Ref No:

< SRI KRISHNA INSTITUTE OF TECHNOLOGY, BENGALURU>

COURSE PLAN

Academic Year 2019-20

Program:	B E – Mechanical Engineering
Semester :	3
Course Code:	18ME36A
Course Title:	Computer Aided Machine Drawing
Credit / L-T-P:	3 / 1-4-0
Total Contact Hours:	70
Course Plan Author:	CHANDRAIAH M T

Academic Evaluation and Monitoring Cell

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Table of Contents

Note : Remove “Table of Content” before including in CP Book
Each Course Plan shall be printed and made into a book with cover page
Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

18ME36A : Computer Aided Machine Drawing

A. COURSE INFORMATION

1. Course Overview

Degree:	BE	Program:	ME
Semester:	3	Academic Year:	2019-20
Course Title:	Computer Aided Machine Drawing	Course Code:	18ME36A
Credit / L-T-P:	3 / 1-4-0	SEE Duration:	180 Minutes
Total Contact Hours:	70 Hours	SEE Marks:	60 Marks
CIA Marks:	40 Marks	Assignment	1 / Module
Course Plan Author:	Chandraiah M T	Sign ..	Dt:
Checked By:		Sign ..	Dt:
CO Targets	CIA Target : 90 %	SEE Target:	85%

Note: Define CIA and SEE % targets based on previous performance.

2. Course Content

Content / Syllabus of the course as prescribed by University or designed by institute. Identify 2 concepts per module as in G.

Module	Content	Teaching Hours	Identified Module Concepts	Blooms Learning Levels
1	**Sections of Solids**: Sections of Pyramids, Prisms, Cubes, Tetrahedrons, Cones and Cylinders resting only on their bases (No problems on, axis inclinations, spheres and hollow solids), True shape of section **Orthographic views**: Conversion of pictorial views into orthographic projections of simple machine parts with or without section. (Bureau of Indian Standards conventions are to be followed for the drawings), Hidden line conventions, Precedence of lines. **Fasteners:** Hexagonal headed bolt and nut with washer (assembly), square headed bolt and nut with washer (assembly) simple assembly using stud bolts with nut and lock nut. Flanged nut, slotted nut, taper and split pin for locking, counter sunk head screw, grub screw, Allen screw	15 (7, 8)	- Orthographic views - Thread forms	Apply L3
2	**Keys and Joints:** Parallel, Taper, Feather Key, Gib head key and Woodruff key **Joints:** Cotter joint (socket and spigot), Knuckle joint (pin joint) for two rods **Couplings:** Split muff coupling, Protected type flange coupling, Pin (bush) type flexible coupling, Oldham's coupling and Universal coupling (Hook's Joint).	15 (7, 8)	- Keys and Joints - Couplings	Apply L3
3	Introduction, Fundamental tolerances, Deviations, Methods of placing limit dimensions, Types of fits with symbols and applications, Geometrical tolerances on drawings, Standards followed in industry. (Part drawings shall be given) 1. Plummer block (Pedestal Bearing) 2. Rams Bottom Safety Valve 3. I. C. Engine connecting rod 4. Screw jack (Bottle type) 5. Tails tock of lathe 6. Machine vice 7. Lathe square tool post	40	- Assemblies of Machine parts	Apply L3
-	**Total**	**70**	-	-

3. Course Material

Books & other material as recommended by university (A, B) and additional resources used by course teacher (C).
1. Understanding: Concept simulation / video ; one per concept ; to understand the concepts ; 15 – 30 minutes
2. Design: Simulation and design tools used – software tools used ; Free / open source
3. Research: Recent developments on the concepts – publications in journals; conferences etc.

Modules	Details	Chapters in book	Availability
A	**Text books (Title, Authors, Edition, Publisher, Year.)**	-	-
1,2,3,4,5	'A Primer on Computer Aided Machine Drawing-2007', Published by VTU, Belgaum.	1, 2 3, 5	In Lib / In Dept
1,2,3,4,5	'Machine Drawing', N.D.Bhat & V.M.Panchal, Published by Charotar Publishing House, 1999.	1, 2, 4	In Lib/ In dept
1,2,3,4,5	"A Text Book of Computer Aided Machine Drawing", S. Trymbakaa Murthy, CBS Publishers, New Delhi, 2007.	1, 2, 3, 4, 5	In Lib
1,2,3,4,5	'Machine Drawing', K.R. Gopala Krishna and Ravindra , Subhash publication.	1, 2, 3, 4, 5	In Lib/In dept
B	**Reference books (Title, Authors, Edition, Publisher, Year.)**	-	-
1,2,3,4,5	'Engineering drawing', P.S.Gill, S K Kataria and Sons. 2013.	1, 2, 3, 4, 5	In Lib
1,2,3,4,5	Machine Drawing', N. Siddeshwar, P. Kanniah, V.V.S. Sastri,published by Tata McGraw Hill,2006	1, 2, 3, 4, 5	In Lib
C	**Concept Videos or Simulation for Understanding**	-	-
C1	– 3.42 Mins		
C1	https://www.youtube.com/watch?v=ruu5yHoxcek -33.04 Mins		
C1	https://www.youtube.com/watch?v=f1Hdtf_iAWk -8.17 Mins		
C2	https://www.youtube.com/watch?v=7PBjoLXju9M -12.56 Mins		
C2	https://www.youtube.com/watch?v=-JJSqRZ90nA -4.11 Mins		
C2	https://www.youtube.com/watch?v=uI22Yd0aEsg -1.43 Mins		
C2	https://www.youtube.com/watch?v=fpNQrDKEUKE -1.46 Mins		
C3	https://www.youtube.com/watch?v=nqpFW9vSNYQ – 7.35 Mins		
C3	https://www.youtube.com/watch?v=J0pIhX4XGvw - 8.39 Mins		
C3	https://www.youtube.com/watch?v=bGQ9uReBPHY - 3.56 Mins		
C3	https://www.youtube.com/watch?v=J-MzX86BK_E -12.15 Mins		
C3	https://www.youtube.com/watch?v=yfooCQi09ss -13.36 Mins		
D	**Software Tools for Design**	-	-
	Solid Edge, Solid Works, Catia, Auto CADD		
E	**Recent Developments for Research**	-	-
	https://www.outsource2india.com/eso/mechanical/articles/latest-trends-cad-technology.asp		
F	**Others (Web, Video, Simulation, Notes etc.)**	-	-
1	-		

4. Course Prerequisites

Refer to GL01. If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

Students must have learnt the following Courses / Topics with described Content . . .

Modules	Course Code	Course Name	Topic / Description	Sem	Remarks	Blooms Level
1	18ME15/25	-Engineering Graphics	Projection of Planes, Projection Solids, Isometric Projection	-	-	Understand L2

5. Content for Placement, Profession, HE and GATE

The content is not included in this course, but required to meet industry & profession requirements and help students for Placement, GATE, Higher Education, Entrepreneurship, etc. Identifying Area / Content requires experts consultation in the area.
Topics included are like, a. Advanced Topics, b. Recent Developments, c. Certificate Courses, d. Course Projects, e. New Software Tools, f. GATE Topics, g. NPTEL Videos, h. Swayam videos etc.

Modules	Topic / Description	Area	Remarks	Blooms Level
1	Solid Works / Knowledge of Solid works software	Higher Study	Gap A Hands on session on Solid works Software	Apply L3
-				

B. OBE PARAMETERS

1. Course Outcomes

Expected learning outcomes of the course, which will be mapped to POs. Identify a max of 2 Concepts per Module. Write 1 CO per Concept.

Modules	Course Code.#	Course Outcome **At the end of the course, student should be able to . . .**	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
1	18ME36A.1	Draw the sections of solids, orthographic projections, thread forms and nut & bolts in 2D	15	Thread Forms	Chalk, Board and LCD Projector	Assignment Unit Test & CIE	L3 Apply
1	18ME36A.2	Draw the Keys, Joints, Couplings in 2D	15	Mechanical joints	Chalk, Board and LCD Projector	Assignment Unit Test & CIE	L3 Apply
2	18ME36A.3	Assemblies from the part drawings with limits ,fits and tolerance given for Plummer block, Lever safety valve, I.C. Engine connecting rod, Screw Jack, Tailstock of lathe, Machine Vice and Tool Head of Shaper in 2D and 3D	40	Assemblies of machine Parts	Chalk, Board and LCD Projector	Assignment Unit Test & CIE	L3 Apply
-	**-**	**Total**	**70**	**-**	**-**	**-**	**L2-L3**

2. Course Applications

Write 1 or 2 applications per CO.
Students should be able to employ / apply the course learning's to . . .

Modules	Application Area Compiled from Module Applications.	CO	Level
1	used in high load applications such as lead screws and Jack screw.	CO1	L3
2	Joints were very often used to join structural members permanently and non permanently	CO2	L3
3	Engine Assembly	CO3	L3

3. Mapping And Justification

CO – PO Mapping with mapping Level along with justification for each CO-PO pair.

To attain competency required (as defined in POs) in a specified area and the knowledge & ability required to accomplish it.

Modules	Mapping		Mapping Level	Justification for each CO-PO pair	Level
-	**CO**	**PO**	-	**'Area': 'Competency' and 'Knowledge' for specified 'Accomplishment'**	-
1	CO1	PO1	2	'Engineering Knowledge:' - Acquisition of Engineering Knowledge of Orthographic Drawing is essential to accomplish solutions to complex engineering problems in Designing.	L2
1	CO1	PO2	1	Problem Analysis': Analyzing problems require knowledge / understanding of Thread Forms to accomplish solutions to complex engineering problems in Design of Nut and Bolt	L2
1	CO1	PO5	2	'Modern Tool Usage:' - Apply appropriate Techniques resources of Solid Edge Software is essential to accomplish solutions to complex engineering Drawing in Assembling of two or more parts.	
2	CO2	PO1	2	'Engineering Knowledge:' - Acquisition of Engineering Knowledge of Mechanical Joints is essential to accomplish solutions to complex engineering problems in Assembling of two or more parts.	L2
2	CO2	PO2	1	Problem Analysis': Analyzing problems require knowledge / understanding of Couplings to accomplish solutions to complex engineering problems in Joining of two non collinear axes shaft	L2
2	CO2	PO5	2	'Modern Tool Usage:' - Apply appropriate Techniques resources of Solid Edge Software is essential to accomplish solutions to complex engineering Drawing in Assembling of two or more parts.	L2
3	CO3	PO1	2	'Engineering Knowledge:' - Acquisition of Engineering Knowledge of sketching of parts drawing is essential to accomplish solutions to complex engineering problems in assembling of components.	
3	CO3	PO2	1	Problem Analysis': Analyzing problems require knowledge / understanding of Part Drawings to accomplish solutions to complex engineering Components in Assembling of machine components	
3	CO3	PO5	2	'Modern Tool Usage:' - Apply appropriate Techniques resources of Solid Edge Software is essential to accomplish solutions to complex engineering Drawing in Assembling of two or more parts.	

4. Articulation Matrix

CO – PO Mapping with mapping level for each CO-PO pair, with course average attainment.

-	-	Course Outcomes	Program Outcomes														-
Modules	CO.#	**At the end of the course student should be able to . . .**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	Level
1	18ME36A.1	Draw the sections of solids, orthographic projections, thread forms and nut & bolts in 2D	2	1			2											L3
1	18ME36A.2	Draw the Keys, Joints, Couplings in 2D	2	1			2											L3
2	18ME36A.3	Assemblies from the part drawings with limits ,fits and tolerance given for Plummer block, Lever safety valve, I.C. Engine connecting rod, Screw Jack, Tailstock of lathe, Machine Vice and Tool Head of Shaper in 2D and 3D	2	1			2											L3
-	**18ME36A**	**Average attainment (1, 2, or 3)**	**2**	**1**			**2**											-
-	*PO, PSO*	*1.Engineering Knowledge; 2.Problem Analysis; 3.Design / Development of Solutions; 4.Conduct Investigations of Complex Problems; 5.Modern Tool Usage; 6.The Engineer and Society; 7.Environment and Sustainability; 8.Ethics; 9.Individual and Teamwork; 10.Communication; 11.Project Management and Finance; 12.Life-long Learning; S1.Software Engineering; S2.Data Base Management; S3.Web Design*																

5. Curricular Gap and Content

Topics & contents not covered (from A.4), but essential for the course to address POs and PSOs.

Modules	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping

1	Solid works software	Seminar	2nd Aug 2019	Mr. Mohan Kumar, Auto cadd Centre	PO3

6. Content Beyond Syllabus

Topics & contents required (from A.5) not addressed, but help students for Placement, GATE, Higher Education, Entrepreneurship, etc.

Modules	Gap Topic	Area	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1	Uni graphics software	Placement,	Hands on Training	17th Oct 2019	Mr. Mohan Kumar, Auto cadd Centre	PO3

C. COURSE ASSESSMENT

1. Course Coverage

Assessment of learning outcomes for Internal and end semester evaluation. Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

Modules	Title	Teach. Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE		
1	Section of Solids, Orthographic Views, Thread Forms, Fasteners	15	2	2	2	1	1	2	CO1	L3
2	Keys, Joints, Couplings	15	2	2	2	1	1	2	CO2	L3
3	Assembly Drawings	40	2	2	2	1	1	2	CO3	L3
-	**Total**	**70**	**6**	**6**	**6**	**3**	**3**	**6**	-	-

2. Continuous Internal Assessment (CIA)

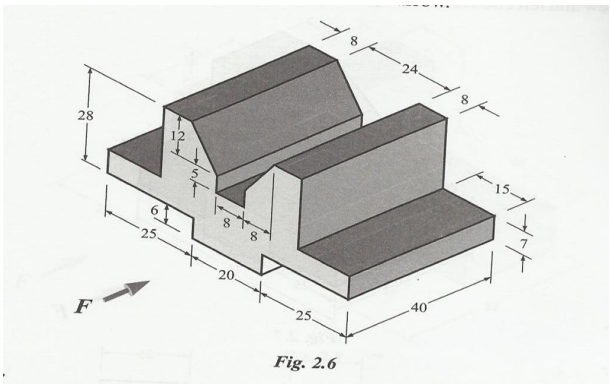
Assessment of learning outcomes for Internal exams. Blooms Level in last column shall match with A.2.

