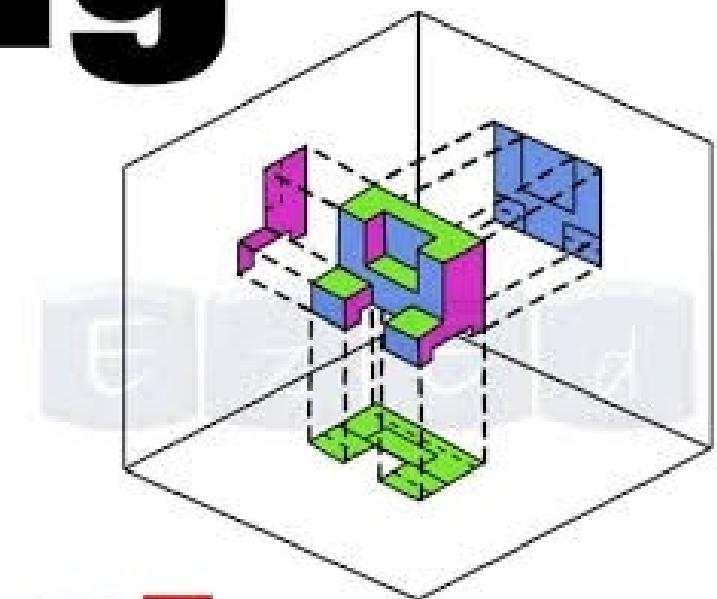


Engineering

Drawing &

Its Applications



INTRODUCTION TO ENG 104

Engineering drawing is a language or a means of communication between an architect and a contractor

OR

Engineering drawing is a medium by which the architect uses drawing on paper to pour out his mind

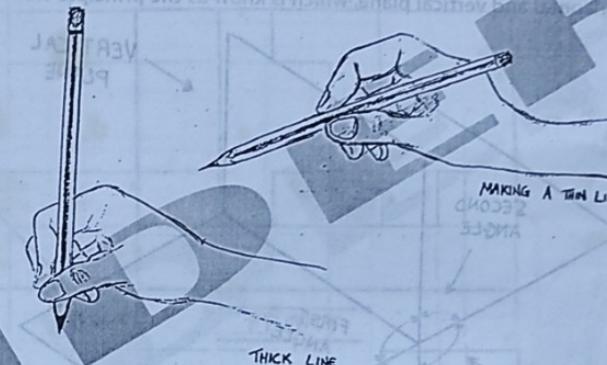
BASIC DRAWING MATERIALS

- > DRAWING BOARD
- > DRAWING PAPER
- > SET SQUARE
- > T-SQUARE
- > DRAWING SET
- > FRENCH CURVES
- > PENCILS

BASIC THINGS THAT MATTERS IN ENG DRAWING

- > NEATNESS
- > SPEED
- > ACCURACY
- > DIMENSIONING
- > TITLE BLOCK
- > PENCIL SHARPNESS
- > THICK AND THIN LINES OBSERVATIONS
- > LABELS

HOW TO PRODUCE A THICK AND A THIN LINE



TOPICS TO BE EXPLAINED

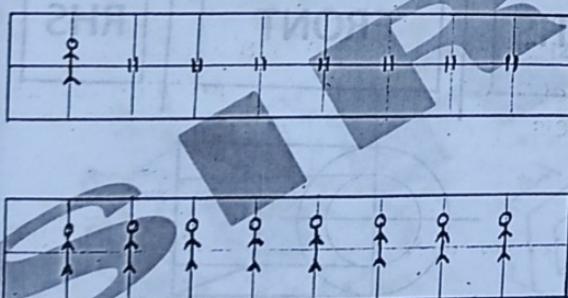
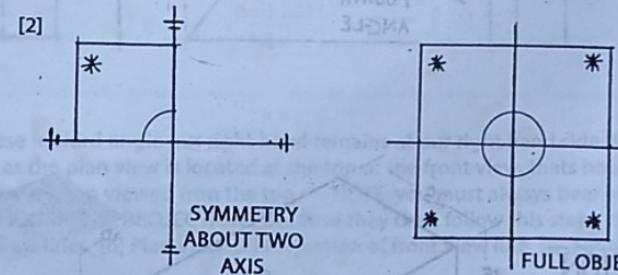
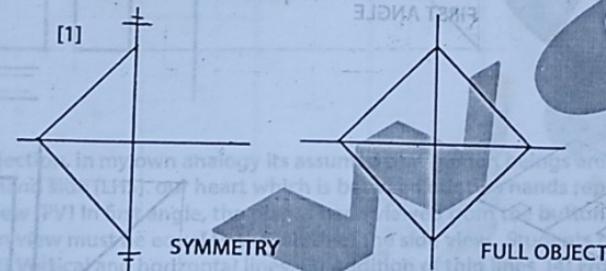
- 1 CONVENTIONS
- 2 ORTHOGRAPHIC PROJECTION [1st and 3rd]
- 3 PICTURE DRAWING - isometric and oblique projection
- 4 SECTIONING VIEWS
- 5 DEVELOPMENT OF SURFACES
- 6 BOLTS AND NUTS
- 7 PAST QUESTIONS AND SOLUTIONS

