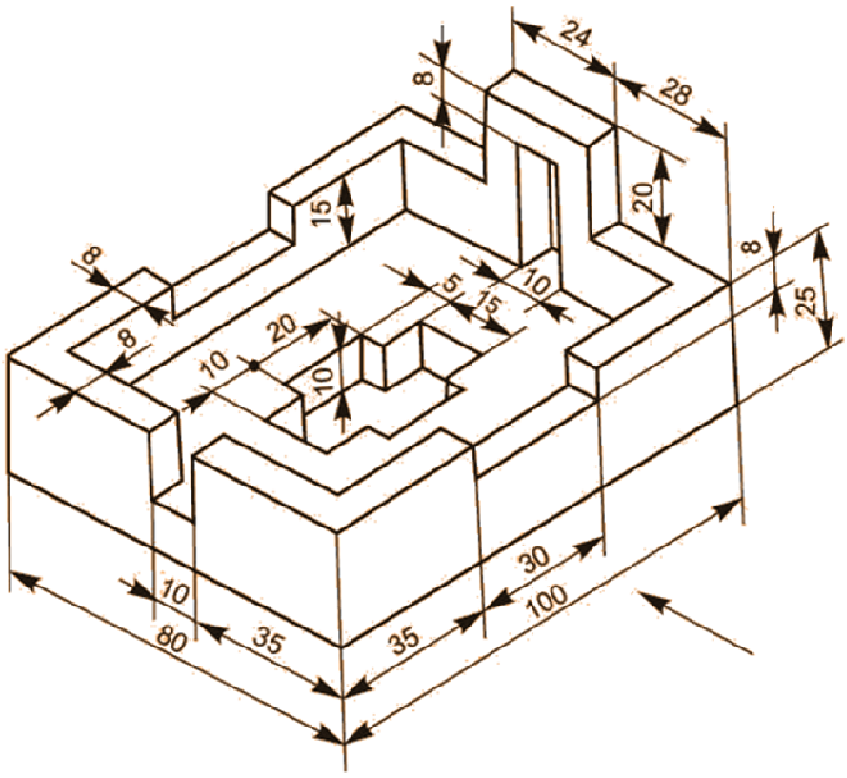
[ME 251 LABORATORY EXERCISES]

August - November, 2018

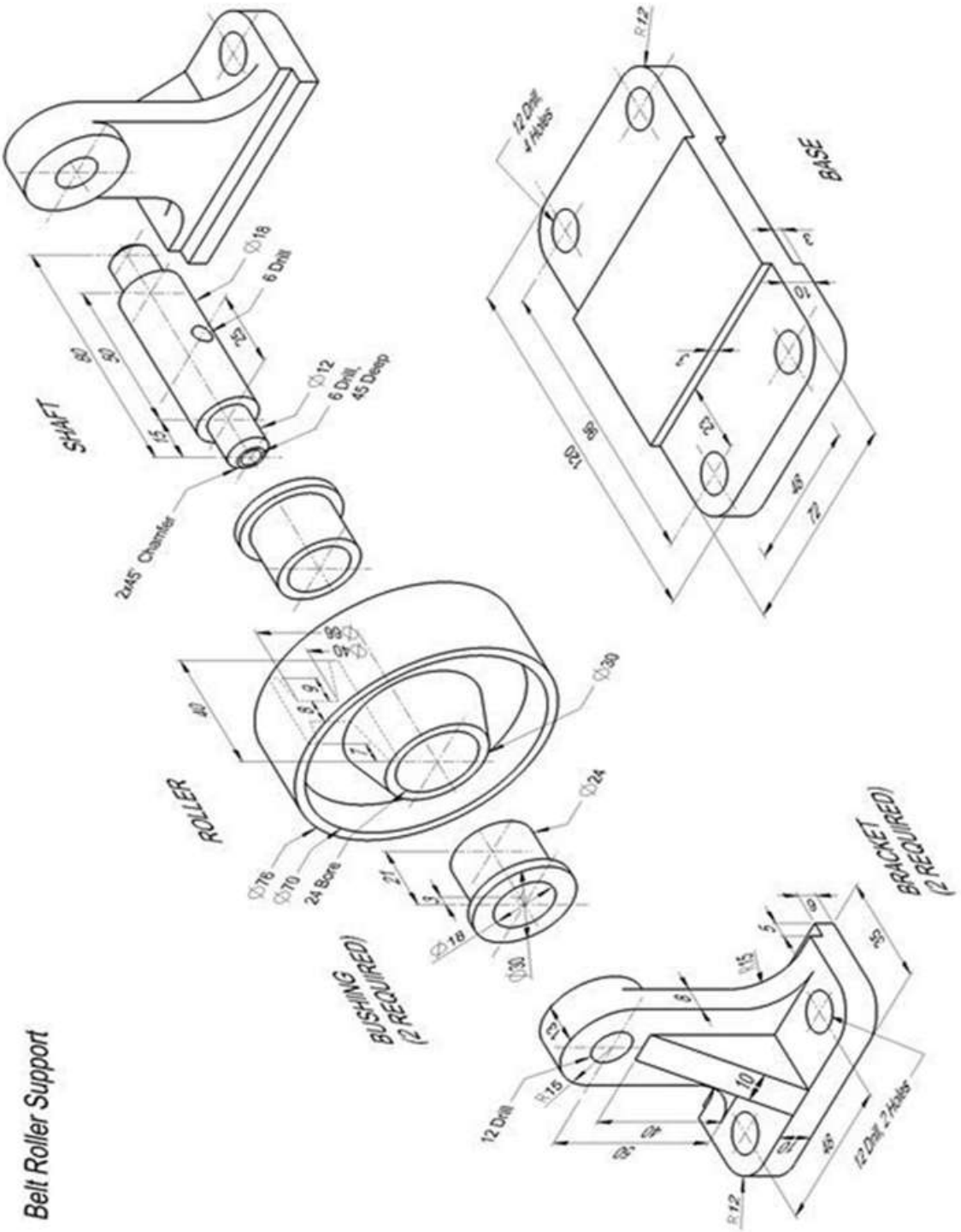
ME 251 Laboratory Exercise 1 (WARM UP)

Q. Draw the **full-section** front view and **half-section** side view of the object (problem from book "Machine drawing" by Sidheswar, et. al) shown below. Also, draw the top view.



