

**COURSE FILE**

**MACHINE DRAWING  
(Subject Code: A40310)**

II Year B.TECH. (MECHANICAL ENGINEERING) II Semester

Prepared by **K.VIJAY, Asst. Professor**



**DEPARTMENT OF MECHANICAL ENGINEERING  
GEETHANJALI COLLEGE OF ENGINEERING & TECHNOLOGY  
CHEERYAL (V), KEESARA (M), R.R. DIST. - 501 301**  
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2015 – 2016





GEETHANJALI COLLEGE OF ENGINEERING & TECHNOLOGY

CHEERYAL (V), KEESARA (M), R.R. DIST. 501 301

**DEPARTMENT OF MECHANICAL ENGINEERING**

**(Name of the Subject /Lab Course): MACHINE DRAWING**

(JNTU CODE: A40310)

Programme: UG

**Branch: MECHANICAL ENGINEERING**

**Version No: 01**

Year: II

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Semester: II

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**Distribution List:**

**Prepared by:**

- 1) Name : K. VIJAY
- 2) Sign. :
- 3) Design.: Asst. Professor
- 4) Date :

**Verified by:**

**\* For Q.C Only.**

- |             |              |
|-------------|--------------|
| 1) Name :   | 1) Name:     |
| 2) Sign :   | 2) Sign :    |
| 3) Design : | 3) Design. : |
| 4) Date :   | 4) Date :    |

Approved by: (HOD)

- 1) Name : T.SIVA PRASAD
- 2) Sign :
- 3) Date :



GEETHANJALI COLLEGE OF ENGINEERING & TECHNOLOGY

CHEERYAL (V), KEESARA (M), R.R. DIST. 501 301

**COURSE FILE**

Department of: MECHANICAL ENGINEERING

Year and Semester to Whom Subject is offered: II Year B.Tech. II Semester

Name of the Subject: MACHINE DRAWING

Name of the Faculty: K. VIJAY      Designation: Asst.Professor      Department: Mech. Engg.

**INDEX**

- 1.1. Introduction to the subject
- 1.2. Pre-requisite/Co-requisite/Exclusion
- 1.3. Objectives of the subject
- 1.4. Outcomes of the subject
- 1.5. Teaching/Learning Methodology
- 1.6. JNTU Syllabus with Additional Topics
- 1.7. Unit wise Summary
- 1.8. Micro Plan
- 1.9. Time Table
- 1.10. Student list
- 1.11. Quality Control Sheets
- 1.12. Assignment questions, University Quiz and Regular examination question papers
- 1.13. Course Plan
- 1.14. Tutorial Sheets
- 1.15. Lecture Notes
- 1.16. Closure Report

**1.1. COURSE DESCRIPTION**

Machine drawing is used to communicate the necessary technical information required for manufacture and assembly of machine components. These drawings follow rules laid down in national and International Organizations for Standards (ISO).

Hence the knowledge of the different standards is very essential. Students have to be familiar with industrial drafting practices and thorough understanding of production drawings to make themselves fit in industries. The following topics have been covered to fulfill the above objectives.

Classification of Machine Drawings, Principles of Drawings, Sectioning, Dimensioning, Limits, Fits and Tolerance, Symbols and Conventional Representation, Screw Fasteners, Key Joints, Coupling and its Types, Riveted Joints, Welded Joints, Structural Applications, Assembly Drawings, Production Drawings, Reproduction of Drawing, Introduction of Computer Aided Drafting, Introduction of Solid 3D Modeling.

### **Introduction to the subject**

In our daily life, we come across a wide array of machines. It can be a sewing machine, a cycle or a motor car. Power is produced by the engine which makes use of a mechanism called slider crank mechanism. It converts reciprocating motion of a piston into rotary motion of the crank. The power of the engine is transmitted to the wheels with the help of different mechanisms. If you visit LPG gas filling plant or a bottling plant almost all the functions are done by making use of mechanisms. These are only few examples. Generally, manual handling in industries has been reduced to the minimum. In engineering, mechanisms and machines are two very common and frequently used terms. We shall start with simple definition of these terms.

### **I.3. Pre-requisites**

- Engineering Drawing

### **1.4. Objectives of the Machine Drawing**

Student will get methodically and well thought out presentation that covers fundamental issues common to almost all areas of machine drawing.