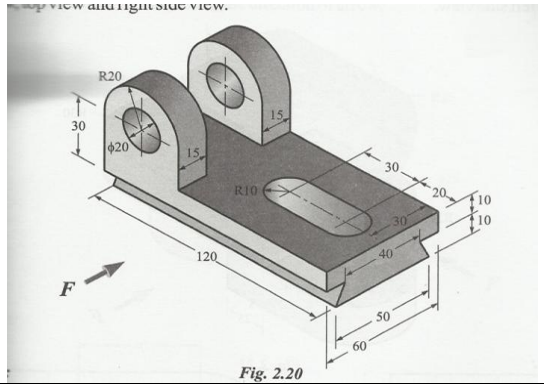
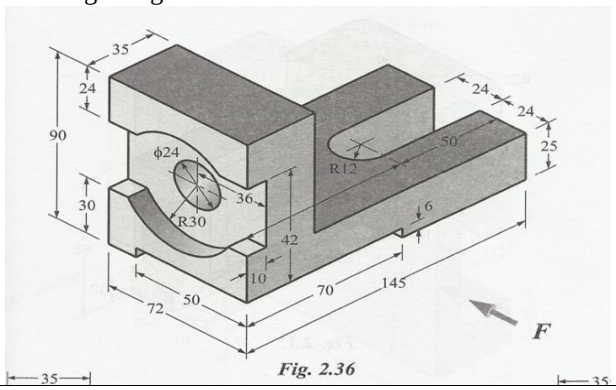
Modules	Evaluation	Weightage in Marks	CO	Levels
1, 2	CIA Exam – 1	20	CO1, CO2, CO3	L3
3, 4	CIA Exam – 2	20	CO1, CO2, CO3	L3
5	CIA Exam – 3	20	CO1, CO2, CO3	L3
1, 2	Assignment - 1	12	CO1	L3
3, 4	Assignment - 2	12	CO2	L3
5	Assignment - 3	12	CO3	L3
1, 2	Print out - 1	8	CO1	L3
3, 4	Print out - 2	8	CO2	L3
5	Print out - 3	8	CO3	L3
1, 2	Quiz - 1		-	-
3, 4	Quiz - 2		-	-
5	Quiz - 3		-	-
1 - 5	Other Activities – Mini Project	-	CO9, CO10	L2,L2
	Final CIA Marks	**40**	-	-

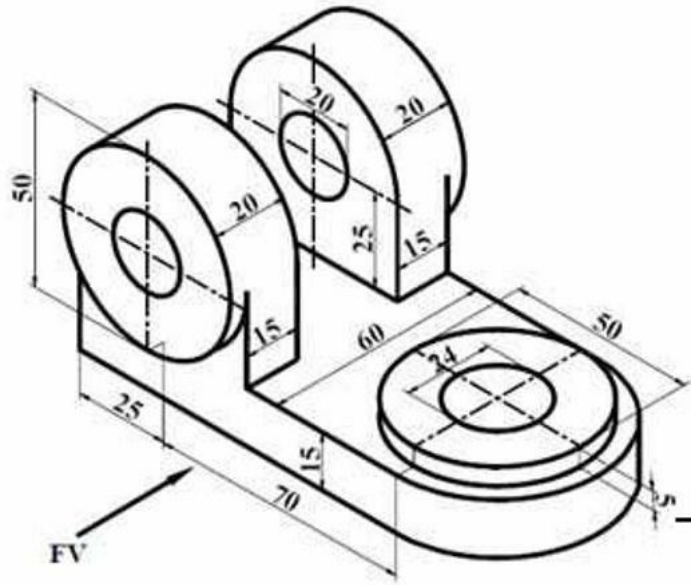
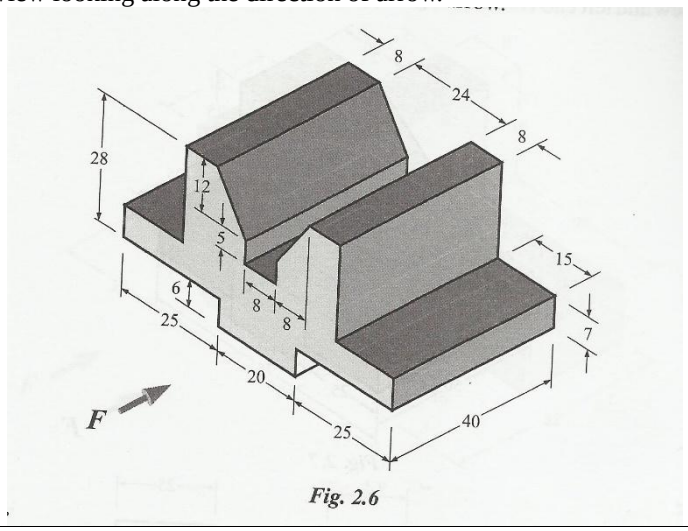
D1. TEACHING PLAN - 1

Module - 1

Title:	Sections of Solids, Orthographic Views, Tread Forms and Fasteners	Appr Time:	15 Hrs

a	*Course Outcomes*	CO	Blooms
-	At the end of the topic the student should be able to . . .	-	**Level**
1	Understand the importance of the linking functional and visualization aspects in the preparation of the part drawings in 2D	CO1	L3
b	***Course Schedule***	-	-
Class No	**Portion covered per hour**	-	-
1	Draw the Section of Pyramids	C01	L3
2	Draw the section of Prisms, and Cubes	C01	L3
3	Draw the section of Cones and Cylinders	C01	L3
4	Draw the Orthographic View of Simple Machine Component Without Section	C01	L3
5	Draw the Orthographic View of Simple Machine Component Without Section	C01	L3
6	Draw the Orthographic View of Simple Machine Component Without Section	C01	L3
7	Draw the Orthographic View of Simple Machine Component With Section	C01	L3
8	Draw the Orthographic View of Simple Machine Component With Section	C01	L3
9	Draw the Orthographic View of Simple Machine Component With Section	C01	L3
10	Draw the Sectional views of ISO Metric Thread (Internal and External) and American Standard Tread	C01	L3
11	Draw the Sectional views of BSW and Square tread	C01	L3
12	Draw the Sectional views of ACME and Sellars Tread.	C01	L3
13	Draw the Hexagonal Nut and Bolt with Washer in 2D Front view and Top view	C01	L3
14	Draw the Square Nut and Bolt with Washer in 2D	C01	L3
15	Draw the Stud bolts with nut and lock nut	C01	L3
c	**Application Areas**	-	-
-	Students should be able employ / apply the Module learnings to . . .	-	-
1	used in high load applications such as lead screws and Jack screw.	CO1	L3
d	**Review Questions**	-	-
-	The attainment of the module learning assessed through following questions	-	-
1	A triangular pyramid of base edge 40mm and axis 60mm is resting on its base on HP with one of its base edges parallel to VP. A section plane passing through one of the base corners of the pyramid and the two slant edges at a height of 20mm and 30mm above HP cuts the pyramid. Draw the front view, sectional top view and true shape of the section. Determine the inclination of the section plane with HP.	CO1	L3
2	A pentagonal pyramid sides of base 40mm and altitude 60mm rests with its base on HP and with a side of base parallel to VP and 20mm from it. It is cut by a horizontal section plane and is bisecting the axis. Draw the front view and sectional top view.	CO1	L3
3	The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow.  *Fig. 2.6*	CO1	L3
4	The isometric view of a machine component is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow.	CO1	L3

	 *Fig. 2.20*		
5	The isometric view of a machine component is shown in fig. Draw its front view, top view and left end view looking along the direction of arrow.  *Fig. 2.36*	CO1	L3
6	Draw the following to indicate the conventional representation of BSW thread having pitch of 50mm and Acme thread having a pitch of 60mm. Show at least 3 threads in section.	CO1	L3
7	Draw the following to indicate the conventional representation of ISO thread having pitch of 50mm and Sellers thread having a pitch of 60mm. Show at least 3 threads in section.	CO1	L3
8	Draw 2 views of hexagonal headed bolt and nut with washer (assembly) for a 25mm diameter bolt. Take the length of the bolt equal to 100mm.	CO1	L3
9	Draw the following to indicate the conventional representation of BSW thread having pitch of 50mm	CO1	L3
10	Draw 2 views of square headed bolt and nut with washer (assembly) for a 25mm diameter bolt. Take the length of the bolt equal to 100mm.	CO1	L3
11	A square pyramid of base side 45 mm and axis length 70 mm rests on its base on the HP in such a way that all of its base edges are equally inclined to the VP. It is cut by a section plane perpendicular to the VP, inclined at 45^0 to the HP and bisecting the axis. Draw its sectional top view, sectional side view and true shape of section.	CO1	L3
12	A pentagonal pyramid sides of base of side 40 mm and altitude 70 mm is rests with its base on the HP and with a aside of base parallel to the VP and 25 mm from it. It is cut by a horizontal cutting plane and is bisecting the axis. Draw the front view and the sectional view looking from the top	CO1	L3
13	The isometric view of a machine component is shown in fig. Draw its front view, top view and left end view looking along the direction of arrow.	CO1	L3

			
14	A cube of 45 mm edge rests on one of its faces on the ground with its base edges equally inclined to the VP. A VT perpendicular to one of the solid diagonals cuts the solid through one of its base corners. Draw the sectional top view, true shape of section and determine the inclination of the section plane with the reference plane.	CO1	L3
15	The true shape of section of hexahedron is an equilateral triangle of side 50 mm. position the cube of suitable size on the HP and locate the VT. Determine the inclination of the section plane with HP and size of the cube. Also draw the sectional top view and true shape of section.	CO1	L3
16	The isometric view of a machine component is shown in fig. Draw its front view, top view and left end view looking along the direction of arrow.  *Fig. 2.6*	CO1	L3
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO2	L2
5			

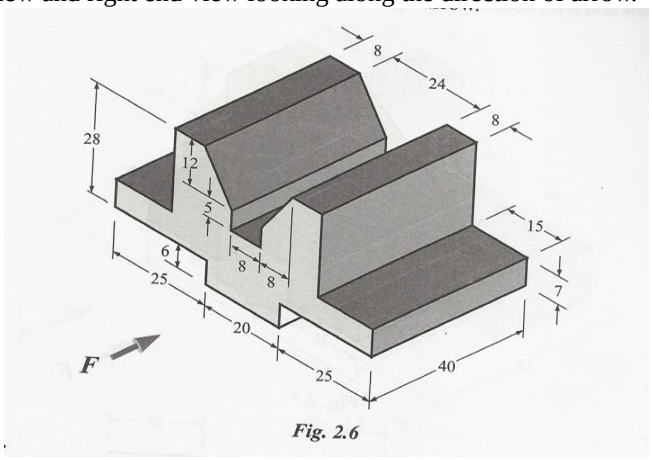
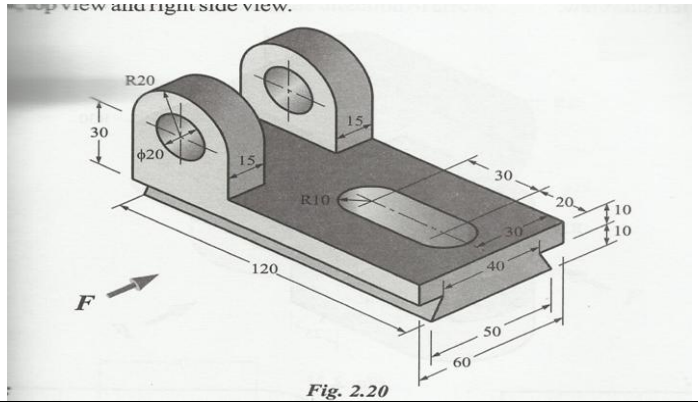
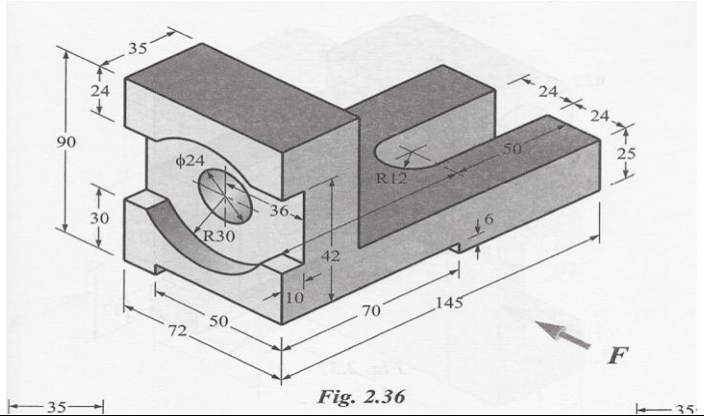
b. Assignment -1

Note: A distinct assignment to be assigned to each student.

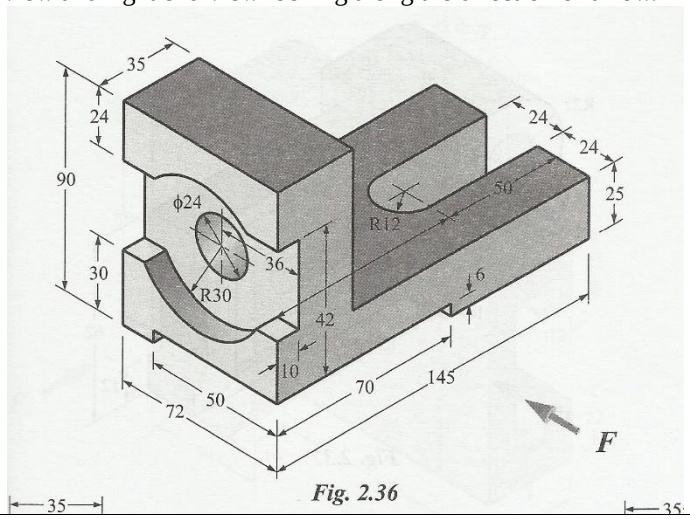
Model Assignment Questions							
Crs Code:	18ME36A	Sem:	III	Marks:	12	Time:	90 – 120 minutes

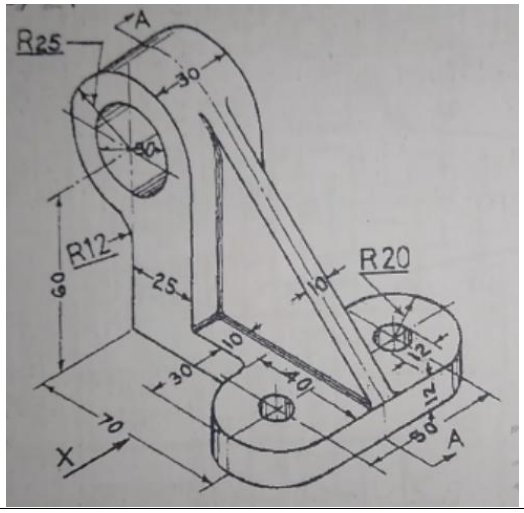
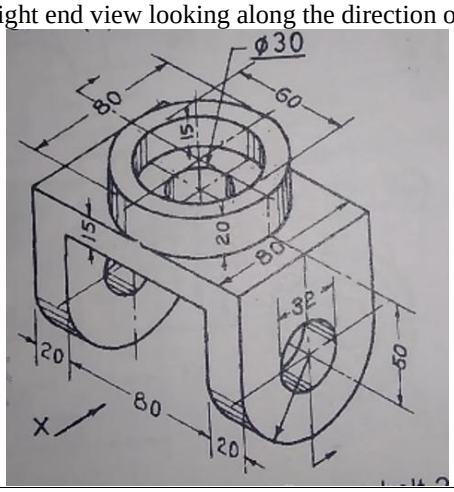
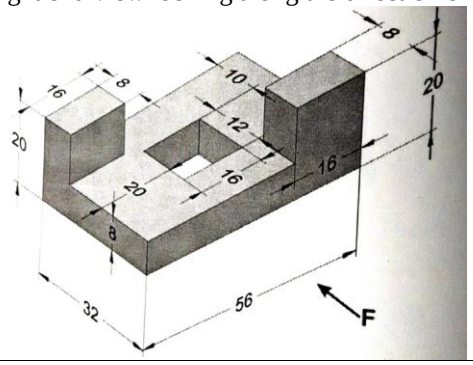
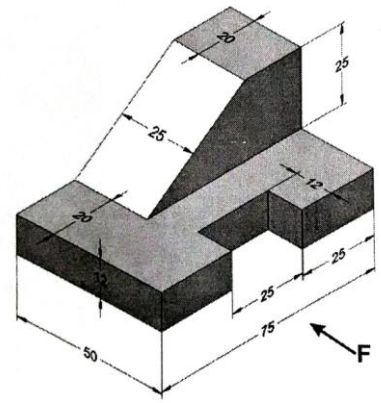
Course:	Computer Aided Machine Drawing	Module : 1	