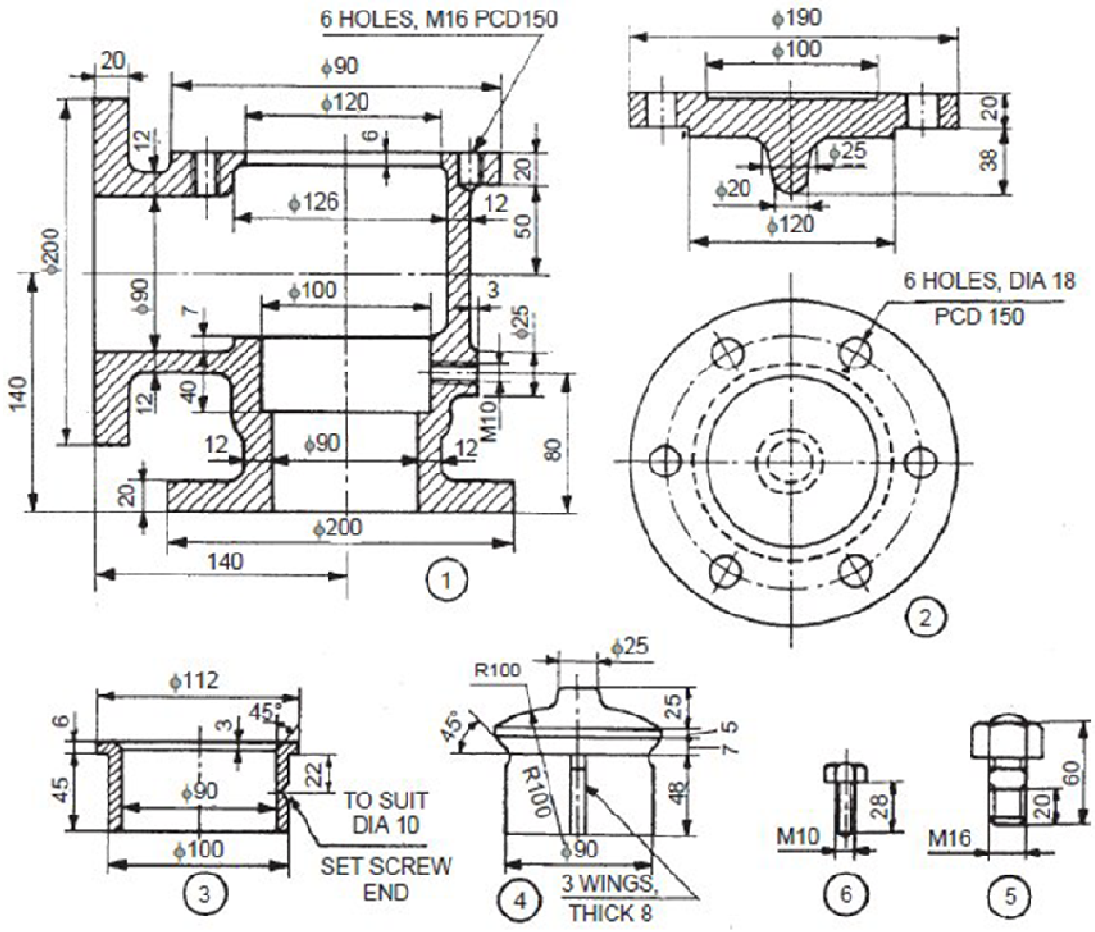
ME 251 Laboratory Exercise 2

Q. Draw the **fullsectioned** assembly drawing of the **Belt Roller Support** in front view. Also, draw the **non-sectioned** top view. Number the parts and show the Bill of Material. Part drawings (**SOURCE**:http://www.chegg.com/homework-help/questions-and-answers/belt-roller-support-45-glh-ler-dr-36-r12-q28462934) are shown below.



ME 251 Laboratory Exercise 3

Q. Draw the **fullsectioned** assembly drawing of the **Non-return valve** in front view. Number the parts and show the Bill of Material. Part drawings (**SOURCE**:https://www.slideshare.net/umeshchikhale/assembly-and-details) are shown below.



Parts list

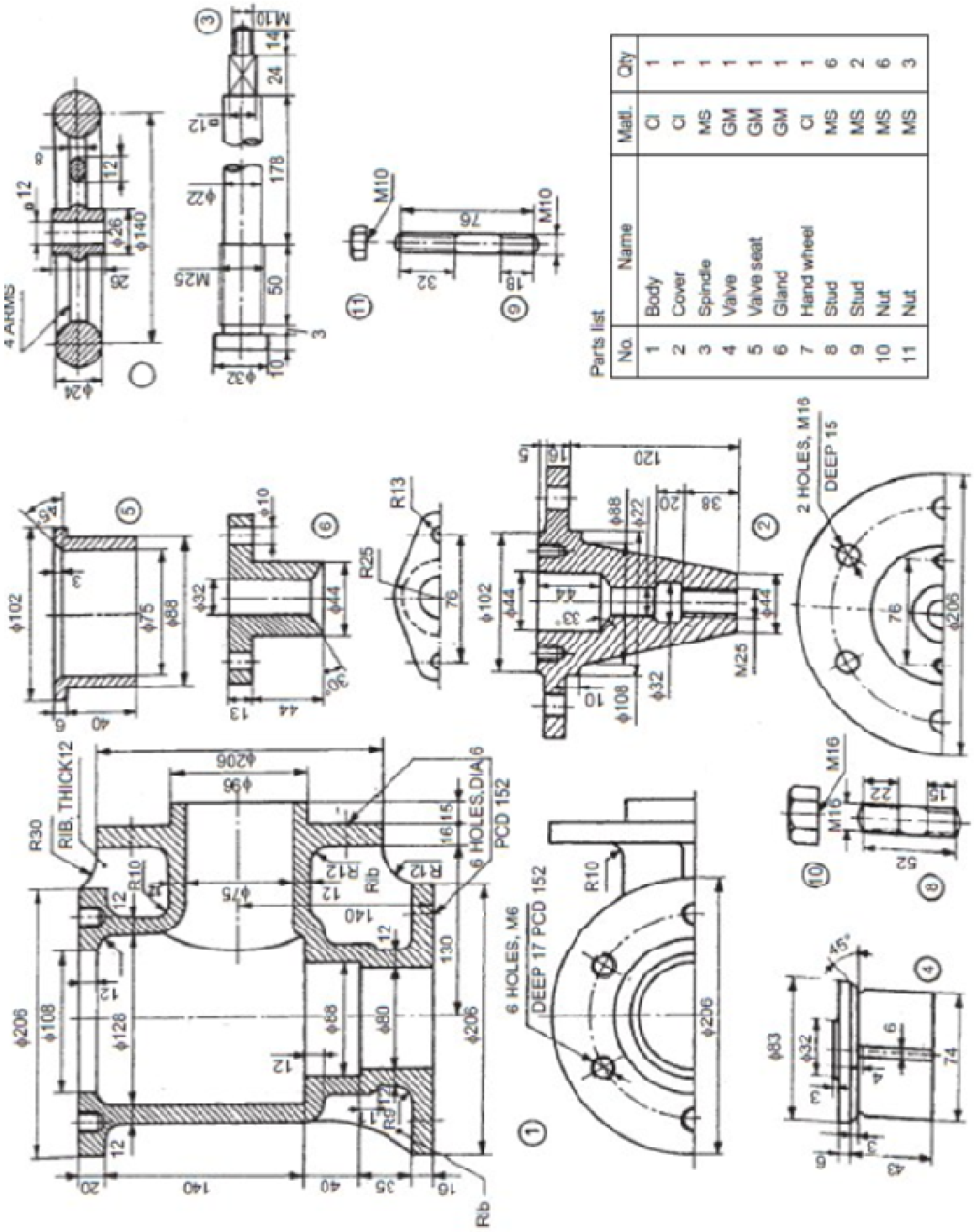
No.	Name	Matl	Qty
1	Body	Brass	1
2	Cover	Brass	1
3	Valve seat	Bronze	1
4	Valve	Brass	1
5	Stud with nut	MS	6
6	Set screw	MS	1

Fig. 18.30 Non-return valve (Light duty)