CONVENTIONS

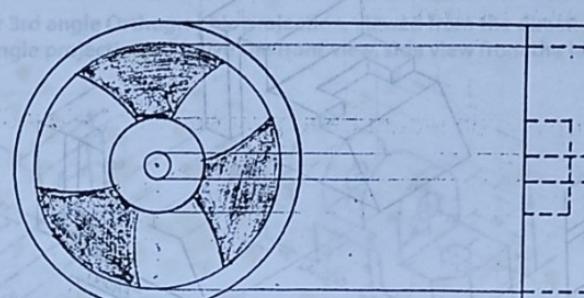
CONVENTION is an advanced form of scale, because it is majorly used for saving time and space. convention can be represented with lines and symbols and it has a lot of role to play in ENG 104

TYPES OF CONVENTION

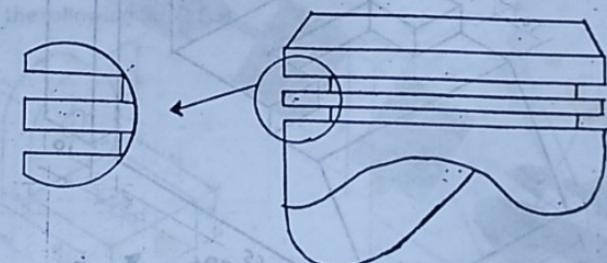
- 1 SYMMETRY CONVENTION
- 2 SYMMETRY about two axis
- 3 REPETITIVE CONVENTION
- 4 REVOLUTION CONVENTION
- 5 REMOVED VIEW CONVENTION