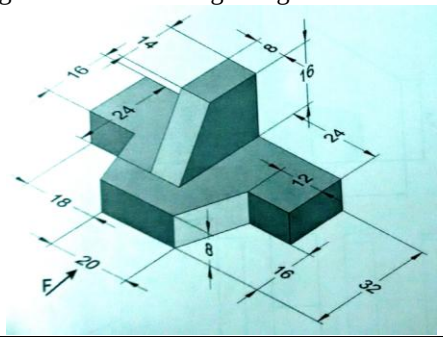
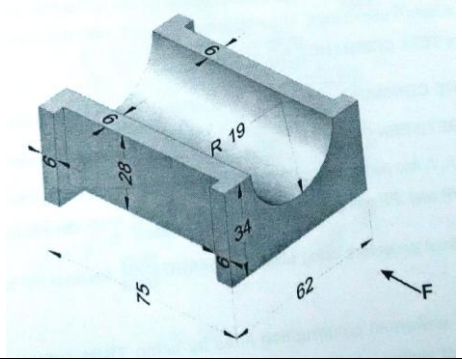
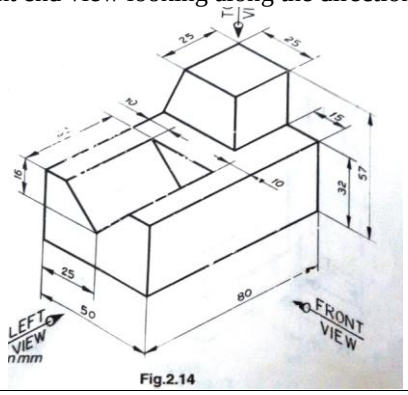
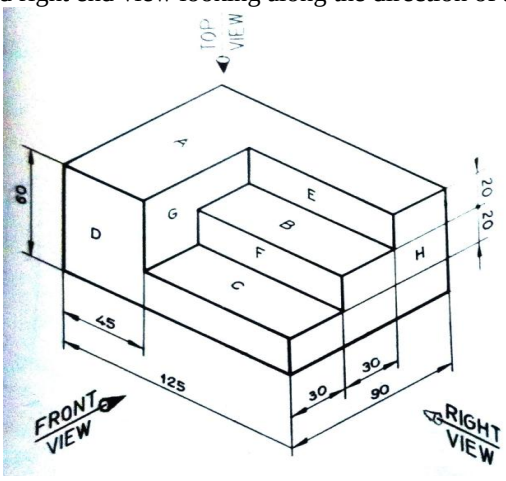
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

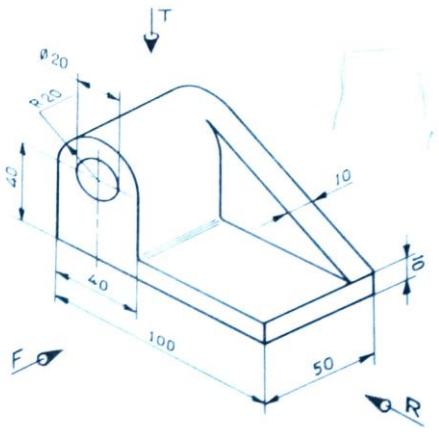
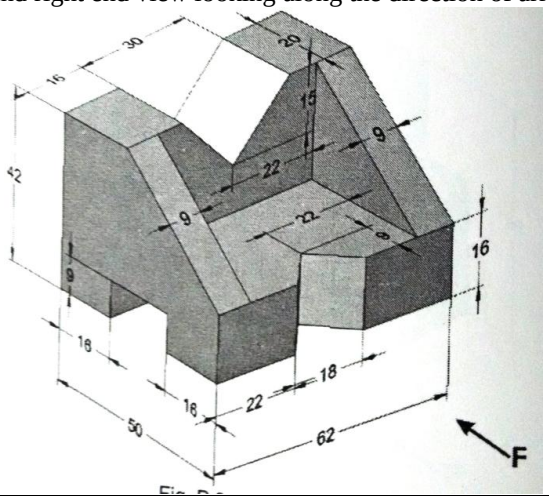
SNo	USN	Assignment Description	Marks	CO	Level
1		A triangular pyramid of base edge 40mm and axis 60mm is resting on its base on HP with one of its base edges parallel to VP. A section plane passing through one of the base corners of the pyramid and the two slant edges at a height of 20mm and 30mm above HP cuts the pyramid. Draw the front view, sectional top view and true shape of the section. Determine the inclination of the section plane with HP	12	CO1	L3
2		A pentagonal pyramid sides of base 40mm and altitude 60mm rests with its base on HP and with a side of base parallel to VP and 20mm from it. It is cut by a horizontal section plane and is bisecting the axis. Draw the front view and sectional top view	12	CO1	L3
3		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow.  *Fig. 2.6*	12	CO1	L3
4		The isometric view of a machine component is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow.  *Fig. 2.20*	12	CO1	L3
5		The isometric view of a machine component is shown in fig. Draw its front view, top view and left end view looking along the direction of arrow.  *Fig. 2.36*	12	CO1	L3

6		Draw 2 views of hexagonal headed bolt and nut with washer (assembly) for a 25mm diameter bolt. Take the length of the bolt equal to 100mm.	12	CO1	L3
7		Draw 2 views of stud with nut and lock nut for a 25mm diameter. Stud using simple assembly.	12	CO1	L3
8		Draw the following to indicate the conventional representation of BSW thread having pitch of 50mm and Acme thread having a pitch of 60mm. Show at least 3 threads in section.	12	CO1	L3
9		Draw the following to indicate the conventional representation of ISO thread having pitch of 50mm and Sellers thread having a pitch of 60mm. Show at least 3 threads in section.	12	CO1	L3
10		Draw 2 views of square headed bolt and nut with washer (assembly) for a 25mm diameter bolt. Take the length of the bolt equal to 100mm	12	CO1	L3
11		Draw the following profiles a) Acme thread b) ISO thread of pitch 50 mm both	12	CO1	L3
12		Draw the following to indicate convention representation of a) BSW thread having pitch of 50mm b) ACME thread having pitch of 60mm, show at least 03 threads in section	12	CO1	L3
13		Draw the following profiles a) Sellers thread of pitch 60mm b) ISO thread of pitch 50mm	12	CO1	L3
14		Draw the two views of Hexagonal headed bolt M25 x 100 and a thread length of 60mm with a Hexagonal nut with washer. Indicate all the proportions and actual dimensions.	12	CO1	L3
15		Draw the two views of Square Headed Bolt M25 x 100 and a thread length of 60mm with a hexagonal nut. Indicate all the proportions and actual dimensions.	12	CO1	L3
16		Draw the two views of Square Headed Bolt M25 x 100 and a thread length of 60 mm, with a square nut. Indicate all the proportions and actual dimensions.	12	CO1	L3
17		Draw the two views of Stud with Hexagonal Nut and lock nut on one end for a 25 mm diameter stud using simple assembly by taking total length of thread = 125 mm and a thread length 50 mm, on either side.	12	CO1	L3
18		Draw the two views of an ISO threaded Square bolt 24 mm diameter and a thread length of 60mm, with a square nut. Indicate all the proportions and actual dimensions.	12	CO1	L3
19		Draw the two views of the stud with nut and lock nut for a 25mm diameter stud using simple assembly.	12	CO1	L3
20		Draw two vies of a hexagonal headed bot and nut with washer (assembly) for a 25mm diameter bolt. Take the length of the bolt equal to 100mm	12	CO1	L3
21		Draw two views of square headed bolt of M24 and a thread length of 100mm, with a square nut. Indicate all the proportions and actual dimensions.	12	CO1	L3
22		A cube of 40 mm side is cut by a VT, so that the true shape of section is an equilateral triangle of sides of maximum length. Draw the sectional top view and true shape of section. Determine the inclination plane to HP and measure the length of the equilateral triangle.	12	CO1	L3
23		A rectangular prism of height 80 mm and cross section 48x32 mm is resting on the HP with its base. It is cut by a section plane in such a way that the true shape of section is a square of sides of maximum dimension. Draw the front view and determine the inclination of section plane to the reference plane. Also draw the sectional top view and true shape of section	12	CO1	L3
24		A cylinder of base diameter 50 mm and axis 70 mm is resting on the HP with its axis vertical. A section plane perpendicular to both the HP and the VP cuts the cylinder at 15 mm right of the axis. Draw the projections of the cylinder showing the true shape of section	12	CO1	L3
25		A cylinder of base diameter 50 mm and height 70 mm is resting with its	12	CO1	L3

		base on the HP. A section plane inclined at 50^0 to the VP and perpendicular to the HP cuts the solid at 10 mm in front of it. Draw the top view, sectional front view and true shape of the section.			
26		A cylinder of base diameter 50 mm and axis 100 mm long rests on its base on the HP. A VT cuts the cylinder at 70^0 to the HP through the midpoint of the axis. Draw the front view, sectional plan and true shape of section	12	CO1	L3
27		A true shape of section of a vertical cylinder of base diameter 40 mm is a rectangle of sides 60 mm and 30 mm. draw the projections of suitable cylinder, true shape of section and determine the inclination of the section plane. Also determine the height of the cylinder	12	CO1	L3
28		A tetrahedron of sides 60 mm is resting on the HP on one of its faces, with an edge perpendicular to the VP and the nearest base corner is 25 mm in front of it. A VT, whose angle of inclination 550 with the reference line XY cuts the solid by passing through the axis at a height of 40 mm above the base. Draw the resulting sectional view and true shape of section	12	CO1	L3
29		Draw the following profiles a) Sellers thread of pitch 60mm b) square thread of pitch 50mm	12	CO1	L3
30		Draw the following profiles a) Sellers thread of pitch 50mm b) ACME thread of pitch 50mm	12	CO1	L3
31		Draw the following profiles a) Square thread of pitch 60mm b) Buttress thread of pitch 50mm	12	CO1	L3
32		Draw the following profiles a) BSW thread of pitch 50mm b) Buttress thread of pitch 50mm	12	CO1	L3
33		Draw the following profiles a) Square thread of pitch 40mm b) ISO thread of pitch 50mm	12	CO1	L3
34		Draw the following profiles a) ACME thread of pitch 60mm b) Sellars thread of pitch 45mm	12	CO1	L3
35		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow.  *Fig. 2.36*	12	CO1	L3
36		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow.	12	CO1	L3

					
37		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow. 	12	CO1	L3
38		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow. 	12	CO1	L3
39		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow 	12	CO1	L3

40		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow 	12	CO1	L3
41		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow 	12	CO1	L3
42		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow  Fig.2.14	12	CO1	L3
43		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow 	12	CO1	L3
44		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow	12	CO1	L3

					
45		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow 	12	CO1	L3

Module – 2

Title:	**Keys, Joints and Couplings**	Appr Time:	15 Hrs
a	***Course Outcomes***	**CO**	**Blooms**
-	At the end of the topic the student should be able to . . .	-	**Level**
1	Draw the Keys, Joints, Couplings in 2D	CO2	L3
b	***Course Schedule***	-	-
Class No	**Portion covered per hour**	-	-
16	Draw the Parallel Key, Taper Key as per the ISO standards in 2D	CO2	L3
17	Draw the Gib Head Key as per the ISO standards in 2D	CO2	L3
18	Draw the Woodruff Key as per the ISO standards in 2D	CO2	L3
19	Draw the cotter joint for two rods	CO2	L3
20	Draw the cotter joint for two rods	CO2	L3
21	Draw the knuckle joint for two rods	CO2	L3
22	Draw the knuckle joint for two rods	CO2	L3
23	Draw the split muff coupling in 2D	CO2	L3
24	Draw the split muff coupling in 2D	CO2	L3
25	Draw the Protected flange coupling in 2D	CO2	L3
26	Draw the Protected flange coupling in 2D	CO2	L3
27	Draw the oldham's coupling in 2D	CO2	L3
28	Draw the oldham's coupling in 2D	CO2	L3
29	Draw the Universal coupling in 2D	CO2	L3
30	Draw the Universal coupling in 2D	CO2	L3
c	**Application Areas**	-	-
-	Students should be able employ / apply the Module learnings to . . .	-	-
1	Joints were very often used to join structural members.	CO2	L3
d	**Review Questions**	-	-
-	The attainment of the module learning assessed through following questions	-	-
17	Draw the appropriate view of Woodruff Key of shaft diameter 50mm	CO2	L3
18	Draw the appropriate view of Parallel Key of shaft diameter 50mm	CO2	L3
19	Draw the appropriate view of Woodruff Key of shaft diameter 60mm	CO2	L3
20	Draw the sectional front view and top view of Knuckle Joint, take diameter of rods equal to 25mm. Indicate all proportions with dimensions.	CO2	L3
21	Draw sectional Front View and a view looking from socket end of a SOCKET and SPIGOT COTTER JOINT used for joining two rods of diameter 20mm. Indicate dimensions.	CO2	L2
22	Draw the sectional front view and top view of 'Pin Type Flexible Coupling' used to	CO2	L5

	connect two shafts of 30 mm diameter. a) Front View with Top half in sectional b)Side View from the pin end		
23	Draw the following views of a UNIVERSAL COUPLING by taking shaft diameter of 25 mm. a) Sectional Front View b)Side View	CO2	L2
24	Draw sectional front and side views of an Oldham's coupling to connect two shafts of diameter 25mm. Indicate dimensions.	CO2	L3
25	Draw the following views of a Oldham's Coupling by taking shaft diameter of 25 mm. a) Sectional Front View b) Side View	CO2	L3
26	Draw the following views of a Split Muff Coupling by taking shaft diameter of 25 mm. a) Sectional Front View b) Side View	CO2	L3
27	Draw the following views of a Protected type Flange Coupling by taking shaft diameter of 25 mm. a) Sectional Front View b) Side View	CO2	L3
28	Draw the following views of a UNIVERSAL COUPLING by taking shaft diameter of 20 mm. a) Sectional Front View b) Side View	CO2	L3
29	Draw the appropriate view of Taper Key of shaft diameter 50mm	CO2	L3
30	Draw the appropriate view of Gibhead Key of shaft diameter 50mm	CO2	L3
e	**Experiences**	-	-
1		CO3	L2
2			
3			
4		CO4	L2
5			

b. Assignment -2

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	18ME36A	Sem:	III	Marks:	12	Time:	90 – 120 minutes
Course:	Computer Aided Machine Drawing				Module : 2		

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1		Draw the appropriate view of Woodruff Key of shaft diameter 50mm	12	CO2	L3
2		Draw the appropriate view of Parallel Key of shaft diameter 50mm	12	CO2	L3
3		Draw the appropriate view of Woodruff Key of shaft diameter 60mm	12	CO2	L3
4		Draw the sectional front view and top view of Knuckle Joint, take diameter of rods equal to 25mm. Indicate all proportions with dimensions.	12	CO2	L3
5		Draw sectional Front View and a view looking from socket end of a SOCKET and SPIGOT COTTER JOINT used for joining two rods of diameter 20mm. Indicate dimensions.	12	CO2	L3
6		Draw the sectional front view and top view of 'Pin Type Flexible Coupling' used to connect two shafts of 30 mm diameter. a) Front View with Top half in sectional b)Side View from the pin end	12	CO2	L3
7		Draw the following views of a UNIVERSAL COUPLING by taking shaft diameter of 25 mm. a) Sectional Front View b)Side View	12	CO2	L3

8		Draw sectional front and side views of an Oldham's coupling to connect two shafts of diameter 25mm. Indicate dimensions.	12	CO2	L3
9		Draw the following views of a Oldham's Coupling by taking shaft diameter of 25 mm. a) Sectional Front View b) Side View	12	CO2	L3
10		Draw the following views of a Split Muff Coupling by taking shaft diameter of 25 mm. a) Sectional Front View b) Side View	12	CO2	L3
11		Draw the following views of a Protected type Flange Coupling by taking shaft diameter of 25 mm. a) Sectional Front View b) Side View	12	CO2	L3
12		Draw the following views of a UNIVERSAL COUPLING by taking shaft diameter of 20 mm. a) Sectional Front View b) Side View	12	CO2	L3
13		Draw the appropriate view of Taper Key of shaft diameter 50mm	12	CO2	L3
14		Draw the appropriate view of Gibhead Key of shaft diameter 50mm	12	CO2	L3