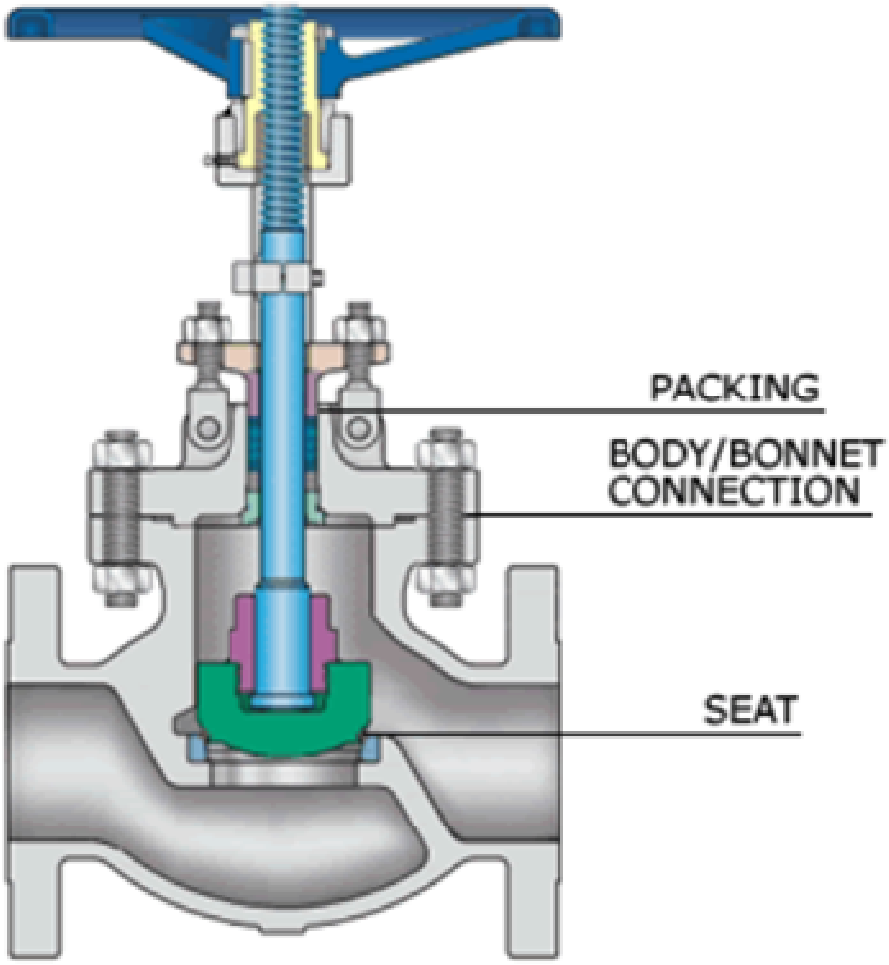
Part Drawings of the Non-return Valve

ME 251 Laboratory Exercise 4

Q. Draw the **fullsectioned** assembly drawing of the **Feed check valve** in front view. Number the parts and show the Bill of Material. Part drawings (**SOURCE**:https://www.slideshare.net/umeshchikhale/assembly-and-details) and a schematic are shown below.



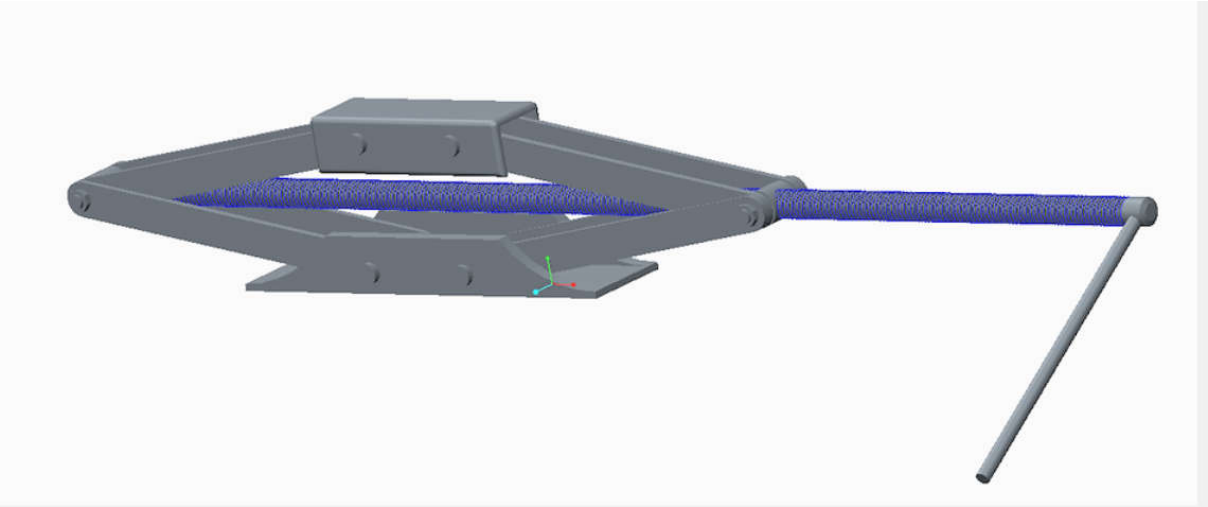
Part Drawings of the Feed Check Valve

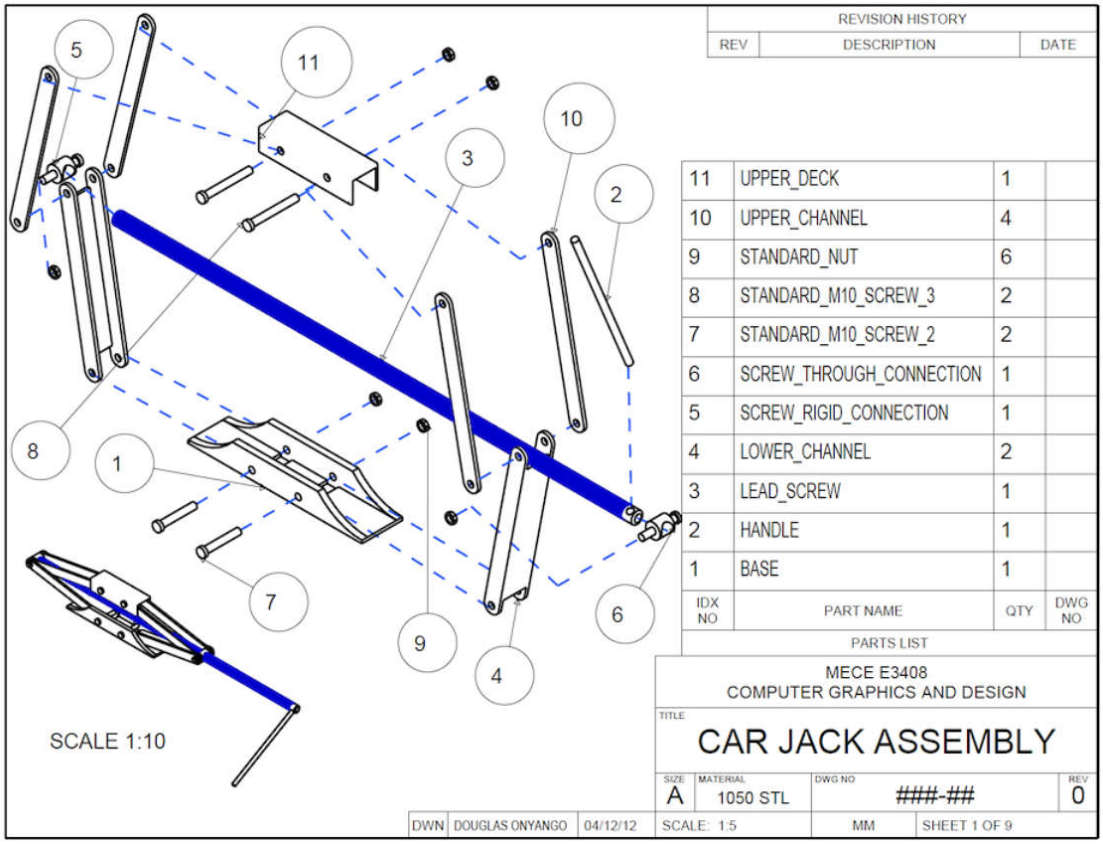


Schematic of the Feed Check Valve

ME 251 Laboratory Exercise 5

Q. Draw the **fullsectioned** assembly drawing of the **Screw Jack** in front view. Also, draw the **non-sectioned** top view. Number the parts and show the Bill of Material. Part drawings (**SOURCE**: https://donyango.carbonmade.com/projects/4388020) are shown below.