REPETITIVE CONVENTION



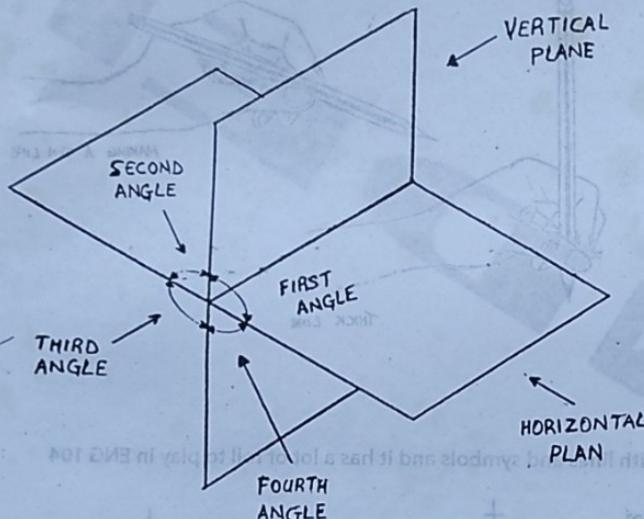
REVOLUTION CONVENTION



REMOVED VIEW CONVENTION

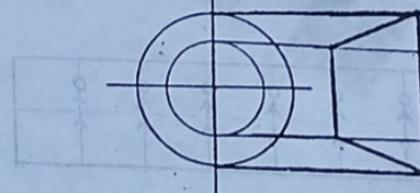