Module – 3

Title:	Assembly Drawings (Parts drawings shall be given)	Appr Time:	40 Hrs
a	***Course Outcomes***	**CO**	**Blooms**
-	At the end of the topic the student should be able to . . .	-	**Level**
1	Assemblies from the part drawings with limits ,fits and tolerance given for Plummer block, Ram bottom safety valve, I.C. Engine connecting rod, Screw Jack, Tailstock of lathe, Machine Vice and Lathe square tool post in 2D and 3D	CO3	L3
b	***Course Schedule***		
Class No	**Portion covered per hour**	-	-
31	Fundamental tolerances, Types of fits, symbols and application (1 Hrs)	CO3	L2
32-33	Methods of placing limit dimensions (2 Hrs)	CO3	L2
34-35	Geometrical tolerances on drawings, standards followed in industry (2 Hrs)	CO3	L2
36-40	Parts drawing of Plummer block then assemble of parts, then create 2D drawings. (5 Hours)	CO3	L3
41-45	Parts drawing of Screw jack, then assemble of parts, then create 2D drawings. (5Hours)	CO3	L3
46-50	Parts drawing of Machine vice then assemble of parts, then create 2D drawings. (5Hours)	CO3	L3
51-55	Parts drawing of Lever safety valve then assemble of parts, then create 2D drawings. (5 Hours)	CO3	L3
56-60	Parts drawing of IC Engine connecting rod then assemble of parts, then create 2D drawings. (5 Hours)	CO3	L3
61-65	Parts drawing of tool head of shaper, then assemble of parts, then create 2D drawings. (5 Hours)	CO3	L3
66-70	Parts drawing of Tailstock of lathe, then assemble of parts, then create 2D drawings. (5 Hours)	CO3	L3
c	**Application Areas**	-	-
-	Students should be able employ / apply the Module learnings to . . .	-	-
1	Assembly of automotive parts	CO3	L3
d	**Review Questions**	-	-
-	The attainment of the module learning assessed through following questions	-	-
31	Figure 1 shows the details of 'TAIL STOCK'. Assemble the parts and draw the following views of the assembly. i) Front view in section ii) Top view	CO3	L3
32	Details of "IC ENGINE CONNECTING ROD" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view. b) Top view	CO3	L3

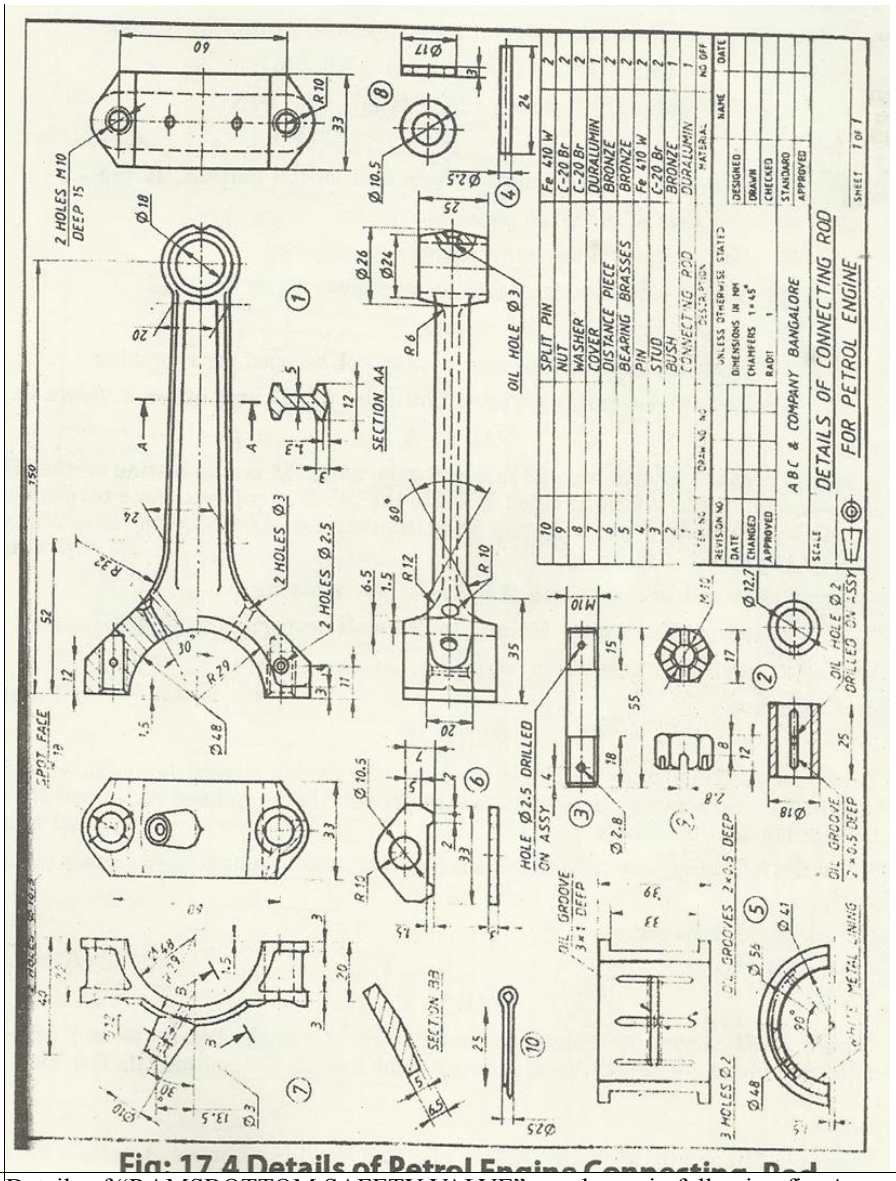
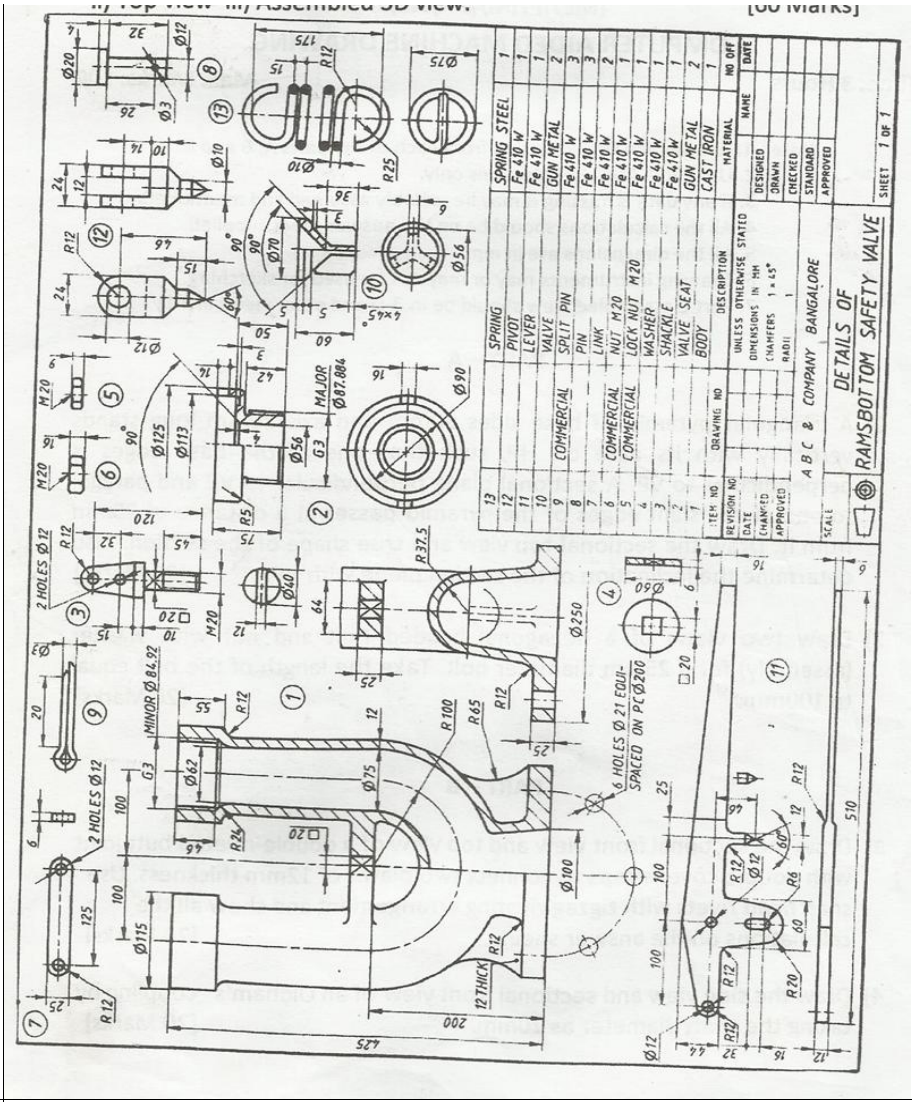
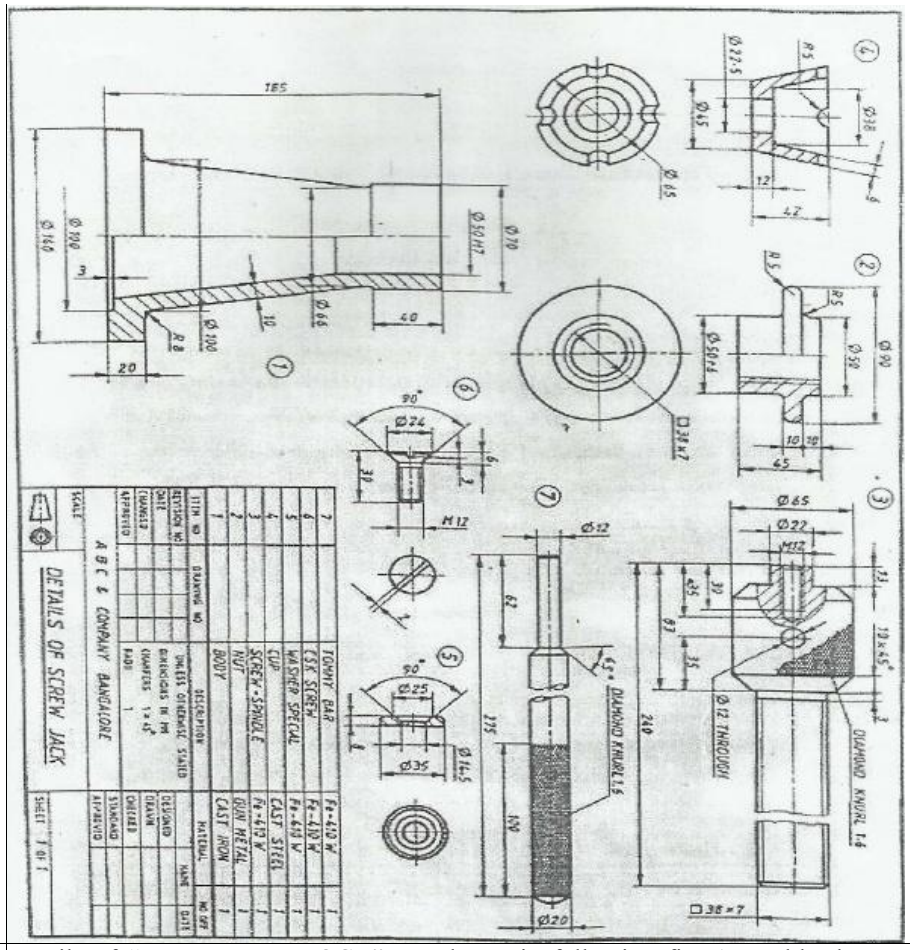
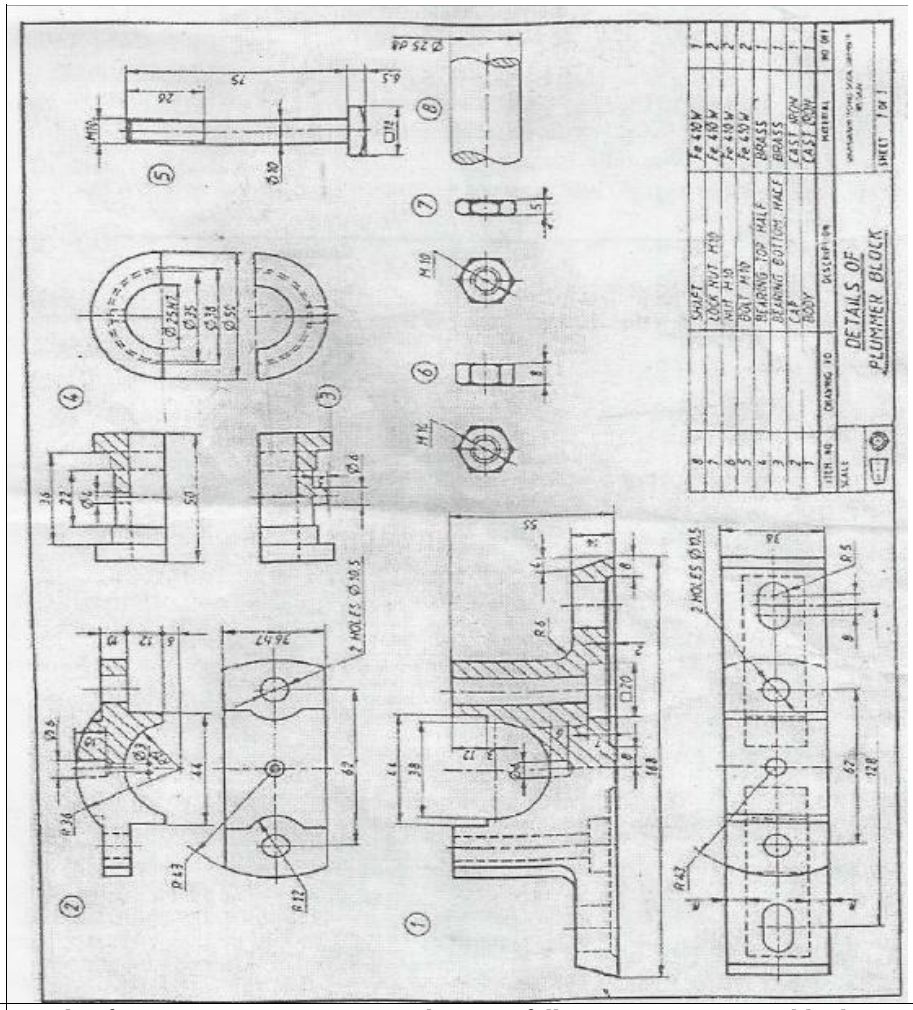


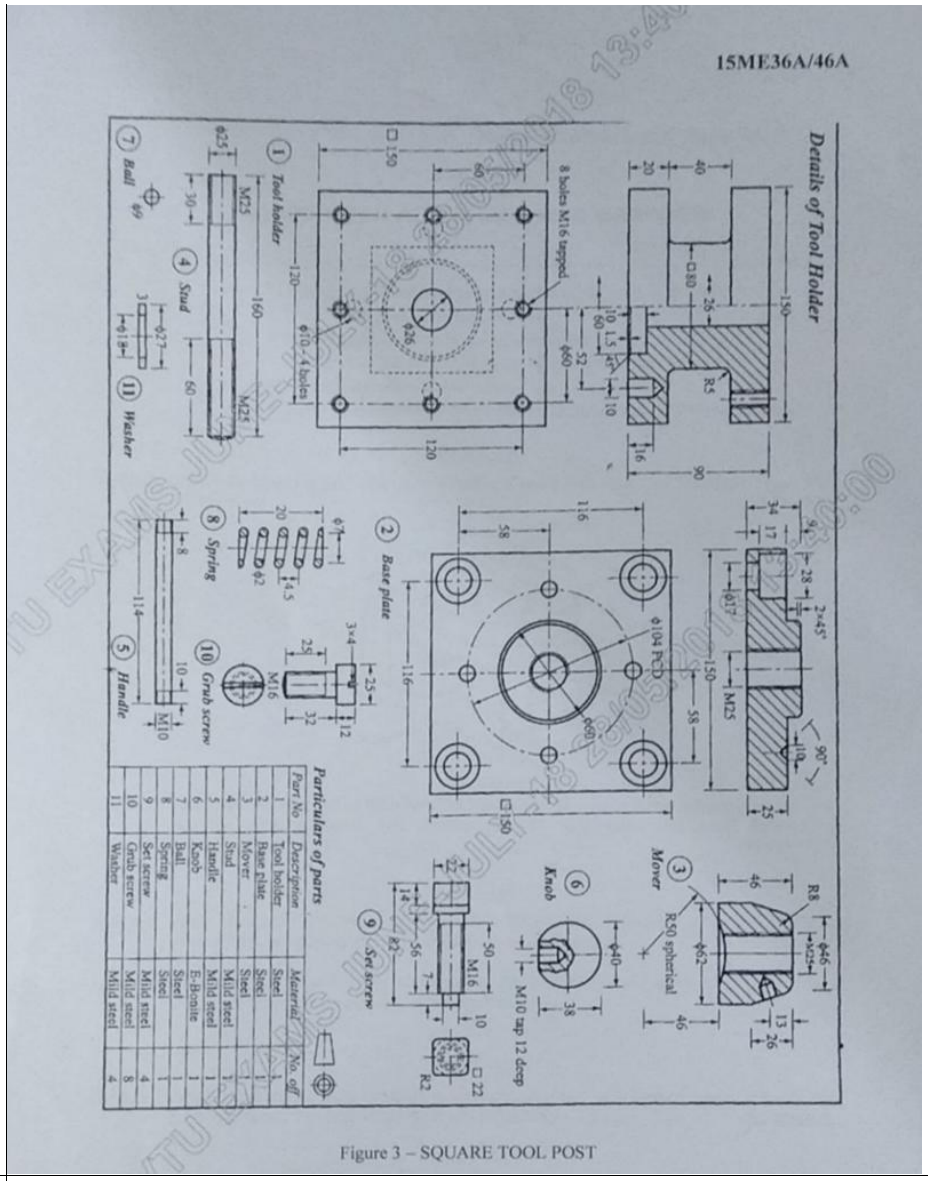
Fig: 17.4 Details of Petrol Engine Connecting Rod