REVISION HISTORY

REV	DESCRIPTION	DATE

IDX NO	PART NAME	QTY	DWG NO
11	UPPER_DECK	1	
10	UPPER_CHANNEL	4	
9	STANDARD_NUT	6	
8	STANDARD_M10_SCREW_3	2	
7	STANDARD_M10_SCREW_2	2	
6	SCREW_THROUGH_CONNECTION	1	
5	SCREW_RIGID_CONNECTION	1	
4	LOWER_CHANNEL	2	
3	LEAD_SCREW	1	
2	HANDLE	1	
1	BASE	1	

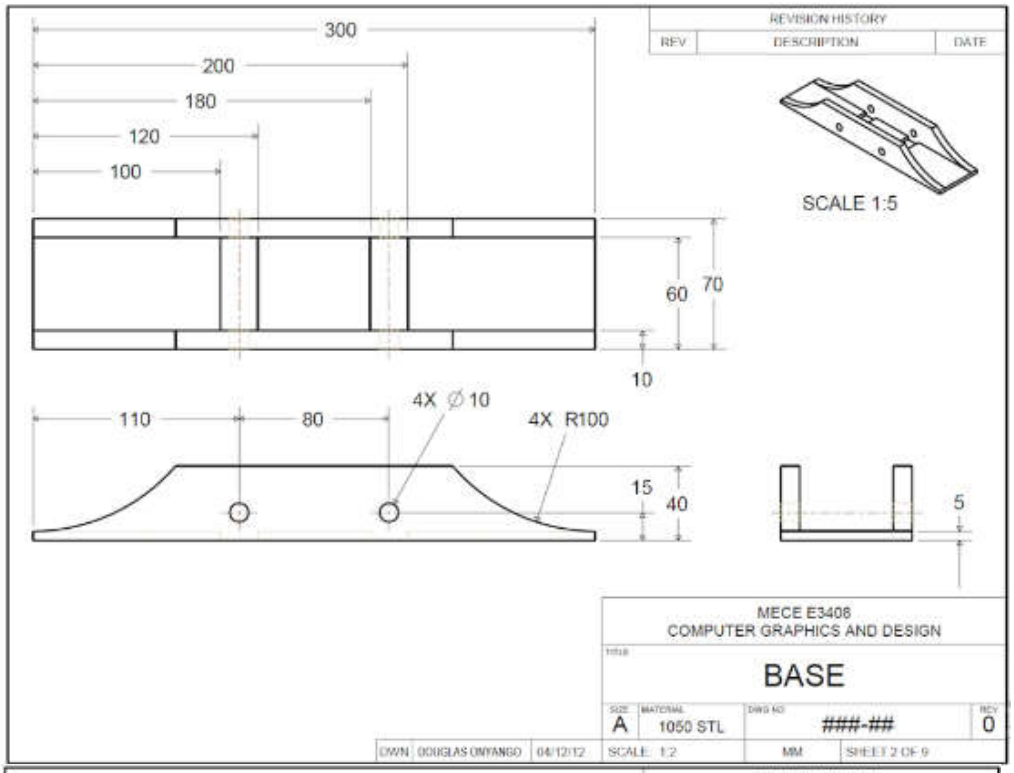
PARTS LIST

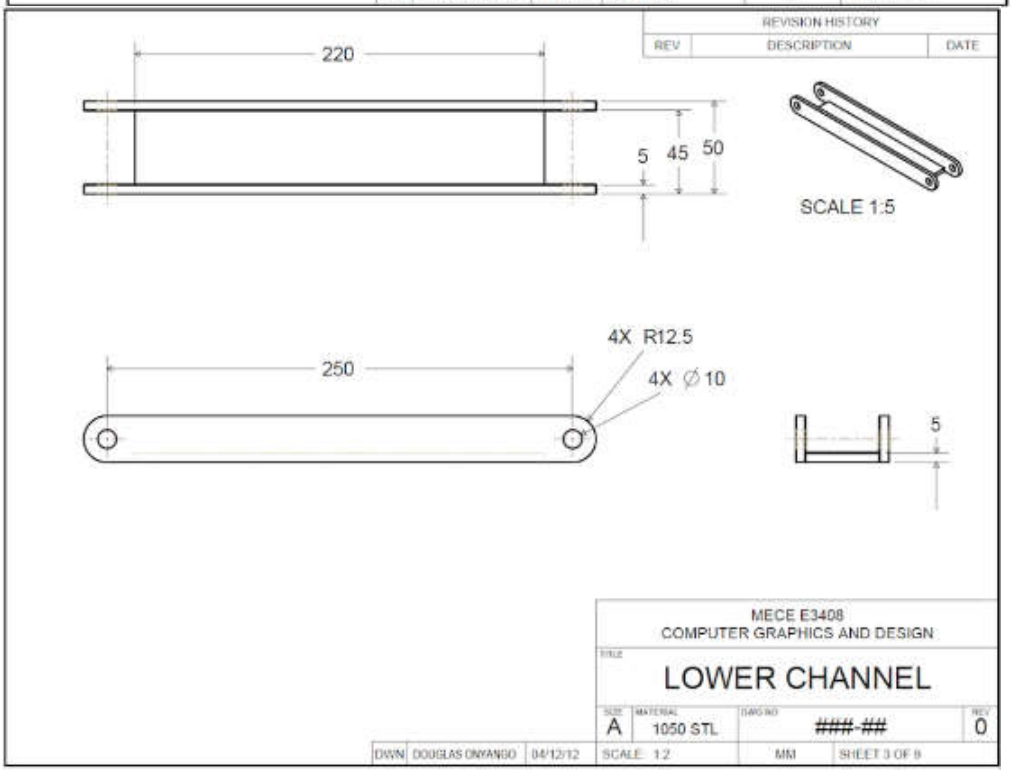
MECE E3408
COMPUTER GRAPHICS AND DESIGN

TITLE: CAR JACK ASSEMBLY

SIZE	MATERIAL	DWG NO	REV
A	1050 STL	###-##	0

DWN	DOUGLAS ONYANGO	04/12/12	SCALE: 1:5	MM	SHEET 1 OF 9


REVISION HISTORY
REV
DESCRIPTION
DATE
300
200
180
120
100
60
70
10
SCALE 1:5
110
80
4X ∅10
4X R100
15
40
5
MECE E3408
COMPUTER GRAPHICS AND DESIGN
BASE
SIZE
A
MATERIAL
1050 STL
DWG NO
###-##
REV
0
DWN
DOUGLAS ONYANGO
04/12/12
SCALE: 1:2
MM
SHEET 2 OF 9


REVISION HISTORY
REV
DESCRIPTION
DATE
220
5
45
50
SCALE 1:5
250
4X R12.5
4X ∅10
5
MECE E3408
COMPUTER GRAPHICS AND DESIGN
LOWER CHANNEL
SIZE
A
MATERIAL
1050 STL
DWG NO
###-##
REV
0
DWN
DOUGLAS ONYANGO
04/12/12
SCALE: 1:2
MM
SHEET 3 OF 9