1. Students have an ability to apply knowledge of Modeling, science & engineering.
2. Student can modeled this drawing even in CAD/CAM software by applying the basic knowledge of machine drawing.
3. Students will able to demonstrate an ability to design and conduct experiments, analyze and interpret data and assembly and disassembly drawings knowledge will be provided.

### **I.5. Outcomes of the subject**

- Analysis of complex design systems related to mechanical Engineering.
- Making use of appropriate laboratory tools and design innovative methods.
- To motivate students to develop new innovative methods for measuring product Characteristics.
- To enhance the ability of students to work as teams.

- To enhance the ability to work as practicing mechanical engineers in manufacturing Industries and consulting firms.
- Improving skills to adopt modern methods in mechanical engineering as continuous improvement
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environment and societal context.

### **1.6. Teaching/Learning Methodology**

A mixture of lectures, tutorial exercises, and case studies are used to deliver the various topics. Some of these topics are covered in a problem-based format to enhance learning objectives. Others will be covered through directed study in order to enhance the students' ability of "learning to learn." Some case studies are used to integrate these topics and thereby demonstrate to students how the various techniques are inter-related and how they can be applied to real problems in an industry.

### **1.5. JNTU Syllabus**

#### **MACHINE DRAWING**

#### **Machine Drawing Conventions :**

Need for drawing conventions – introduction to IS conventions

- a) Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
- b) Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
- c) Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
- d) Title boxes, their size, location and details - common abbreviations & their liberal usage
- e) Types of Drawings – working drawings for machine parts.

#### **I. Drawing of Machine Elements and simple parts**

Selection of Views, additional views for the following machine elements and parts with every drawing proportions.

- a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
- b) Keys, cottered joints and knuckle joint.
- c) Rivetted joints for plates
- d) Shaft coupling, spigot and socket pipe joint.

e) Journal, pivot and collar and foot step bearings.

## II. Assembly Drawings:

Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.

a) Engine parts – stuffing boxes, cross heads, Eccentrics, Petrol Engine connecting rod, piston assembly.

b) Other machine parts - Screws jacks, Machine Vices Plummer block, Tailstock.

c) Valves : Steam stop valve, spring loaded safety valve, feed check valve and air cock

### 1.7.3. Websites:-

1. NPTEL Resources

### 1.8. Unit wise Summary

Sl No	Unit No.	Total No. of Periods	Topics to be covered	Reg./ Additional	Teaching aids used LCD, BB OHP, BB	Remarks
1			Need for drawing conventions – introduction to IS conventions	Regular	LCD, BB	
2			Conventional representation of materials	Regular	LCD, BB	
3			Common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.	Regular	LCD, BB	
4			Types of sections – selection of section planes and drawing of sections	Regular	LCD, BB	
5			Auxiliary sectional views	Regular	BB	
6			Methods of dimensioning	Regular	BB	
7			General rules for sizes and placement of dimensions for holes, centers, curved and tapered features.	Regular		
			Title boxes, their size, location and details			
8			Common abbreviations & their liberal usage	Regular	BB	
9			Types of Drawings – working drawings for machine parts	Regular	BB	
10			<b>Drawing of Machine Elements and simple parts</b>	Regular	LCD, BB	
11			Selection of Views, additional views for the machine elements and parts with every drawing proportions.	Regular	BB	
12			Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.	Regular	BB	

13		Keys, cottered joints and knuckle joint.	Regular	BB	
14		Rivetted joints for plates			
		Shaft coupling, spigot and socket pipe joint.			
		Assignment test-1		BB	
14		Journal, pivot and collar and foot step bearings.	Regular	BB	
15		<b>II. Assembly Drawings:</b>	Regular		
16		Drawings of assembled views for the part	Regular	LCD, BB	
17		Engine parts – stuffing boxes, cross heads	Regular	LCD, BB	
18		Eccentrics, Petrol Engine connecting rod	Regular	BB	
19		Piston assembly	Regular	BB	
20		Screws jacks, Machine Vices	Regular	LCD, BB	
21		Plummer block, Tailstock.	Regular	BB	
22		Valves : Steam stop valve, spring loaded safety valve, feed check valve and air cock.	Regular		