33	Details of "RAMSBOTTOM SAFETY VALVE" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view. b) Top view.	CO3	L3

			
34	Details of "MACHINE VICE" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view. b) Top view.	CO3	L3
35	Details of "SCREW JACK" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Front view showing right half in section. b) Top view.	CO3	L3

			
36	Details of "PLUMMER BLOCK" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Front view showing right half in section. b) Top view.	CO3	L3

			
37	Details of SQUARE TOOL POST is shown in following Figure. Assemble the parts and draw the following views. a) sectional front view b) side view from left	CO3	L3



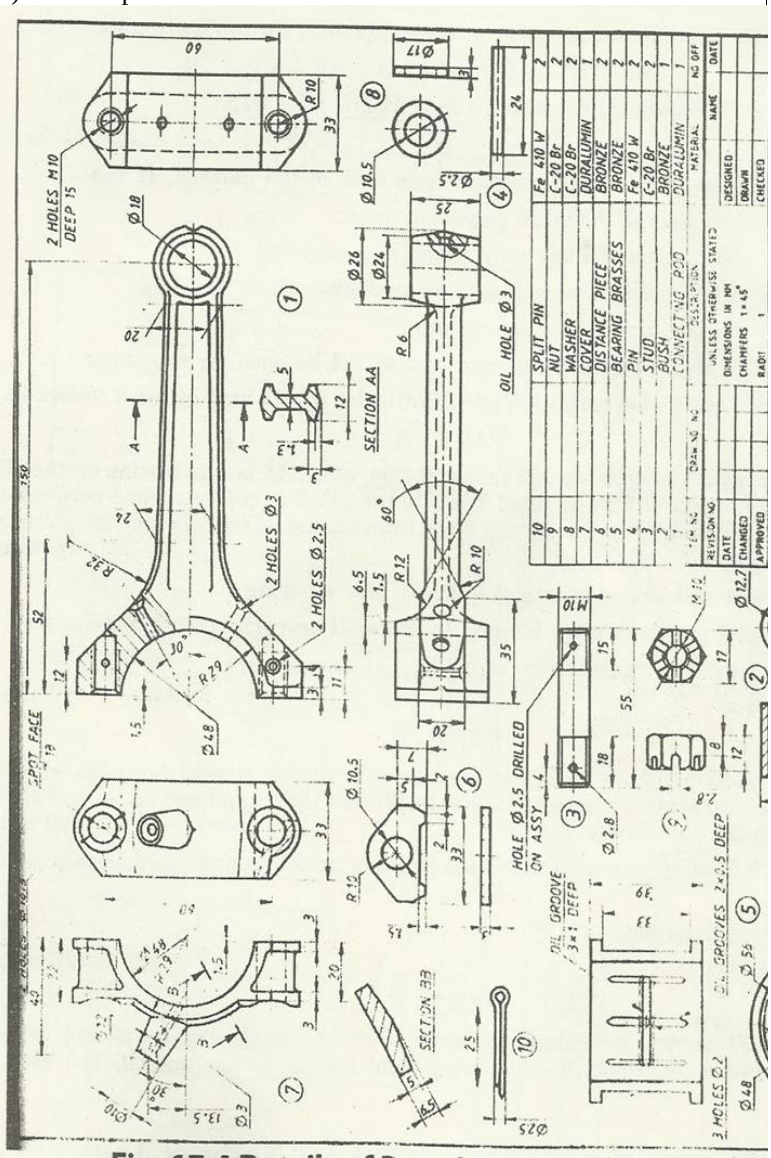
e	**Experiences**	-	-
1		CO6	L2
2			
3			
4		CO6	L2
5			

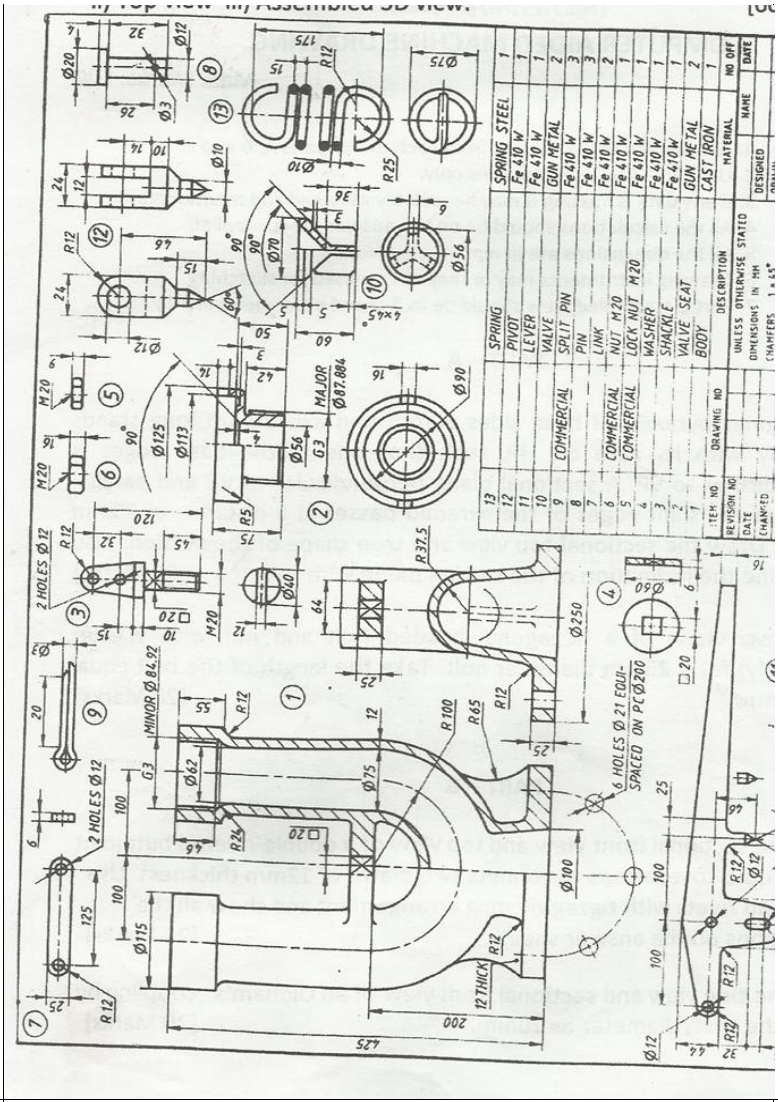
b. Assignment – 3

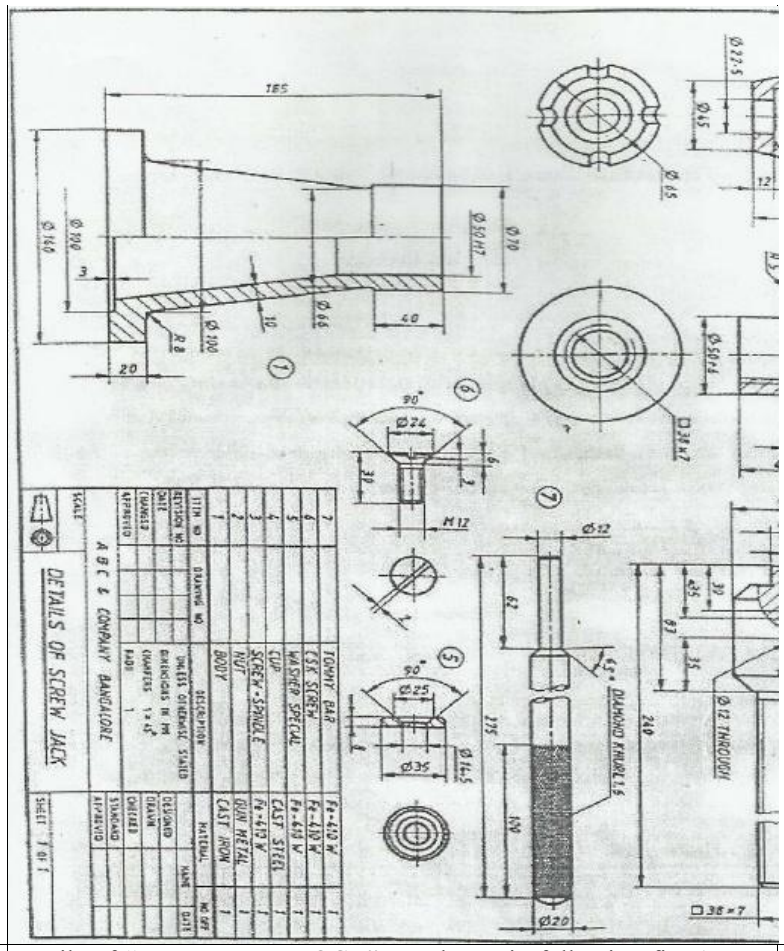
Note: A distinct assignment to be assigned to each student.

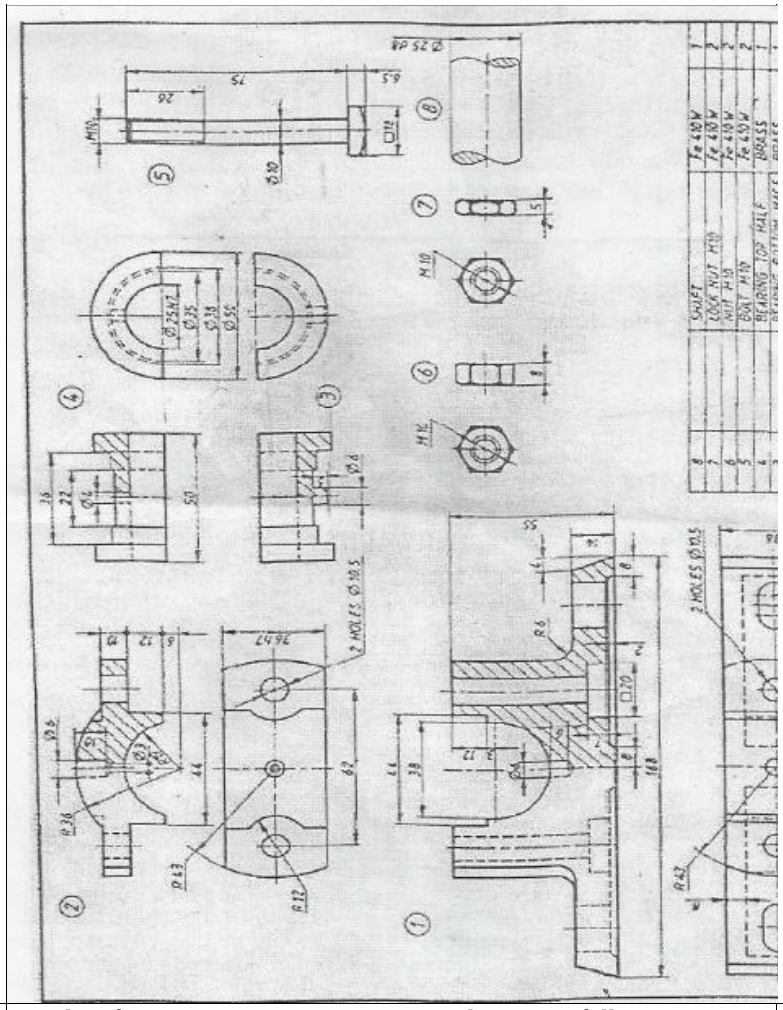
Model Assignment Questions							
Crs Code:	18ME36A	Sem:	III	Marks:	12	Time:	90 – 120 minutes
Course:	Computer Aided Machine Drawing				Module : 3		
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1		Figure 1 shows the details of 'TAIL STOCK'. Assemble the parts and draw the following views of the assembly. i) Front view in section ii) Top view	12	CO3	L3
2		Details of "IC ENGINE CONNECTING ROD" are shown in following fig. Assemble the parts and draw the following views of the assembly:	12	CO3	L3

		a) Sectional Front view. b) Top view  Fig: 17.4 Details of Petrol Engine Connecting R			
3		Details of "RAMSBOTTOM SAFETY VALVE" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view. b) Top view.	12	CO3	L3

					
4		Details of "MACHINE VICE" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view. b) Top view.	12	CO3	L3
5		Details of "SCREW JACK" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Front view showing right half in section. b) Top view.	12	CO3	L3

					
6		Details of "PLUMMER BLOCK" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Front view showing right half in section. b) Top view.	12	CO3	L3

					
7		Details of SQUARE TOOL POST is shown in following Figure. Assemble the parts and draw the following views. a) sectional front view b) side view from left	12	CO3	L3

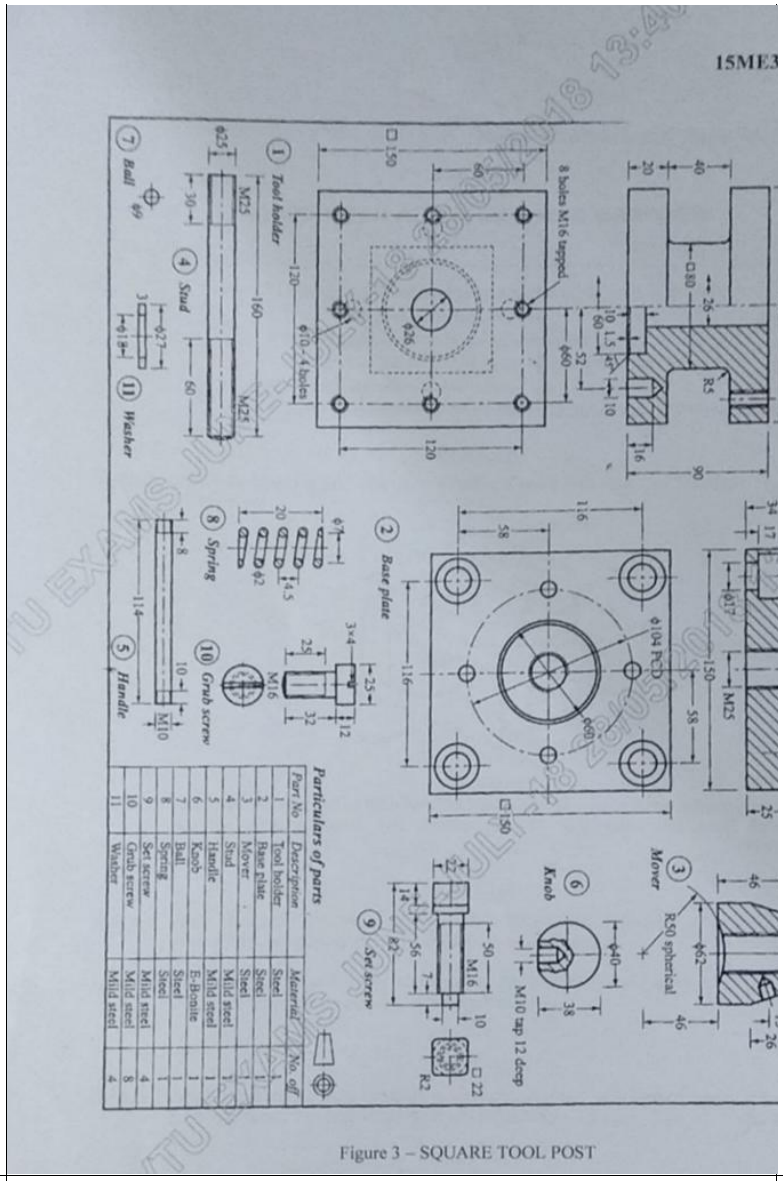
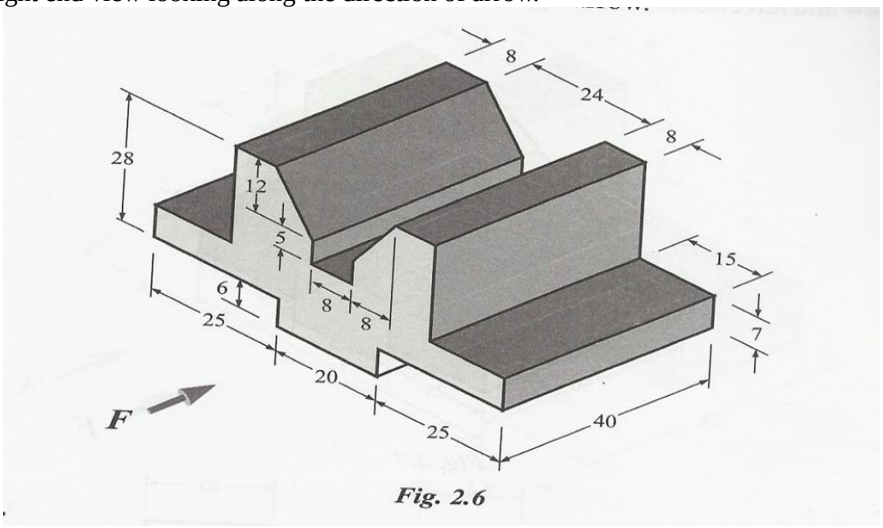