REVISION HISTORY		
REV	DESCRIPTION	DATE

SCALE 1:5

MECE E3408
COMPUTER GRAPHICS AND DESIGN

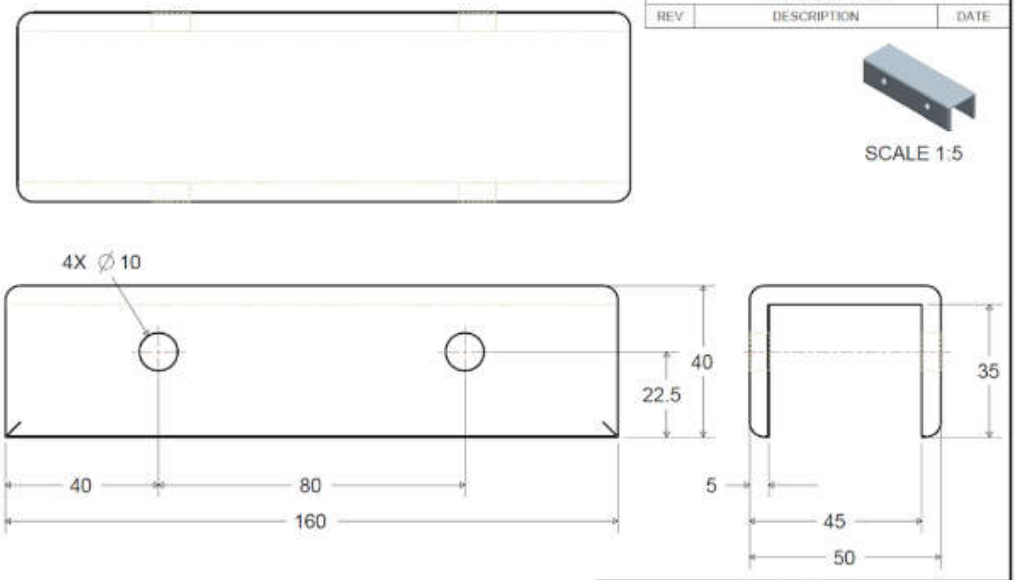
TITLE: UPPER CHANNEL

SIZE	MATERIAL	DWG NO	REV
A	1050 STL	###-##	0

DWN	DOUGLAS ONYANGO	04/12/12	SCALE: 1:2	MM	SHEET 4 OF 9

REVISION HISTORY		
REV	DESCRIPTION	DATE

SCALE 1:5



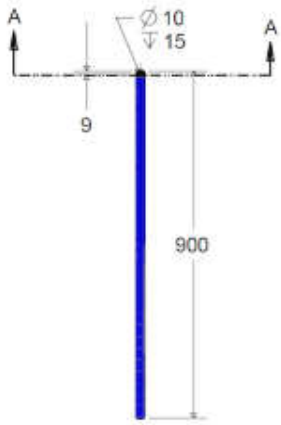
All Rounds R 4

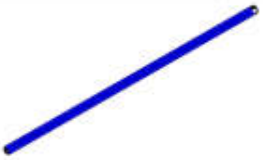
MECE E3408
COMPUTER GRAPHICS AND DESIGN

TITLE: UPPER DECK

SIZE	MATERIAL	DWG NO	REV
A	1050 STL	###-##	0

DWN	DOUGLAS ONYANGO	04/12/12	SCALE: 1:1	MM	SHEET 5 OF 9





All Chamfers 4 X 2

Square thread with pitch = 3 mm. Left-handed.