### 1.9. Micro Plan:-

Sl. No	Unit No.	Total No. of Periods	Date	Topics to be covered	Teaching aids used LCD. OHP. BB	Reg/ Additonal	Remarks
1		01	7.12.2015	Need for drawing conventions – introduction to IS conventions	LCD, BB	Regular	
2		01	10.12.2015	Conventional representation of materials	LCD, BB	Regular	
3		01	14.12.2015	Common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.	LCD, BB	Regular	
4		01	17.12.2015	Types of sections – selection of section planes and drawing of sections	LCD, BB	Regular	
5		01	21.12.2015	Auxiliary sectional views	BB	Regular	
6		01	28.12.2015	Methods of dimensioning	BB		
7		01	01.01.2016	General rules for sizes and placement of dimensions for holes, centers, curved and tapered features.		Regular	
			04.01.2016	Title boxes, their size, location and details		Regular	
8	<b>II</b>	01	08.01.2016	Common abbreviations & their liberal usage	BB	Regular	
9		01	11.01.2016	Types of Drawings – working drawings for machine parts	BB	Regular	



10		01	15.01.2016	<b>Drawing of Machine Elements and simple parts</b>	LCD,B B	Regula r	
11		01	18.01.2016	Selection of Views, additional views for the machine elements and parts with every drawing proportions.	BB		
12		01	22.01.2016	Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.	BB		
13		01	25.01.2016	Keys, cottered joints and knuckle joint.	BB		
14			25.01.2016	Riveted joints for plates			
15		01	29.01.2016	Shaft coupling, spigot and socket pipe joint.		Regula r	
16		01	01.02.2016	Journal, pivot and collar and foot step bearings.	BB	Regula r	
17		01	05.02.2016	<b>II. Assembly Drawings:</b>		Regula r	
18		01	08.02.2016	Drawings of assembled views for the part	LCD,B B	Regula r	
20		01	12.02.2016	Engine parts – stuffing boxes, cross heads	LCD,B B	Regula r	
20		01	15.02.2016	Eccentrics, Petrol Engine connecting rod	BB	Regula r	
21		01	19.02.2016	Piston assembly	BB	Regula r	
22		01	22.02.2016	Screws jacks, Machine Vices	LCD,B B	Regula r	
23		01	26.02.2016	Plummer block, Tailstock.	BB	Regula r	
24		01	04.03.2016	Valves : Steam stop valve, spring loaded safety valve, feed check valve and air cock.		Regula r	
25							

### 1.7. Subject Contents

1.7. 1. Synopsis page for each period (62 pages)

1.7.2. Detailed Lecture notes containing:

1. Ppts
2. Ohp slides
3. Subjective type questions (approximately 5 to 8 in no)
4. Objective type questions (approximately 20 to 30 in no)
5. Any simulations

**1.8. Course Review (By the concerned Faculty):**

(i)Aims (ii) Sample check (iii) End of the course report by the concerned faculty

**GUIDELINES:**

Distribution of periods:

No. of classes required to cover JNTU syllabus	: 54
No. of classes required to cover Additional topics	: Nil
No. of classes required to cover Assignment tests (for every 2 units 1 test)	: 4
No. of classes required to cover tutorials	: 2
No. of classes required to cover Mid tests	: 2
No of classes required to solve University Question papers	: 2
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Total periods	64