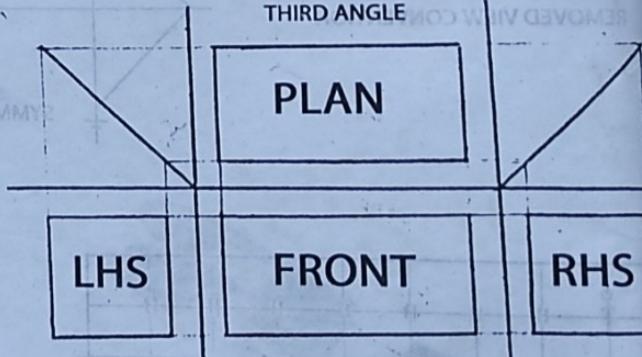
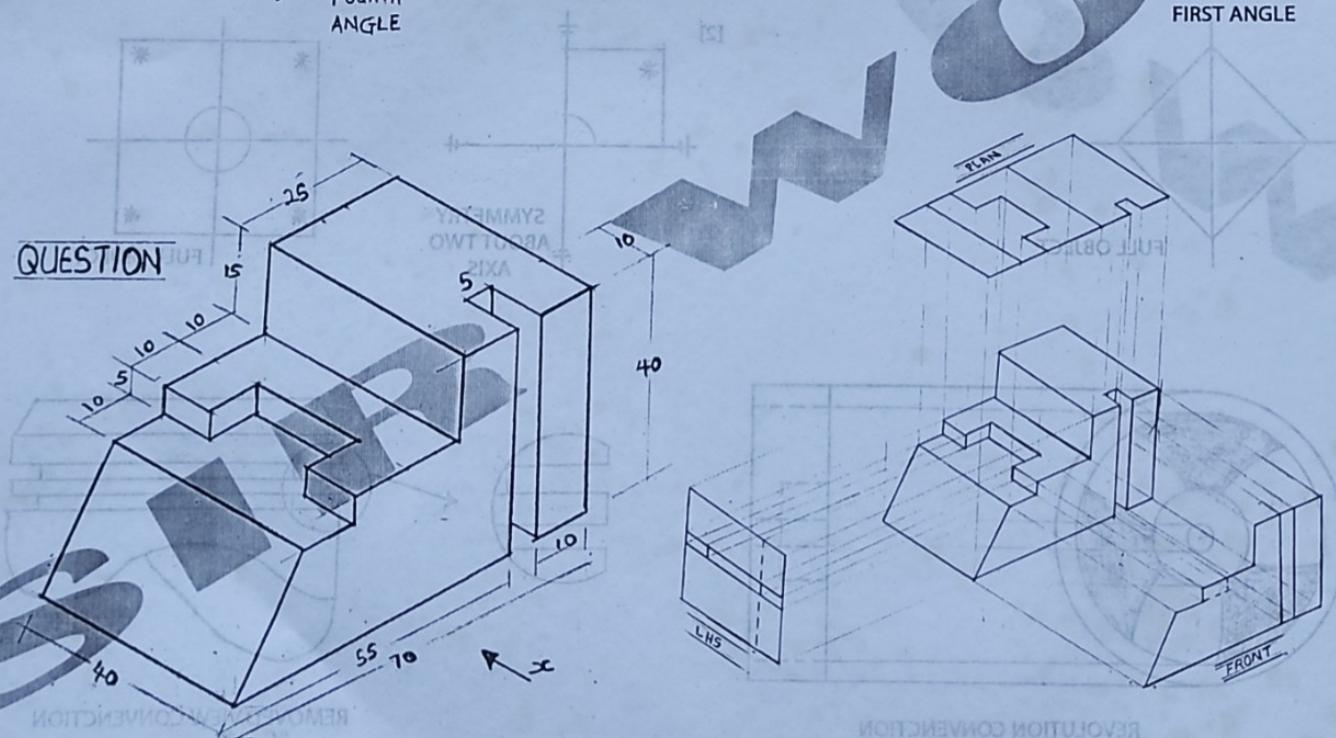
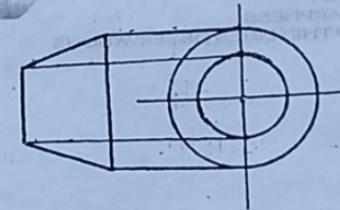
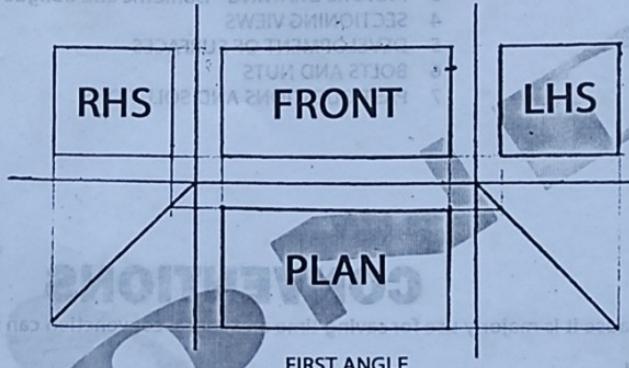
ORTHOGRAPHIC PROJECTION