SECTION A-A
SCALE 1:1

REVISION HISTORY		
REV	DESCRIPTION	DATE

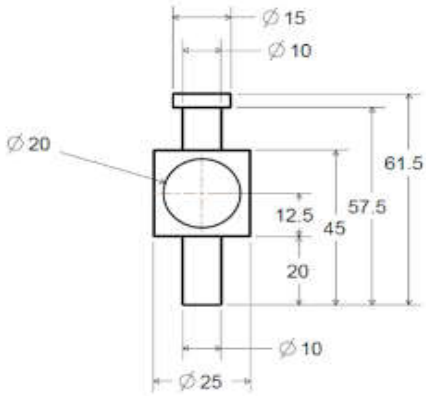
MECE E3408
COMPUTER GRAPHICS AND DESIGN

TITLE: LEAD SCREW

SIZE	MATERIAL	DWG NO	REV
A	1050 STL	###-##	0

DWN	DOUGLAS ONYANGO	04/12/12	SCALE: 1:10	MM	SHEET 6 OF 9

REVISION HISTORY		
REV	DESCRIPTION	DATE



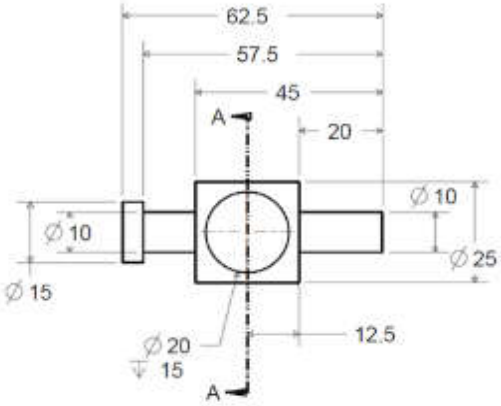
MECE E3408
COMPUTER GRAPHICS AND DESIGN

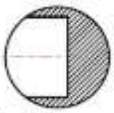
TITLE: SCREW THROUGH CONNECTION

SIZE	MATERIAL	DWG NO	REV
A	1050 STL	###-##	0

DWN	DOUGLAS ONYANGO	04/12/12	SCALE: 1:1	MM	SHEET 7 OF 9

REVISION HISTORY		
REV	DESCRIPTION	DATE





SECTION A-A

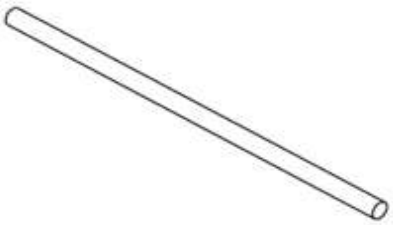
MECE E3408
COMPUTER GRAPHICS AND DESIGN

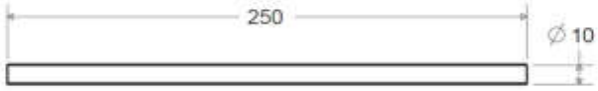
TITLE: SCREW RIGID CONNECTION

SIZE	MATERIAL	DWG NO	REV
A	1050 STL	###-##	0

DWN	DOUGLAS ONYANGO	04/12/12	SCALE: 1:1	MM	SHEET 8 OF 9

REVISION HISTORY		
REV	DESCRIPTION	DATE





MECE E3408
COMPUTER GRAPHICS AND DESIGN

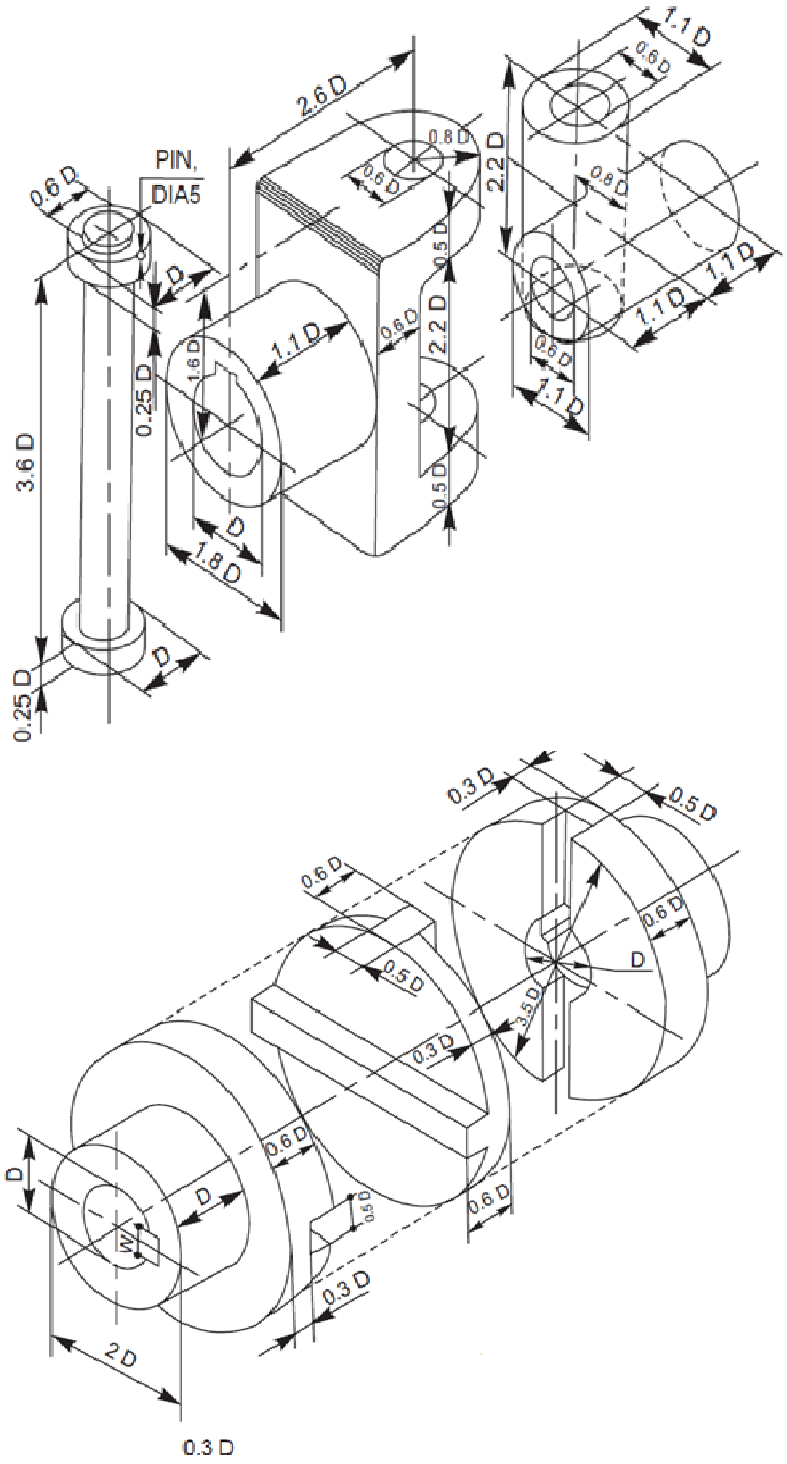
TITLE: HANDLE

SIZE	MATERIAL	DWG NO	REV
A	1050 STL	###-##	0

DWN	DOUGLAS ONYANGO	04/12/12	SCALE: 1:2	MM	SHEET 9 OF 9

ME 251 Laboratory Exercise 6

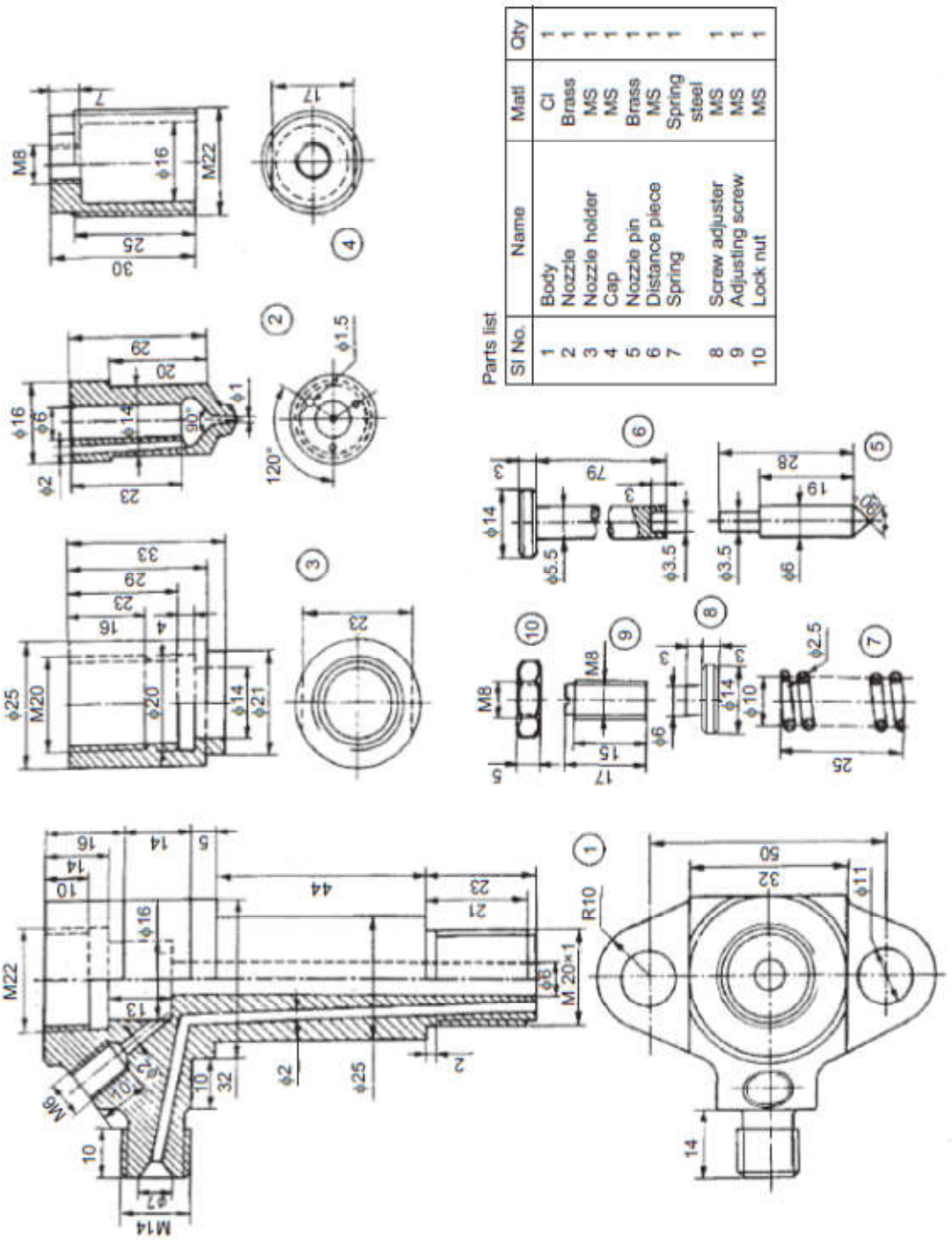
Q. Draw the **fullsectioned** assembly drawings of Universal and Oldham couplings part drawings (**SOURCE**: https://clipartxtras.com/download/43ad6857944e75b608ec99c8e0008248dd82a7fa.html, https://blogpuneet.wordpress.com/2013/10/08/oldhams-coupling/) of which are shown below. Choose *D* appropriately.