GEETHANJALI COLLEGE OF ENGINEERING & TECHNOLOGY

CHEERYAL (V), KEESARA (M), R.R. DIST. 501 301

**DEPARTMENT OF MECHANICAL ENGINEERING**

Time	9.30-10.20	10.20-11.10	11.10-12.00	12.00-12.50	12.50-1.30	1.30-2.20	2.20-3.10	3.10-4.00	
Per	1	2	3	4	LUNCH	5	6	7	
Mon	TE- I	KOM	CRT	CRT		MACHINE DRAWING			
Tue	GS	MF&HM/PT LAB				MF&H M*	LIB/MENT/CACHE/SPORTS		
Wed	MF&H M	PT	M-II	M-II		TE- I	KOM*	GS	
Thur	PT	MF&H M	KOM	M-II*		MF&HM/PT LAB			
Fri	M-II	PT*	TE- I	MF&H M		MACHINE DRAWING			
Satur	KOM	KOM	TE- I*	GS		MF&H M	PT	M II	
S.No	Subject(T/P)					Faculty Name			Sub Code
1	Production Technology				Mr.K.Jitendar Reddy/Subbarao			A40312	4+1* Per
2	Kinematics of Machinery				Mr.K.Raju/V Sandeepa			A40309	4+1* Per
3	Thermal Engineering - I				Mr. P.Laxmi Reddy/B Bhasker			A40313	4+1* Per
4	Mechanics of Fluids and Hydraulic machines				Dr. M. Devaiah/Rajendar			A 40112	4+1* Per
5	Machine Drawing				Mr. K. Vijay,B Shravan,M Mahipal			A40310	4+1* Per
6	Mathematics - II				Ms.Molimol/Mr. N. Nagi Reddy			A40006	4+1* Per
7	Production Technology Lab				Mr.K.Jitendar Reddy,Mr.T Suresh			A40382	3 Per
8	Mechanics of Fluids and Hydraulic machines Lab				Dr.M.Deviah,Mr. Rajendar			A40188	3 Per
9	Gender sensitization				Mr. CBN Murthy				3 Per
10	CACHE				Ms. Madhumathi				2 Per
11	CRT				Mr.Subbarao				2 Per
12	Mentoring/Library/Sports								2 Per

\* Represents Tutorial class



GEETHANJALI COLLEGE OF ENGINEERING & TECHNOLOGY

CHEERYAL (V), KEESARA (M), R.R. DIST. 501 301

Year/Sem/Sec: II B.Tech II-Sem Sec:B      ROOM NO : LH 40      Acad Yr : 2015-16  
 WEF:07.12.2015  
 CLASS INCHARGE: Mr. P.Laxmi Reddy

Time	9.30-10.20	10.20-11.10	11.10-12.00	12.00-12.50	12.50-1.30	1.30-2.20	2.20-3.10	3.10-4.00
Period	1	2	3	4	LUNCH	5	6	7
Monday	M II	MF&HM/PT LAB				CRT	CRT	MF&HM*
Tuesday	PT	KOM	KOM	GS		TE I*	LIB/MENT/CACHE/S PORTS	
Wednesday	M II*	M II*	TE I	MF&HM		MF&HM/PT LAB		
Thursday	KOM	PT	M II	MF&HM		MACHINE DRAWING		
Friday	MF&HM	MACHINE DRAWING				TE I	KOM*	PT*
Saturday	TE I	MF&HM	PT	KOM		GS	GS	M II

S.No	Subject(T/P)	Faculty Name	Subject Code	Periods/Week
1	Production Technology	Mr.K.Jitendar Reddy/Subbarao	A40312	4+1* Periods
2	Kinematics of Machinery	Mr.K.Raju/sandeepa	A40309	4+1* Periods
3	Thermal Engineering - I	Mr. P.Laxmi Reddy/U Sreekanth	A40313	4+1* Periods
4	Mechanics of Fluids and Hydraulic machines	Dr. M. Devaiah/Rajendar	A40112	4+1* Periods
5	Machine Drawing	Mr. K. Vijay/ Mr. Girish/G Jagan Naik	A40310	4+1* Periods
6	Mathematics - II	Mr. N. Nagi Reddy/Ms.Molimol	A40006	4+1* Periods
7	Production Technology Lab	Ms.P Srilatha/ Mr.K.Jitendar Reddy	A40382	3 Periods
8	Mechanics of Fluids and Hydraulic machines Lab	Dr. M. Devaiah/Mr. Niranjan	A40188	3 Periods
9	General Sensitization	Mr C B N Murthy		3 Periods
10	CACHE	Ms.Madhumathi		2 Periods
11	CRT	Mr.Subbarao		2 Periods
12	Library/Sports			1 Periods

\* Represents  
Tutorial class



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**DEPARTMENT OF MECHANICAL ENGINEERING**

**INDIVIDUAL TIME TABLE**

Name of the faculty: **K. VIJAY**

Load : 18

Rev: 0

w.e.f.: 07.12.2015

	9.30-10.20	10.20-11.10	11.10-12.00	12.00-12.50	12.50-1.30	1.30-2.20	2.20-3.10	3.10-4.00
	1	2	3	4		5	6	7
MON	CSE-B(ED)					MD(A)		
TUE								
WED								
THU						MD(B)		
FRI		MD(B)				MD(A)		
SAT						CSE-B(ED)		