ORTHOGRAPHIC PROJECTION simply means the representation of a three dimensional component into a two dimensional form, and all representations must be on a flat surface. Orthographic projection requires that all lines must be accurately dimensioned, and all projections must be parallel and normal to the plane. ORTHOGRAPHIC PROJECTION generally uses horizontal and vertical plane, which is known as the principle view. The two principle planes intersect at right angle thereby producing four quadrant as shown below



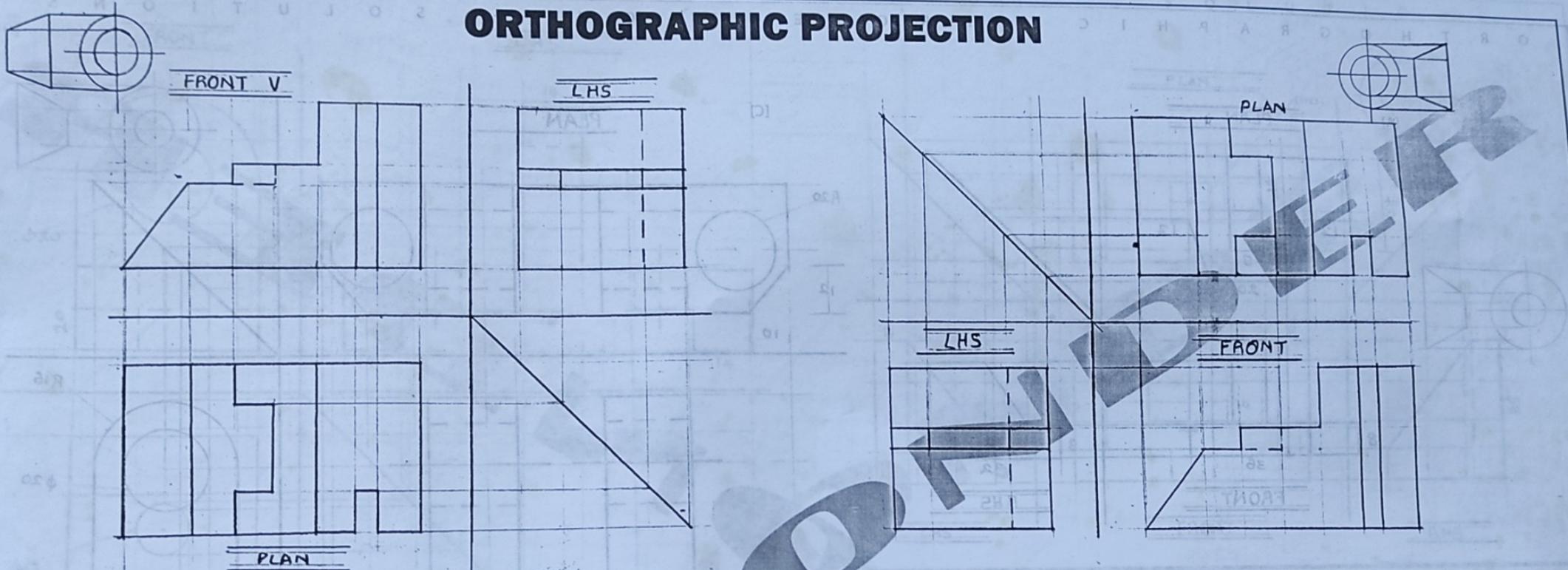
FORMS OF DRAWING ORTHOGRAPHIC PROJECTION

- [1] FIRST ANGLE orthographic projection
- [2] THIRD ANGLE orthographic projection



REVOLUTION CONNECTION

ORTHOGRAPHIC PROJECTION

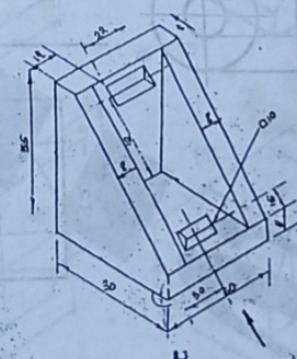
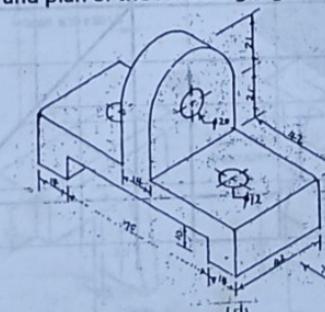
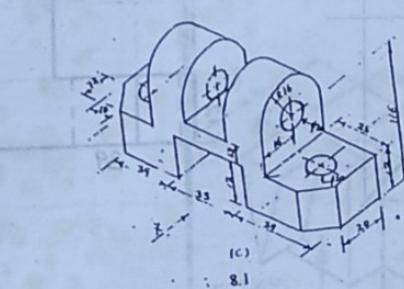
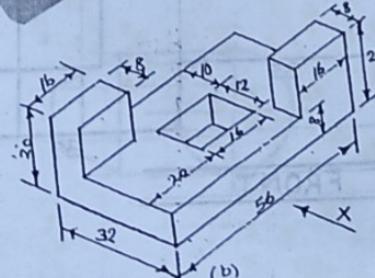
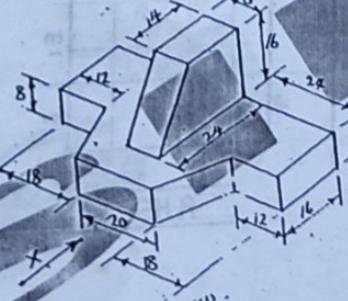