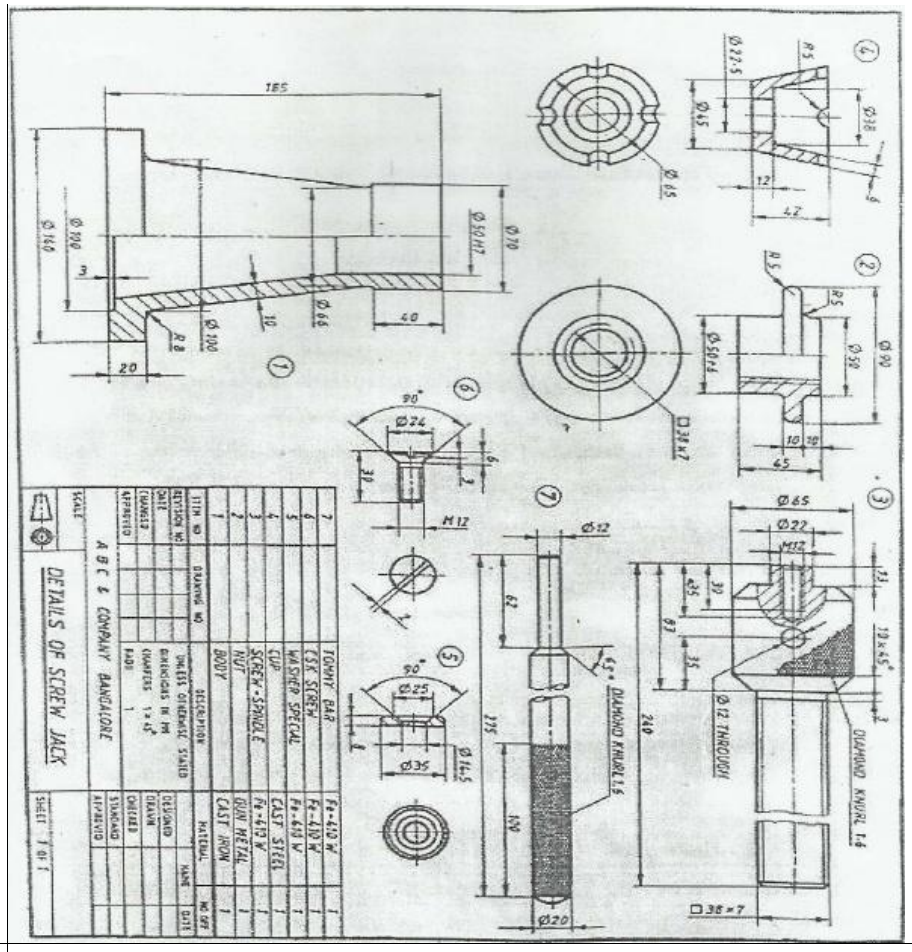
Figure 3 – SQUARE TOOL POST

E. CIA EXAM

a. Model Question Paper - 1

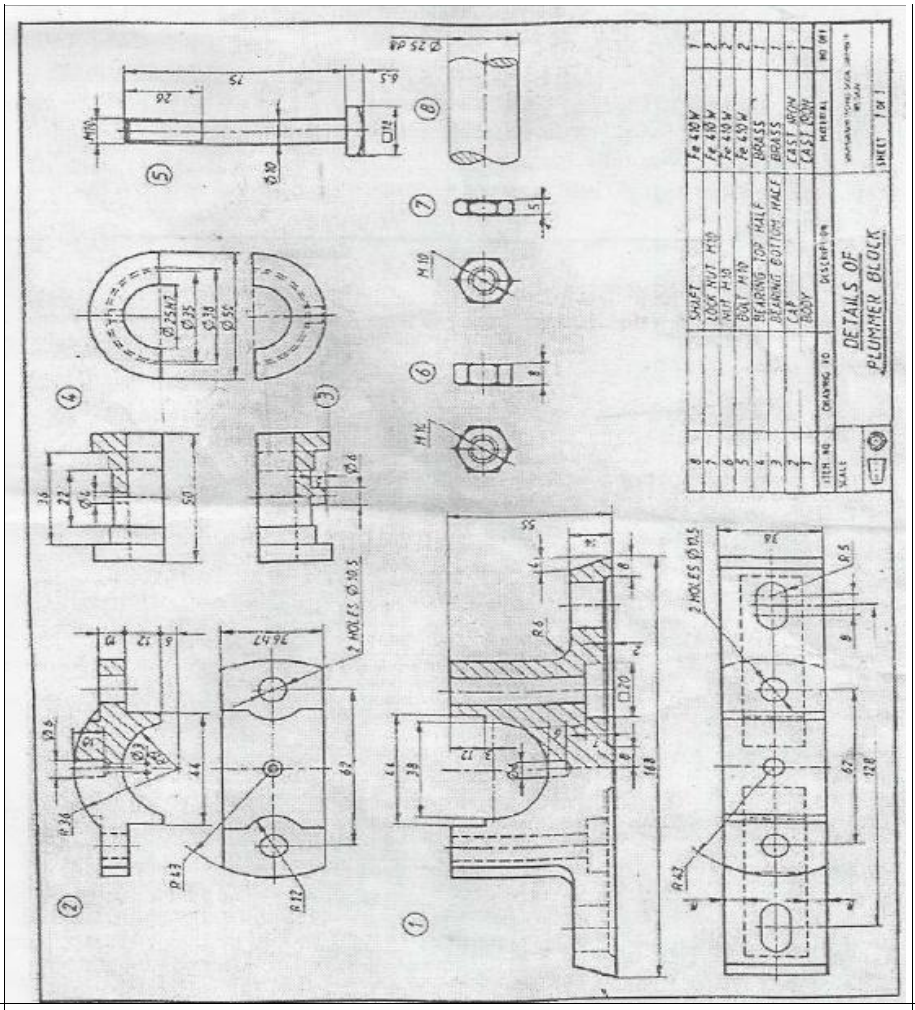
Crs Code:	18ME36A	Sem:	III	Marks:	30	Time:	75 minutes

Course:		Computer Aided Machine Drawing			
-	**-**	**Note: Answer all questions, each carry equal marks. Module : 1, 2, 3**	**Marks**	**CO**	**Level**
1		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow.  *Fig. 2.6*	7	CO1	L3
		OR			
2		A pentagonal pyramid sides of base 40mm and altitude 60mm rests with its base on HP and with a side of base parallel to VP and 20mm from it. It is cut by a horizontal section plane and is bisecting the axis. Draw the front view and sectional top view.	8	CO1	L3
3		Prepare a neat and proportionate free hand sketch of a bushed-pin type of flexible coupling to connect two shafts of 20 mm diameter for the following views i) Front view with top half in section ii) Side view from pin-head end.	8	CO2	L
		OR			
4		Draw the sectional front view and top view of Knuckle Joint, take diameter of rods equal to 20mm. Indicate all proportions with dimensions.	7	CO2	L3
5		Details of "MACHINE VICE" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view. b) Top view.	15	CO3	L3
		OR			
6		Details of "SCREW JACK" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Front view showing right half in section. b) Top view.	15	CO3	L3



b. Model Question Paper - 2

Crs Code:	18ME36A	Sem:	III	Marks:	30	Time:	75 minutes		
Course:	Computer Aided Machine Drawing								
-	-	**Note: Answer all questions, each carry equal marks. Module : 1, 2, 3**						**Marks**	**CO**	**Level**
1		Draw the two views of the stud with nut and lock nut for a 25mm diameter stud using simple assembly.						7	CO1	L3
		OR								
2		Draw the two views of an ISO threaded Square bolt 24 mm diameter and a thread length of 60mm, with a square nut. Indicate all the proportions and actual dimensions.						8	CO1	L3
3		Draw the appropriate drawing of Parallel and taper key for shaft diameter of 50 mm						8	CO2	L
		OR								
4		Draw sectional front and side views of an Oldham's coupling to connect two shafts of diameter 25mm. Indicate dimensions.						7	CO2	L3
5		Details of "PLUMMER BLOCK" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Front view showing right half in section. b) Top view.						15	CO3	L3

					
		OR			
6		Details of "IC ENGINE CONNECTING ROD" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view. b) Top view	15	CO3	L3

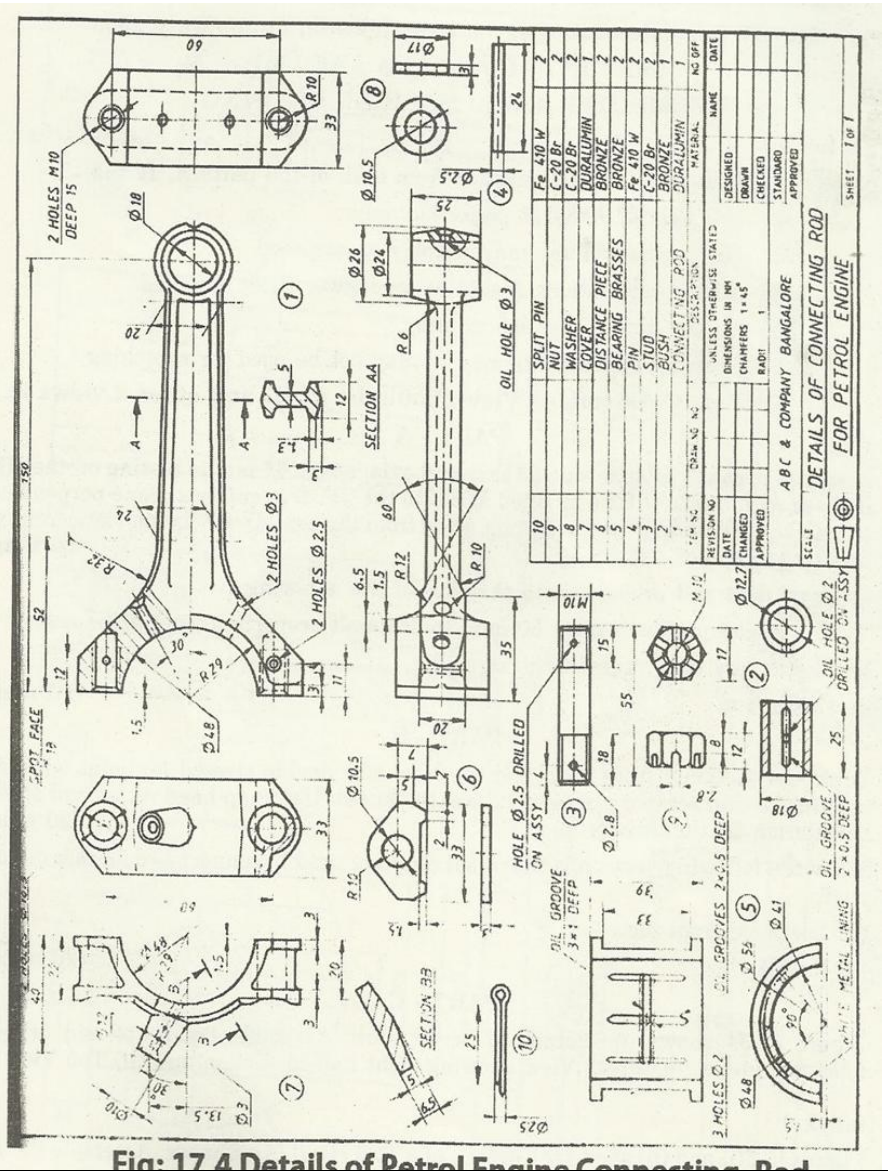
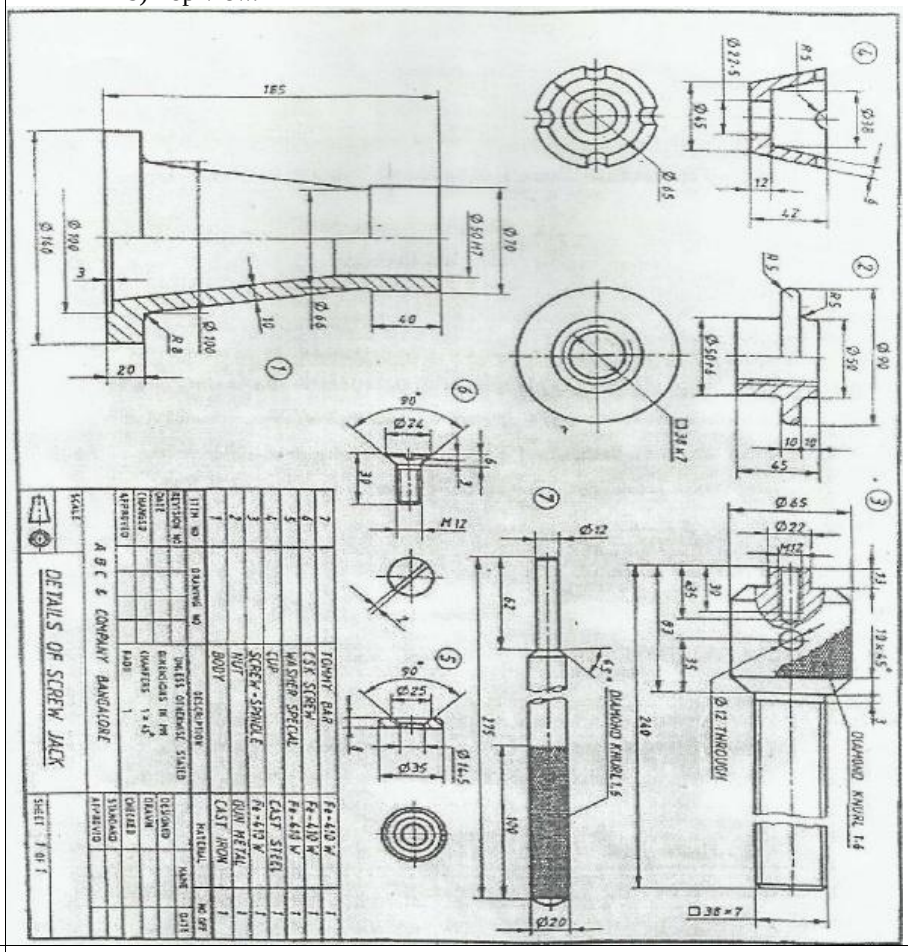