**SCOPE:**

1. To provide in-depth knowledge in basic mechanisms
2. To learn the systematic way of solving problems
3. To understand the different methods of obtaining a mechanism
4. To efficiently implement the solutions for practical problems

**EVALUATION SCHEME:**

PARTICULAR	WEIGHTAGE	MARKS
End Examinations	75%	75
Three Sessionals	20%	20
Assignment	5%	5
TEACHER'S ASSESSMENT(TA)*	WEIGHTAGE	MARKS

\*TA will be based on the Assignments given, Unit test Performances and Attendance in the class for a particular student.



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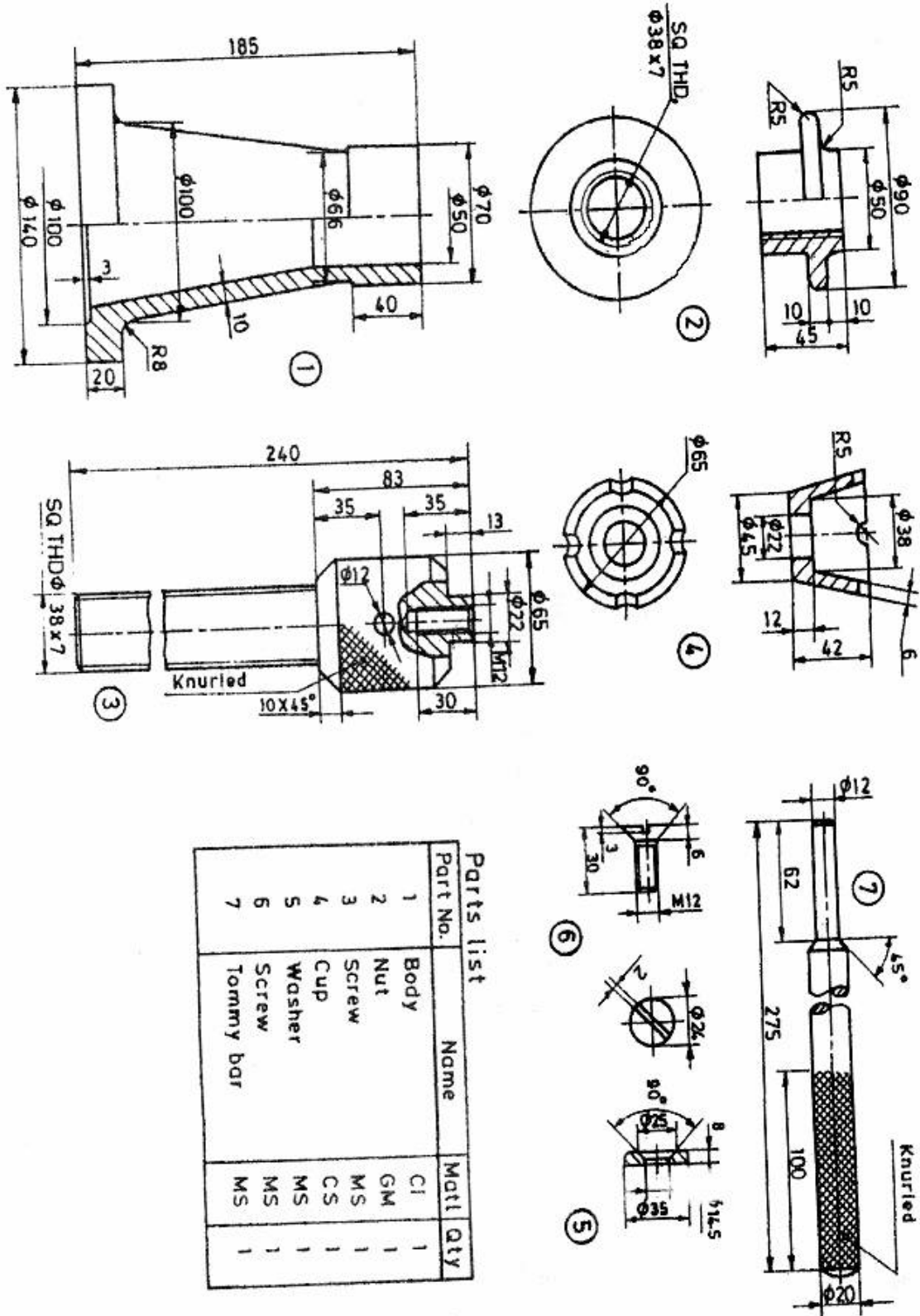
**DEPARTMENT OF MECHANICAL ENGINEERING**