With respect to third angle projection, in my own analogy its assumed that human beings are in third angle projection, because in third angle our right hand remains at our right hand side [RHS] while our left hand, at our left hand side [LHS], our heart which is between our two hands represents our front view [FV]. Just as the plan view is located at the top of the front view, that's how our head represents the plan view [PV] In first angle, the plan is viewed from the button while in third angle the plan view is been viewed from the top. NOTE: you must always bear in mind that the length of the plan view must be equal to the width of the side view. Students have difficulties in drawing ORTHOGRAPHIC PROJECTIONS because they dont follow this steps below

- [1] Labeling of the question
- [2] Vertical and horizontal lines
- [3] Addition of thin lines
- [4] Front view
- [5] Projection of front view lines
- [6] Plan view
- [7] Projection of front view line
- [8] get angle 45
- [9] Side view

ASSIGNMENTS ON ORTHOGRAPHIC PROJECTION

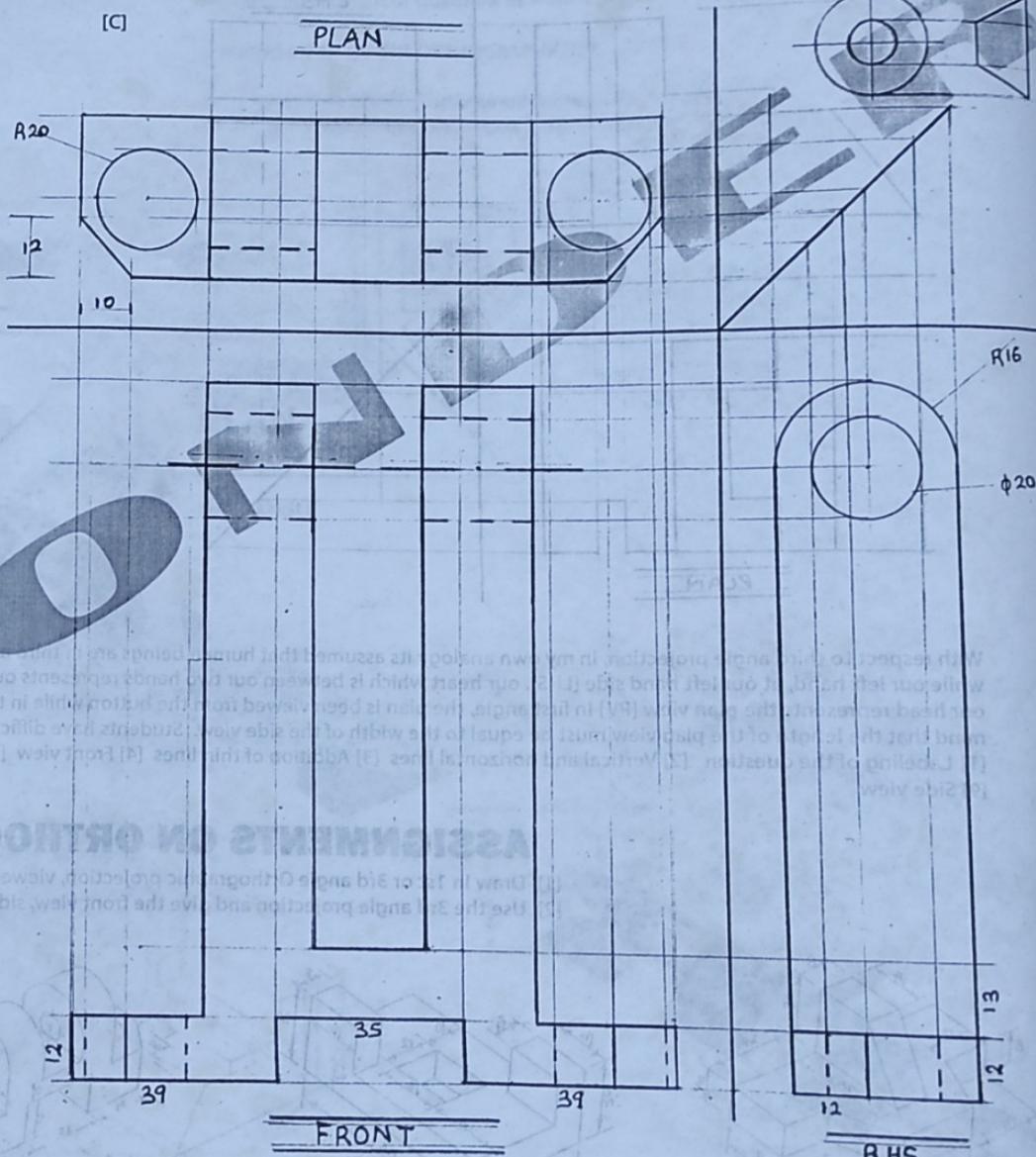
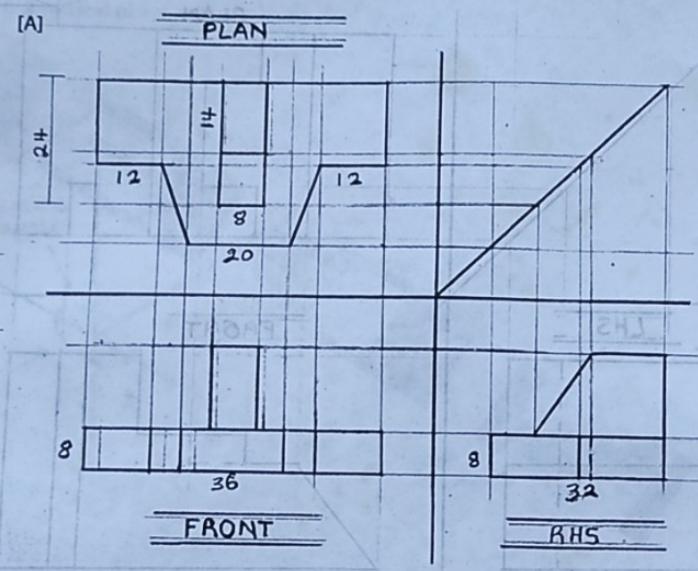
- [1] Draw in 1st or 3rd angle Orthographic projection, viewed from the direction X [fig Q 8.1]
 [2] Use the 3rd angle projection and give the front view, side view from the left and plan of the following [fig Q 8.3]