Fig: 17.4 Details of Petrol Engine Connecting Rod

c. Model Question Paper - 3

Crs Code:	18ME36A	Sem:	III	Marks:	30	Time:	75 minutes
Course:	Computer Aided Machine Drawing						

-	-	**Note: Answer all questions, each carry equal marks. Module : 1, 2, 3**	**Marks**	**CO**	**Level**
1		Draw the following External thread profiles. (Minimum three threads in section) a) ACME Thread of pitch 40 mm b) Square Thread of pitch 40mm	7	CO1	L3
		OR			
2		Draw the two views of Square Headed Bolt M25 x 100 and a thread length of 60mm with a hexagonal nut. Indicate all the proportions and actual dimensions.	8	CO1	L3
3		Draw sectional Front View and a view looking from socket end of a SOCKET and SPIGOT COTTER JOINT used for joining two rods of diameter 20mm. Indicate dimensions.	8	CO2	L
		OR			
4		Draw the following views of a Split muff coupling for a shaft diameter of 20mm. i) Sectional front view ii) Top view.	7	CO2	L3
5		Figure 1 shows the details of 'TAIL STOCK'. Assemble the parts and draw the following views of the assembly.	15	CO3	L3

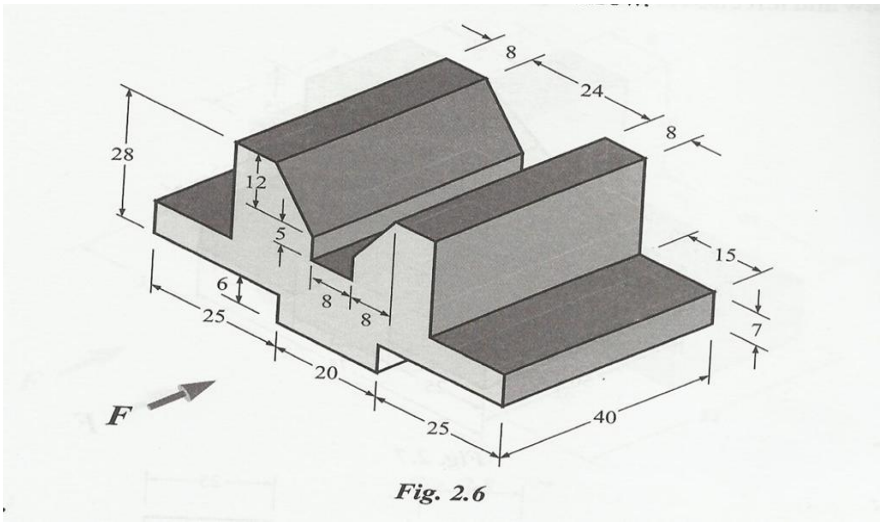
		i) Front view in section ii) Top view			
		OR			
6		Details of "SCREW JACK" are shown in following fig. Assemble the parts and draw the following views of the assembly: a)Front view showing right half in section. b) Top view.  	15	CO3	L3

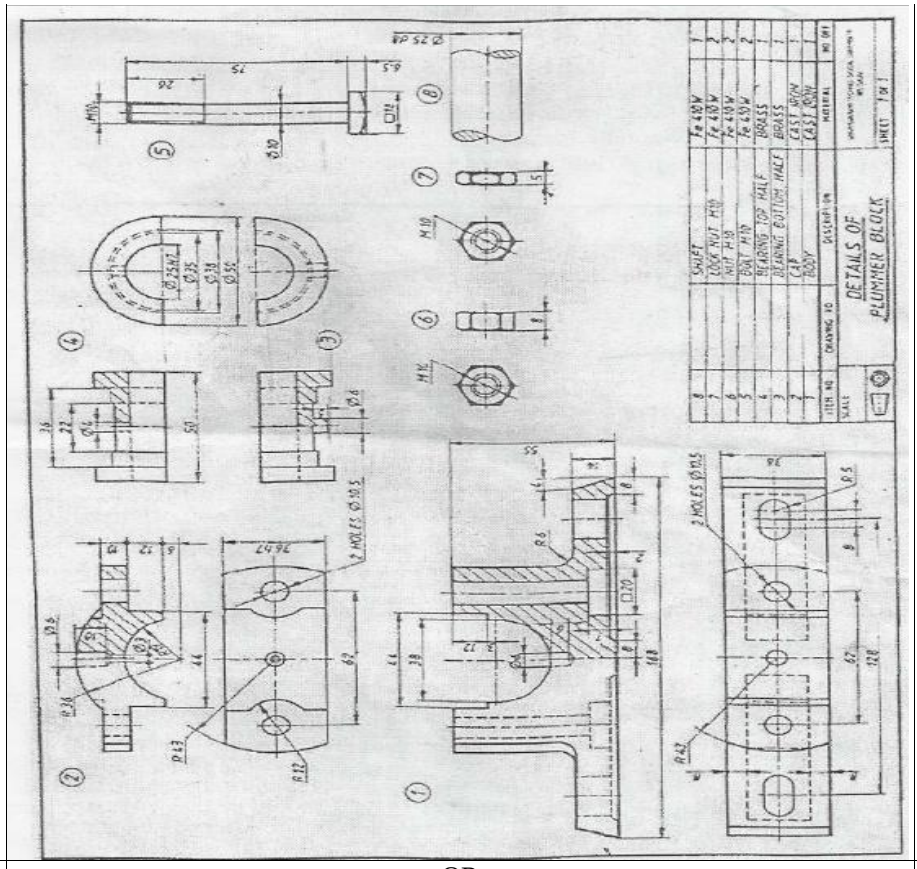
F. EXAM PREPARATION

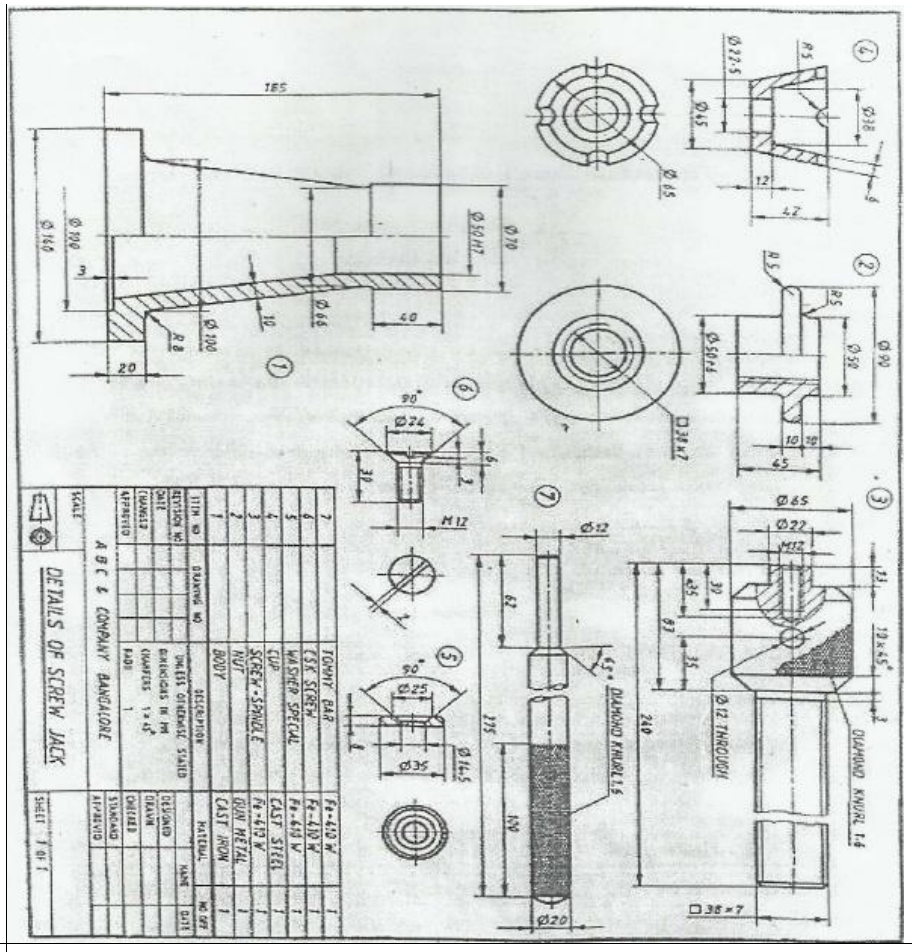
1. University Model Question Paper

Course:	Computer Aided Machine Drawing					Month / Year	Dec /2019
Crs Code:	18ME36A	Sem:	III	Marks:	100	Time:	180 minutes

Module	Note	Answer all THREE full questions. All questions carry equal marks.	Marks	CO	Level
1		The isometric view of a V block is shown in fig. Draw its front view, top view and right end view looking along the direction of arrow.	25	CO1	L3

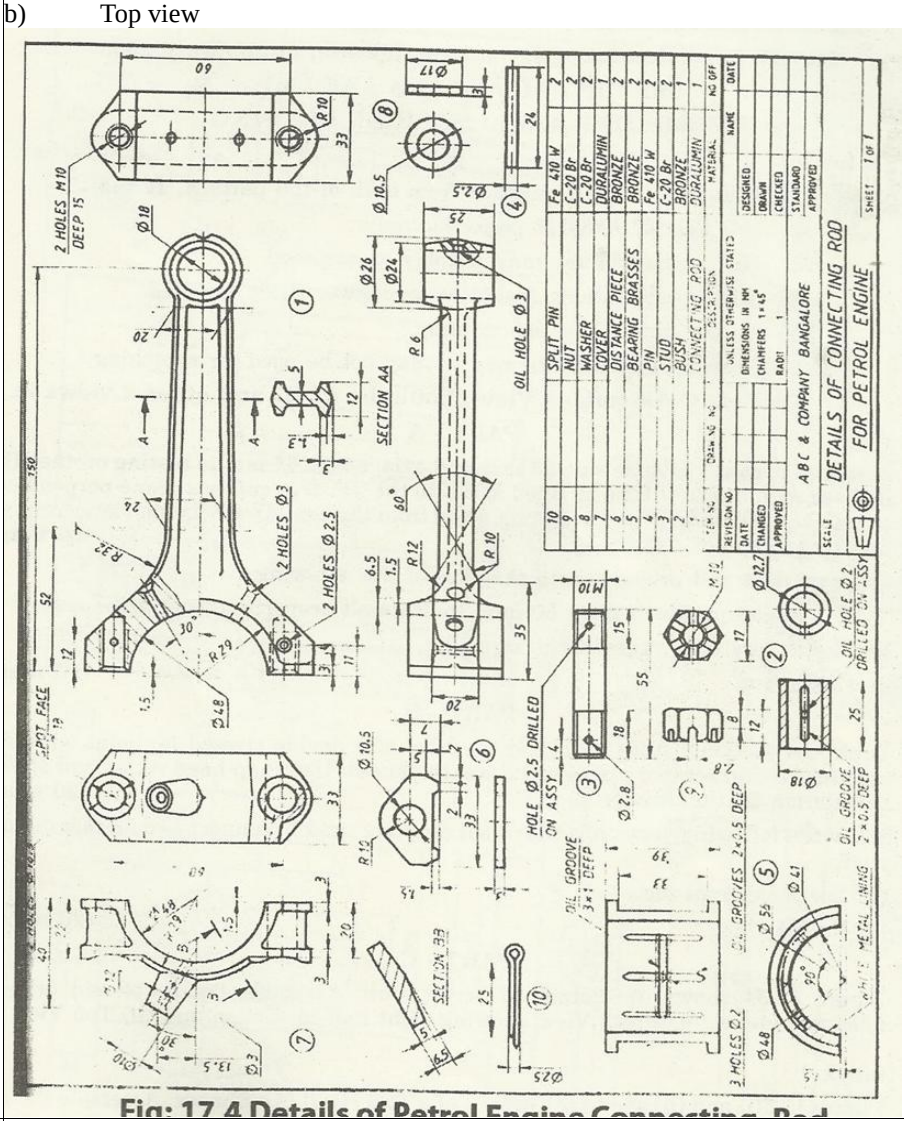
		 *Fig. 2.6*			
		OR			
1		A pentagonal pyramid sides of base 40mm and altitude 60mm rests with its base on HP and with a side of base parallel to VP and 20mm from it. It is cut by a horizontal section plane and is bisecting the axis. Draw the front view and sectional top view.	25	CO1	L3
2		Draw sectional Front View & Top View of the Double Riveted Zig Zag Lap Joint, taking thickness t = 09 mm, Indicate dimensions. (Minimum three rows)	25	C02	L3
		OR			
2		Prepare a neat and proportionate free hand sketch of a bushed-pin type of flexible coupling to connect two shafts of 20 mm diameter for the following views i) Front view with top half in section ii) Side view from pin-head end.	25	CO2	L3
3		Details of "PLUMMER BLOCK" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Front view showing right half in section. b) Top view.	50	CO3	L3

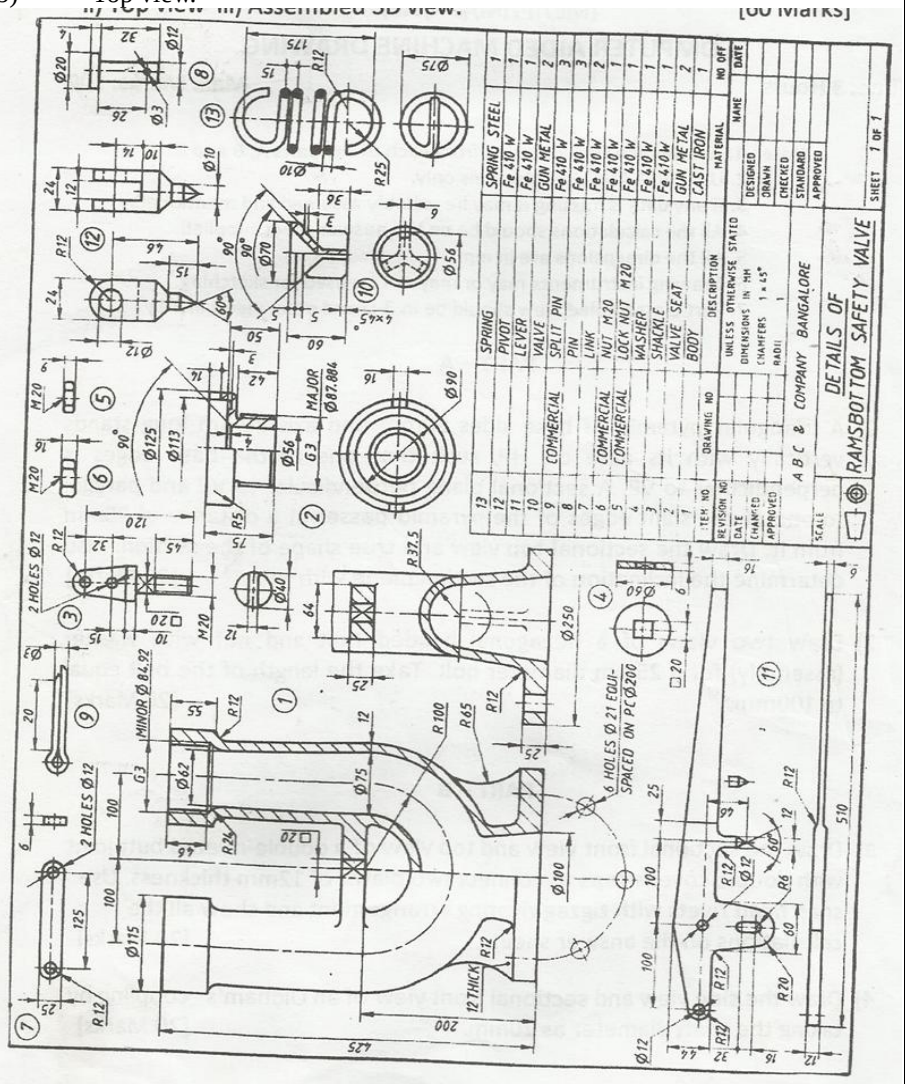
					
		OR			
3		Details of "SCREW JACK" are shown in following fig. Assemble the parts and draw the following views of the assembly: a)Front view showing right half in section. b) Top view.	50	CO3	L3