Part Drawings of the Universal (top) and Oldham (bottom) couplings

ME 251 Laboratory Exercise 7

Q. Draw the **halfsectioned** assembly drawings of the **Fuel injector** part drawings (**SOURCE**: http://www.mechscience.com/fuel-injector-assembly-cad-drawing-practice-3d-modeling-cfd-analysis-in-fuel-injector/) of which are shown below.

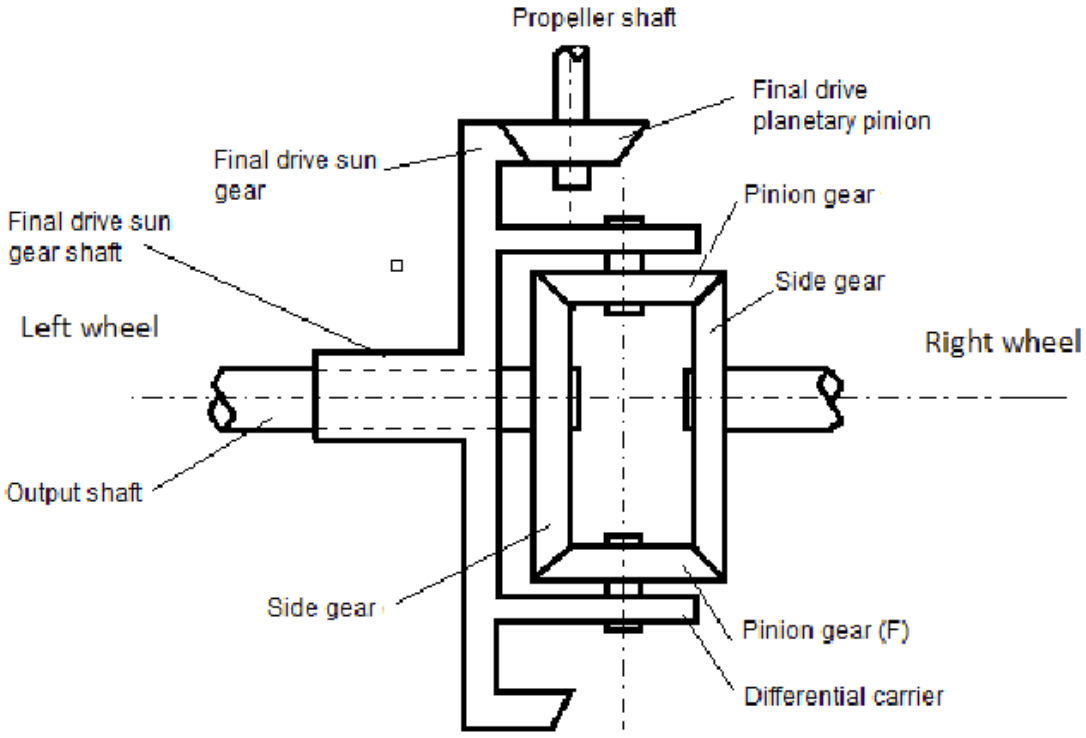


Part Drawings of Fuel injector system

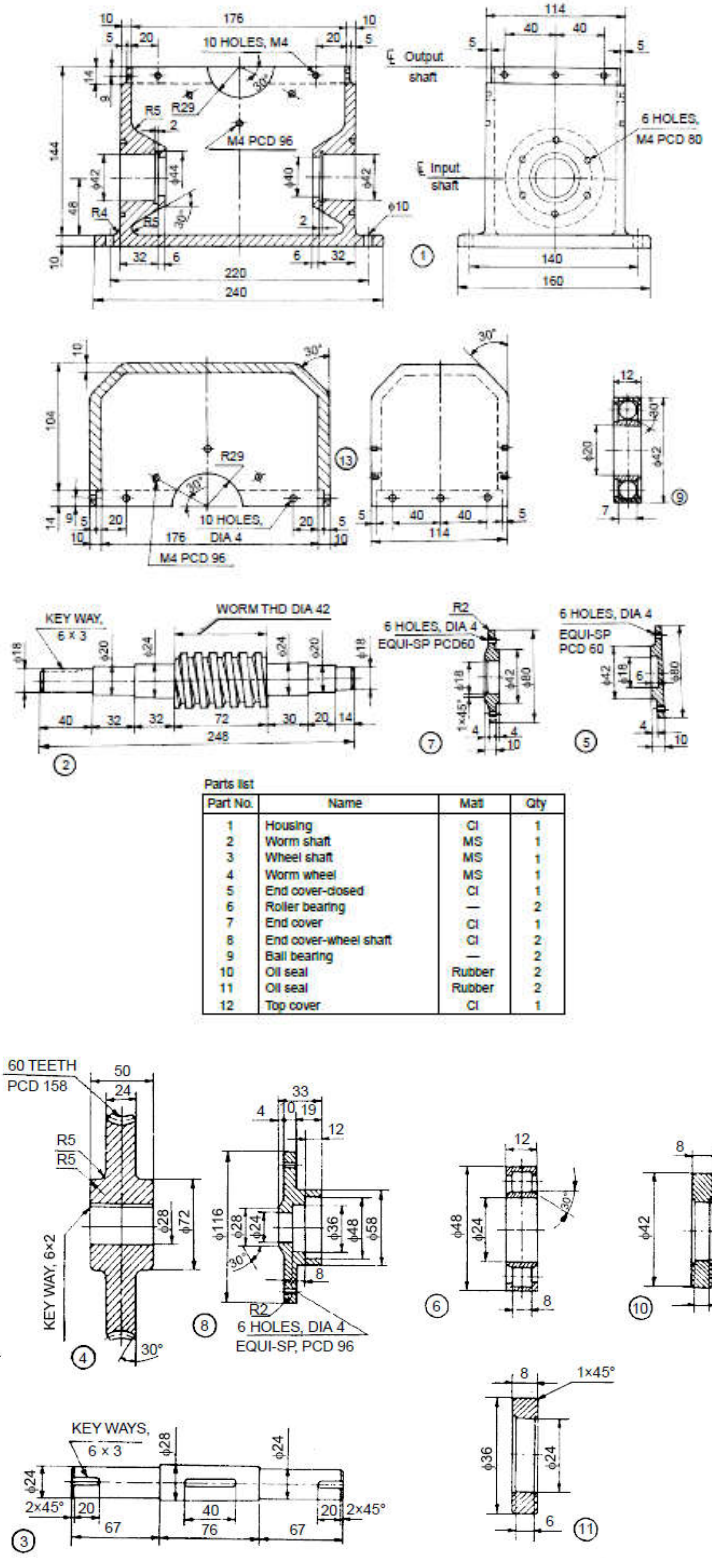
ME 251 Laboratory Exercise 8

Q. Draw the assembly drawings of the **differential mechanism and speed reducer** part drawings (**SOURCE**: Machine drawing book by KL Narayana, P Kannaiah, K V Reddy) of which are shown below.