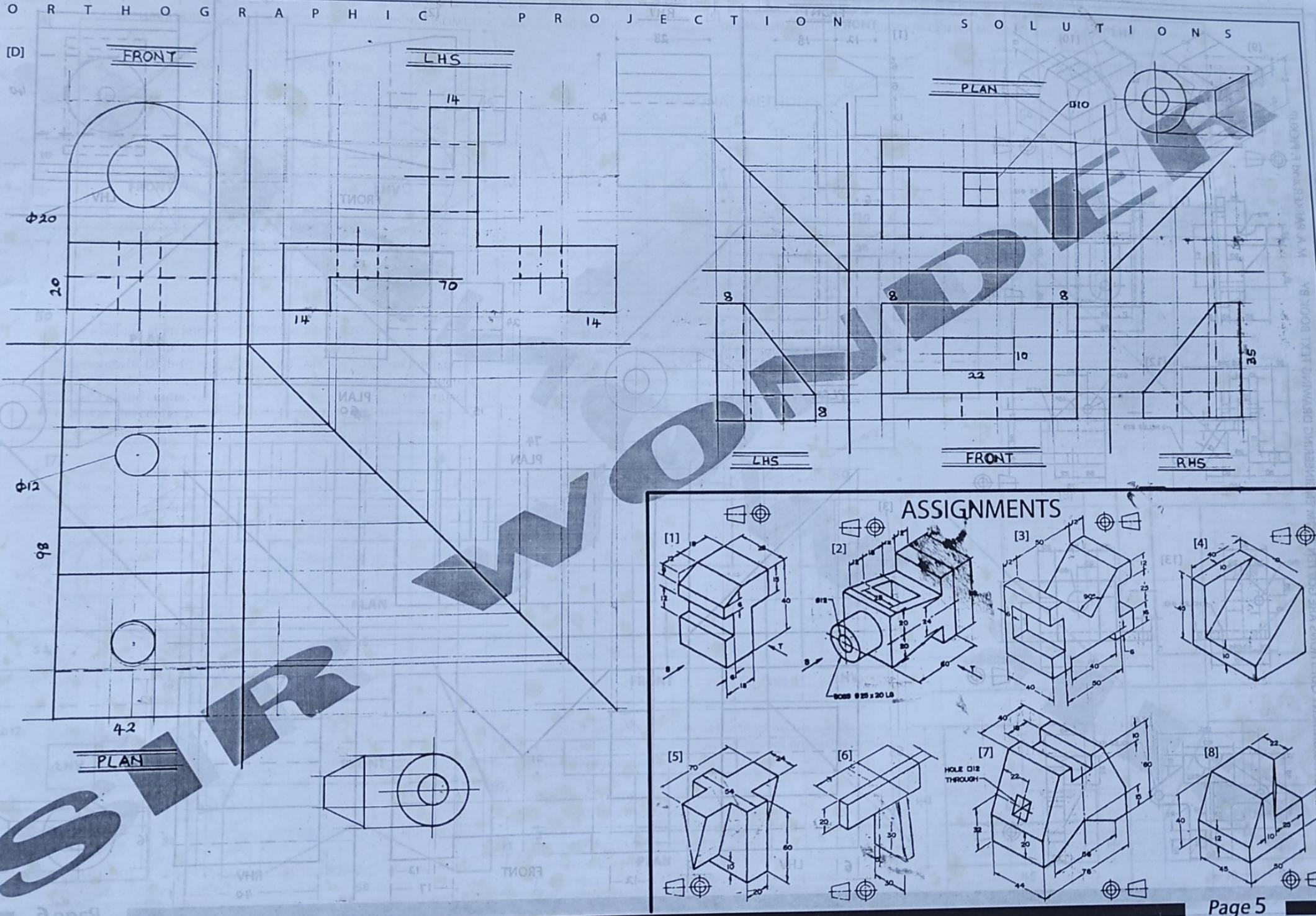


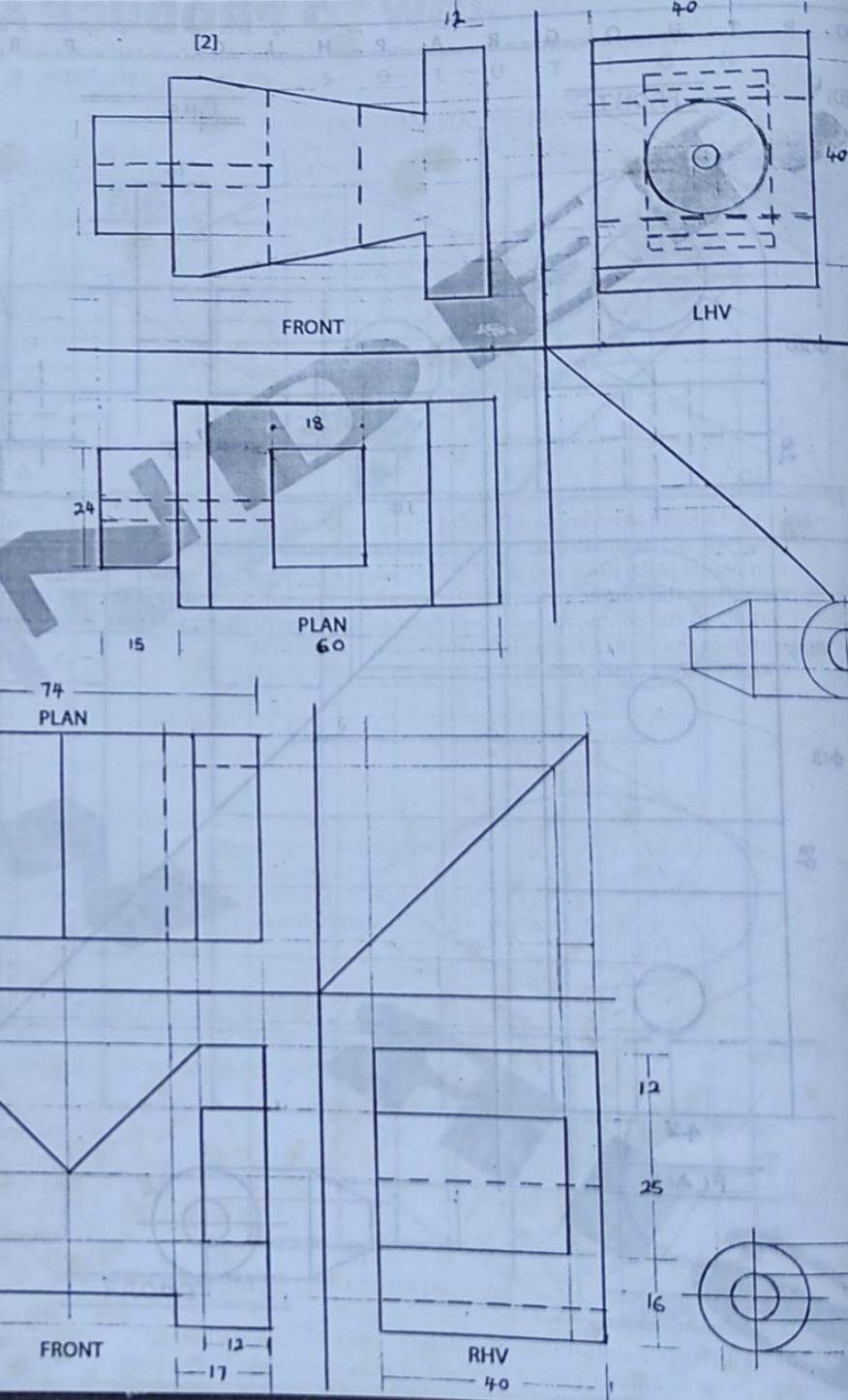
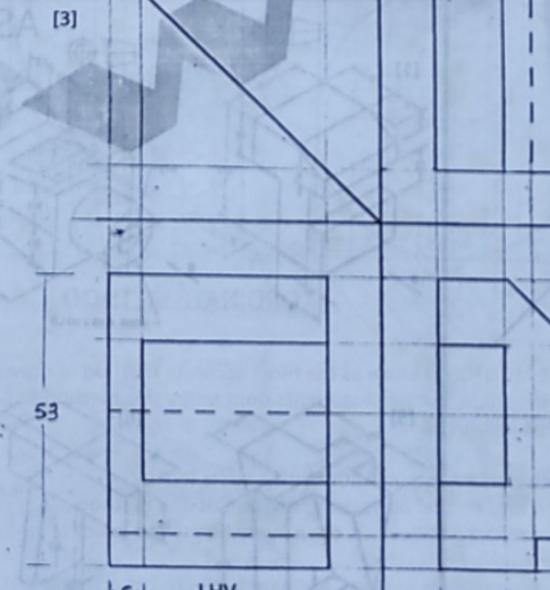