**SUBJECT: MACHINE DRAWING**

**ASSIGNMENT QUESTIONS**

1. Draw the thread profiles of square thread and ACME thread.
2. Draw the Rag foundation bolt with  $D = 30\text{mm}$ .
3. Draw sectional front view and top view of single row combined lap and butt joint with  $D = 20\text{ mm}$  of rivet.
4. Draw any four types of machine and cap screws.
5. Draw sectional front view and right side view of the protective flanged coupling with shaft dia as  $30\text{ mm}$ .
6. Draw sectional front view and top view of the triple riveted butt joint with double straps(zig zag type) with dia of Rivet as  $18\text{ mm}$ .
7. Draw hexagonal headed bolt and nut with dia of bolt as  $30\text{ mm}$ .
8. Draw two views of bushed types flanged coupling with  $D=30\text{ mm}$ .
9. Draw the sectional front view and top view of the double riveted double strap zig zag butt joint with dia of the rivet as  $14\text{ mm}$ .
10. Draw sectional front view and right side view of compression type as muff coupling with dia of shaft as  $25\text{mm}$ .
11. Draw the sectional front view and top view of the double riveted double strap zig zag butt joint with dia of the rivet as  $14\text{ mm}$ .
12. Sketch the schematic representation of threaded parts.
  - a) V – threads
  - b) Square threads.
13. Draw plan and sectional elevation of double riveted zig – zag lap joint to join two plates of  $10\text{ mm}$  thickness.
14. Draw proportionate diagram of Sleeve and cotter joint to connect two shafts of  $\text{Ø } 30\text{mm}$ .

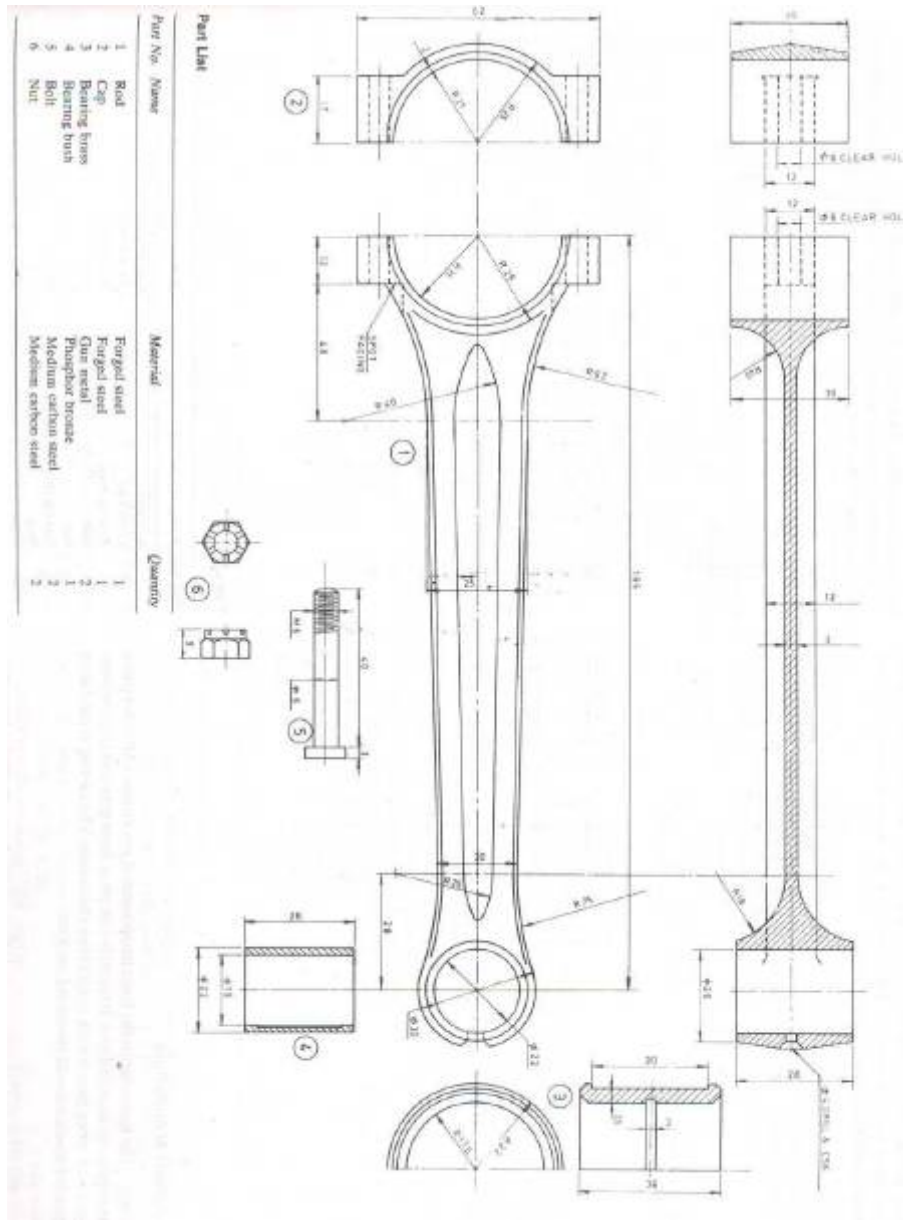
15. The details of screw jack are given in the figure. Draw the following assembled views:  
 a) Half sectional front view  
 b) Top view  
 c) Side view