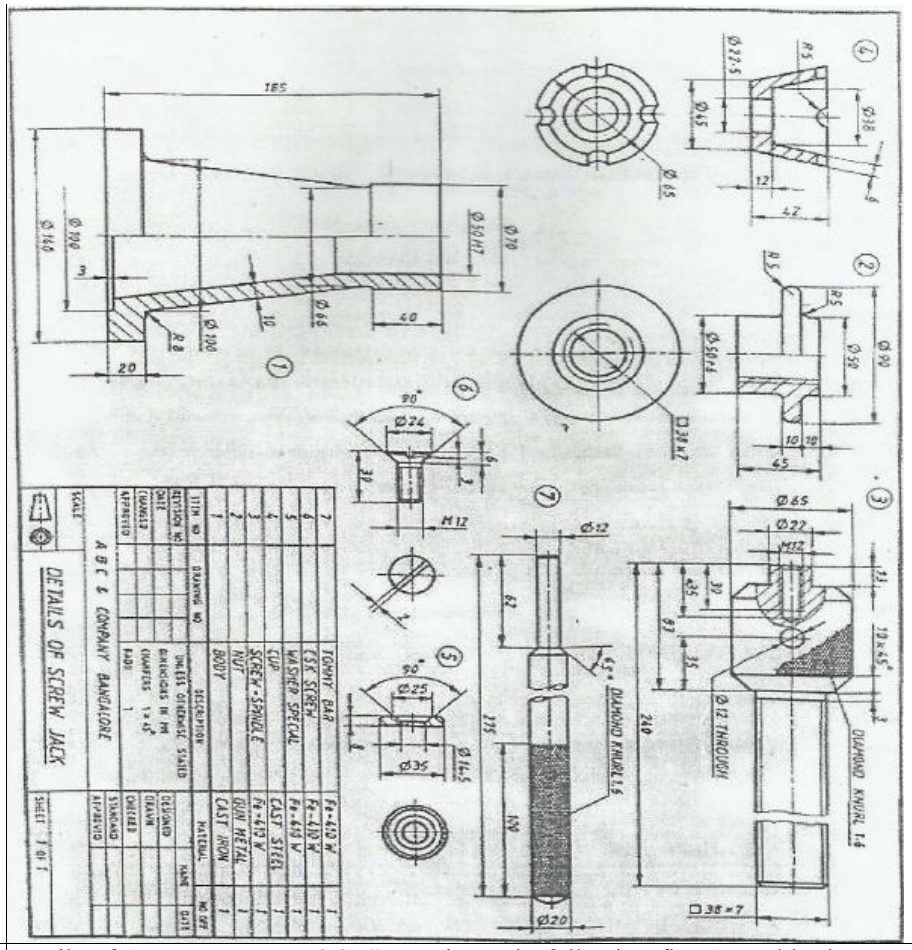


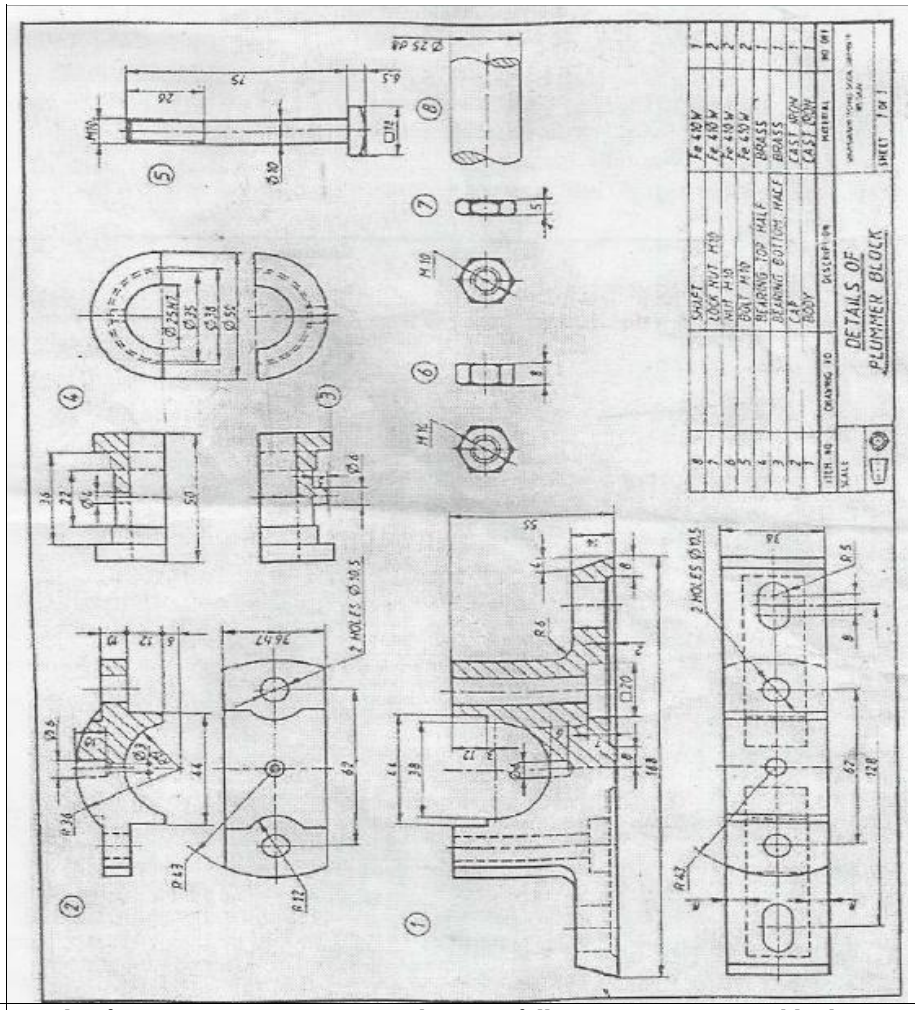
2. SEE Important Questions

Course:	Computer Aided Machine Drawing						Month / Year	Dec/2019	
Crs Code:	18ME36A	Sem:	III	Marks:	60		Time:	180 minutes	
	Note	Answer all THREE full questions. All questions carry equal marks.					-	-	
Module	Qno.	Important Question					**Marks**	**CO**	**Year**
1	1	Draw the following External thread profiles. (Minimum three threads in section) a) ACME Thread of pitch 40 mm b) Square Thread of pitch 40mm					15	CO1	2017
	2	Draw the two views of Square Headed Bolt M25 x 100 and a thread length of 60mm with a hexagonal nut. Indicate all the proportions and actual dimensions.					15	CO1	2017
	3	Draw the two views of the stud with nut and lock nut for a 25mm diameter stud using simple assembly.					20	CO1	2012
	4	Draw the two views of an ISO threaded Square bolt 24 mm diameter and a thread length of 60mm, with a square nut. Indicate all the proportions and actual dimensions.					20	CO1	2016
	5	A triangular pyramid of base edge 40mm and axis 60mm is resting on its base on HP with one of its base edges parallel to VP. A section plane passing through one of the base corners of the pyramid and the two slant edges at a height of 20mm and 30mm above HP cuts the pyramid. Draw the front view, sectional top view and true shape of the section. Determine the inclination of the section plane with HP.					20	CO1	20014
2	1	Draw the following views of a Protected Flange coupling for a shaft diameter of 20mm. i) Sectional front view					20	CO2	2014

		ii) Top view			
	2	Draw the following views of a Unprotected Flange coupling for a shaft diameter of 20mm. iii) Sectional front view iv) Top view	20	CO2	2016
	3	Draw sectional Front View and a view looking from socket end of a SOCKET and SPIGOT COTTER JOINT used for joining two rods of diameter 20mm. Indicate dimensions.	15	CO2	2017
	4	Draw sectional front and side views of an Oldham's coupling to connect two shafts of diameter 25mm. Indicate dimensions.	15	CO2	2017
	5	Draw the following views of a Split muff coupling for a shaft diameter of 20mm. v)Sectional front view vi) Top view	20	CO2	2013
3	1	Figure 1 shows the details of 'TAIL STOCK'. Assemble the parts and draw the following views of the assembly. i) Front view in section ii) Top view	60	CO3	2016
	2	Details of "IC ENGINE CONNECTING ROD" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view. b) Top view  Fig: 17.4 Details of Petrol Engine Connecting Rod	60	CO3	2015
	3	Details of "RAMSBOTTOM SAFETY VALVE" are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view.	60	CO3	2015

		b) Top view. 			
	4	Details of “MACHINE VICE” are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Sectional Front view. b) Top view.	50	CO3	2017
	5	Details of “SCREW JACK” are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Front view showing right half in section. b) Top view.	50	CO3	2017

					
	6	Details of “PLUMMER BLOCK” are shown in following fig. Assemble the parts and draw the following views of the assembly: a) Front view showing right half in section. b) Top view.	50	CO3	2017

					
	7	Details of SQUARE TOOL POST is shown in following Figure. Assemble the parts and draw the following views. a) sectional front view b) side view from left	50	CO3	2017

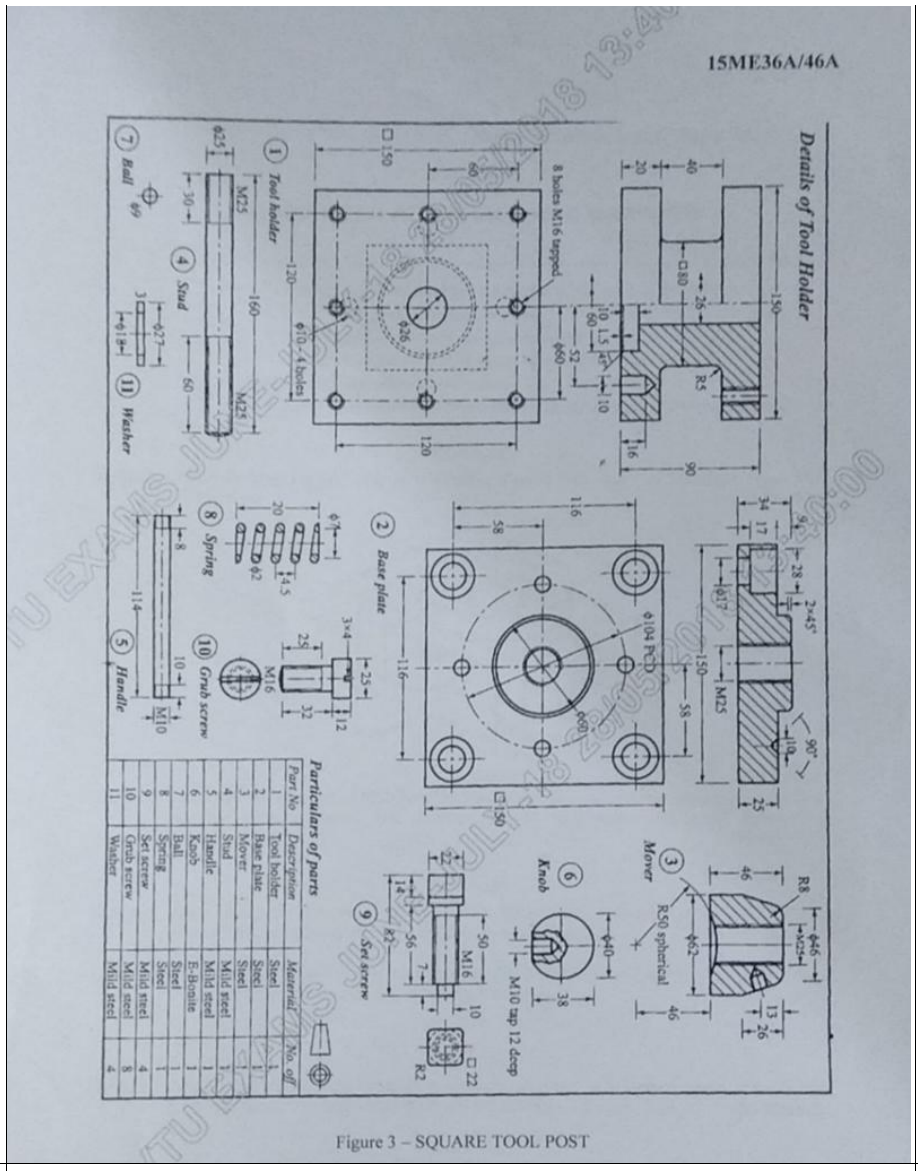


Figure 3 – SQUARE TOOL POST

G. Content to Course Outcomes

1. TLPA Parameters

Table 1: TLPA – Example Course

Module- #	Course Content or Syllabus (Split module content into 2 parts which have similar concepts)	Content Teaching Hours	Blooms' Learning Levels for Content	Final Blooms' Level	Identified Action Verbs for Learning	Instruction Methods for Learning	Assessment Methods to Measure Learning
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*
1	**Sections of Solids:** Sections of Pyramids, Prisms, Cubes, Tetrahedrons, Cones and Cylinders resting only on their bases (No problems on, axis inclinations, spheres and hollow solids), True shape of section Orthographic views: Conversion of pictorial views into orthographic projections of simple machine parts with or without section. (Bureau of Indian Standards conventions are to be followed for the drawings), Hidden line conventions, Precedence of lines. **Fasteners:** Hexagonal headed bolt and nut with	15	- L2 - L3	L2	Apply	- Lecture -Chalk & Board -LCD Projector	- Assignment - -

	washer (assembly), square headed bolt and nut with washer (assembly) simple assembly using stud bolts with nut and lock nut. Flanged nut, slotted nut, taper and split pin for locking, counter sunk head screw, grub screw, Allen screw						
2	**Keys and Joints:** Parallel, Taper, Feather Key, Gib head key and Woodruff key Riveted joints: Single and double riveted lap joints, Butt joints with single/double cover straps (Chain and zigzag using snap head riveters). **Joints:** Cotter joint (socket and spigot), Knuckle joint (pin joint) for two rods **Couplings:** Split muff coupling, Protected type flange coupling, Pin (bush) type flexible coupling, Oldham's coupling and Universal coupling (Hook's Joint).	15	- L2 - L3	L2	Apply	- Lecture -Chalk & Board -LCD Projector	- Assignment - -
3	Introduction, Fundamental tolerances, Deviations, Methods of placing limit dimensions, Types of fits with symbols and applications, Geometrical tolerances on drawings, Standards followed in industry. (Part drawings shall be given) 1. Plummer block (Pedestal Bearing) 2. Rams Bottom Safety Valve 3. I. C. Engine connecting rod 4. Screw jack (Bottle type) 5. Tails tock of lathe 6. Machine vice 7. Tool Head of Shaper	40	- L2 - L3	L2	Apply	- Lecture -Chalk & Board -LCD Projector	- Assignment - -

2. Concepts and Outcomes:

Table 2: Concept to Outcome – Example Course

Module- #	Learning or Outcome from study of the Content or Syllabus	Identified Concepts from Content	Final Concept	Concept Justification (What all Learning Happened from the study of Content / Syllabus. A short word for learning or outcome)	CO Components (1.Action Verb, 2.Knowledge, 3.Condition / Methodology, 4.Benchmark)	Course Outcome **Student Should be able to ...**
A	*I*	*J*	*K*	*L*	*M*	*N*
1	-Draw the sections of solids, orthographic projections, thread forms and nut & bolts in 2D	-Section of Solids -Thread Forms	Thread Forms	Comprehend the Drawing of different tread forms and nut and bolt	-Understand -Drawing -Thread Forms	Understand the Drawing of different thread forms
1	-Draw the Keys, Joints, Couplings in 2D	- Mechanical Joints -	Mechanical Joints	Comprehend the Drawing of different mechanical joints	-Understand -Drawing -Mechanical Joints	Understand the drawing of different mechanical joints
2	-Assemblies from the part drawings machines	-Assembly -	Assembly	Comprehend the part Drawing and then assemble the part drawing	-Understand -Part drawing -Assembly	Understand the part drawing of different component and then assemble the part drawing