(Extract dimensions from the internet, or they will be provided)



Part Drawings of the Differential mechanism



Parts list

Part No.	Name	Matl	Qty
1	Housing	CI	1
2	Worm shaft	MS	1
3	Wheel shaft	MS	1
4	Worm wheel	MS	1
5	End cover-closed	CI	1
6	Roller bearing	—	2
7	End cover	CI	1
8	End cover-wheel shaft	CI	2
9	Ball bearing	—	2
10	Oil seal	Rubber	2
11	Oil seal	Rubber	2
12	Top cover	CI	1

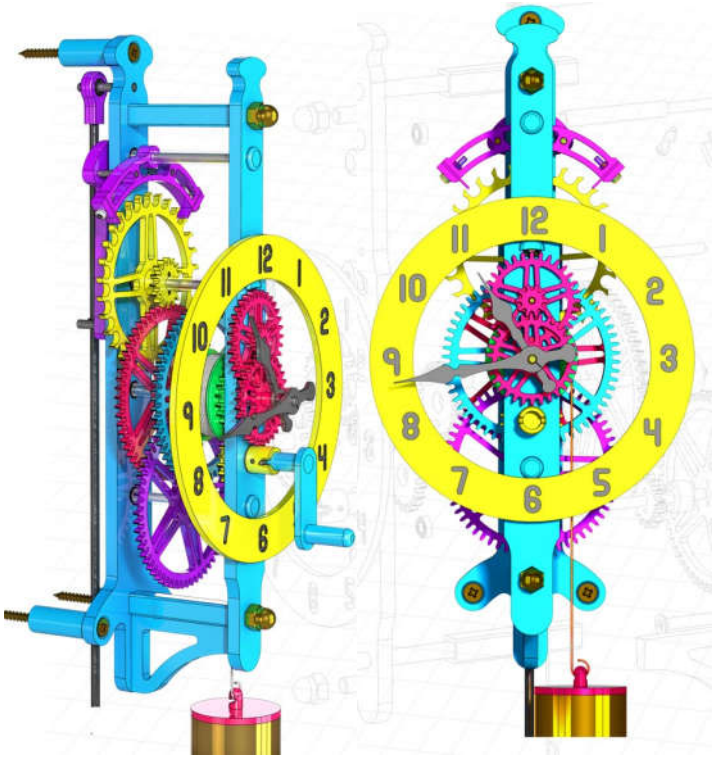
Part Drawings of the Speed reducer

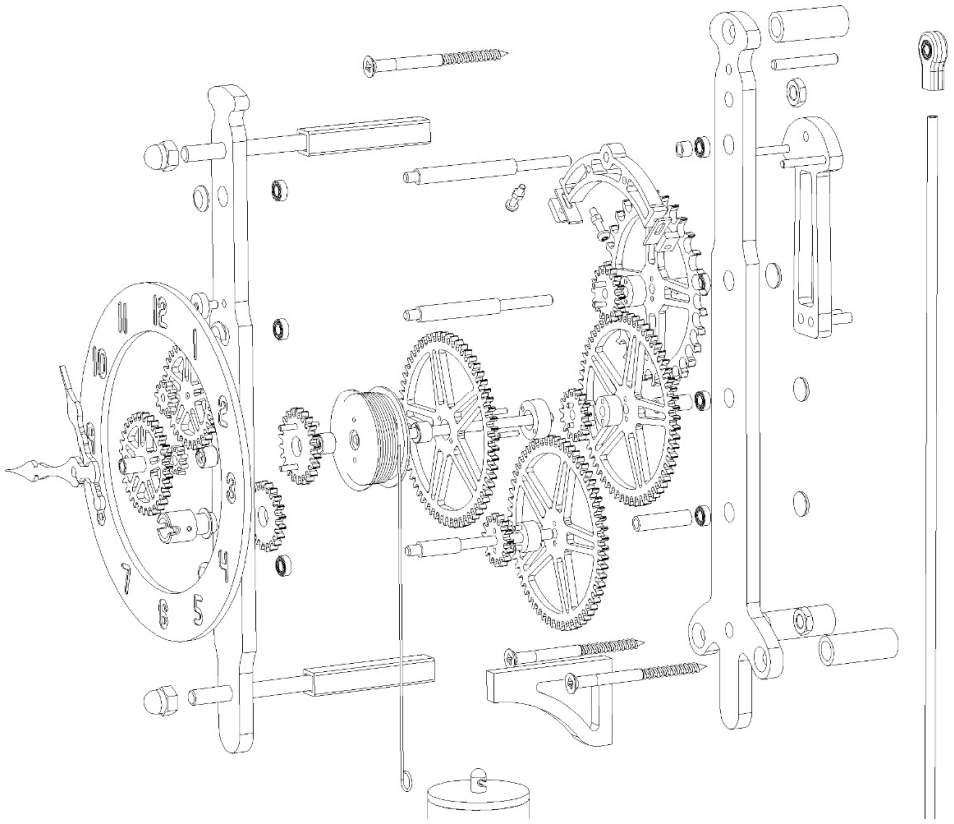
ME 251 Laboratory Exercise 9

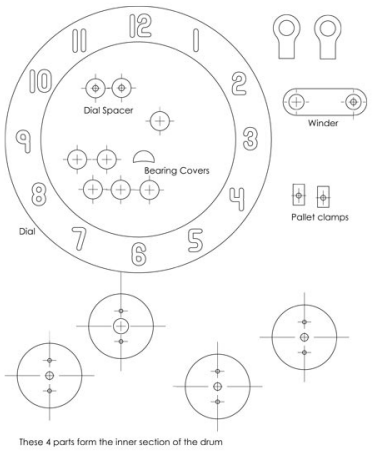
Q For the speed reducer problem in Exercise 8, try to figure the tolerances on the shaft (part #2), based on the discussions in class.

ME 251 PROJECT (2-3 Lab sessions)

Q. Draw the assembly drawings of the **clock** part drawings (**SOURCE**: http://www.woodenclocks.co.uk/page66.html) of which are shown below. (**Dimensions will be provided**.)



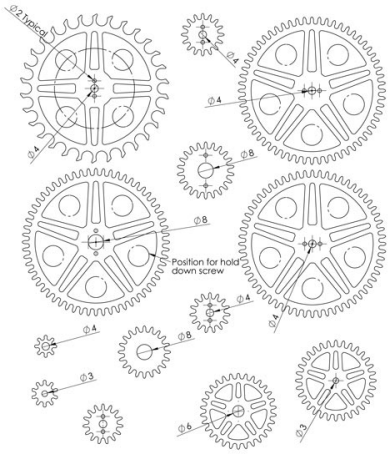




These 4 parts form the inner section of the drum

Clock 19 Profile Cutting Sheet - 2
All profiles on this sheet are 3mm thick.
See drawings for all other dimensions.

Brian Law
15-Jan-2014
Brian@woodenclocks.co.uk



Clock 19 Profile Cutting Sheet - 3

All profiles on this sheet are 3mm thick.

See drawings for all other dimensions.

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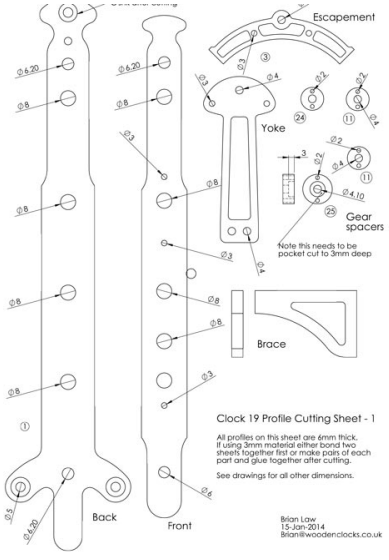
15-Jan-2014
Brian@woodenclocks.co.uk



Clock 19 Profile Cutting Sheet - 1

All profiles on this sheet are 6mm thick.
If using 3mm material either bond two sheets together first or make pairs of each part and glue together after cutting.

See drawings for all other dimensions.

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15-Jan-2014
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