**Parts list**

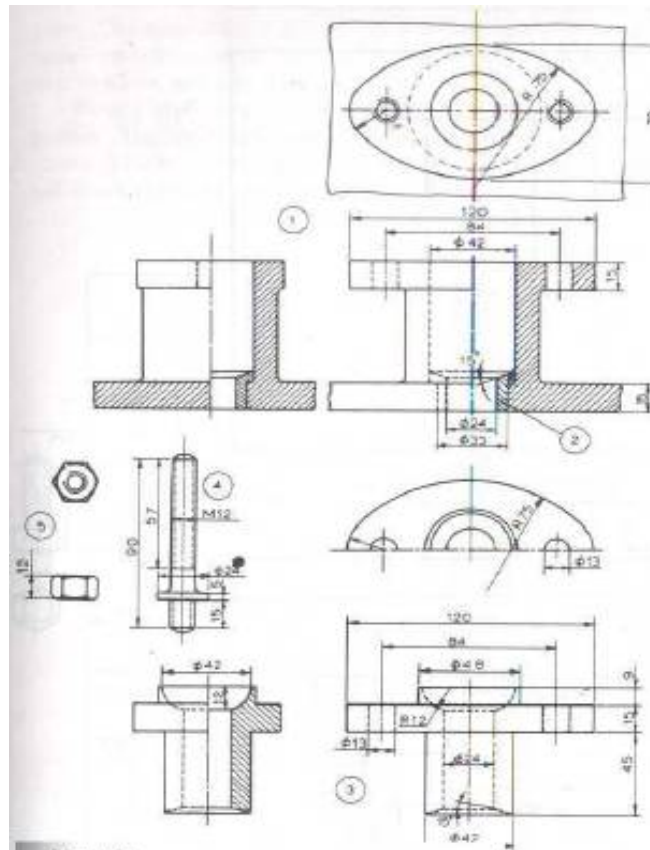
Part No.	Name	Matl	Qty
1	Body	CI	1
2	Nut	GM	1
3	Screw	MS	1
4	Cup	CS	1
5	Washer	MS	1
6	Screw	MS	1
7	Tommy bar	MS	1

16. Draw the sectional top view and front view of the petrol engine connecting rod from the given figure 4 and part list.





17. Draw the sectional front view (left half in section) and right side view of the assembled stuffing box from the given figure 4 and part list.



**Part List**

Part No.	Name	Material	Quantity
1	Body	C.I.	1
2	Bush	Brass	1
3	Gland	Brass	1
4	Stud	M.S.	2
5	Nut	M.S.	2