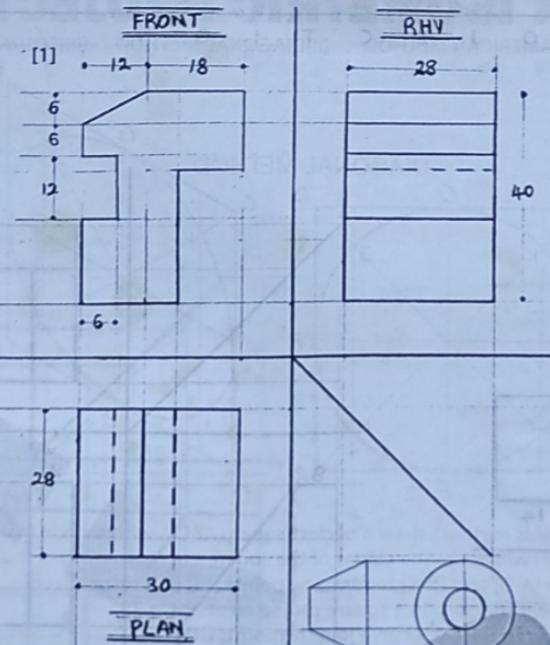
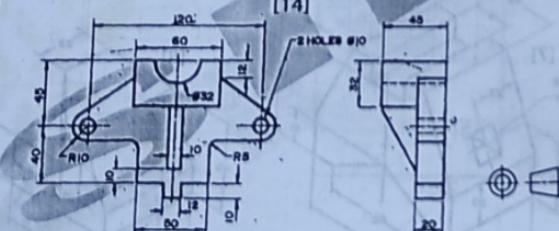
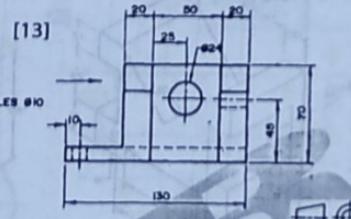
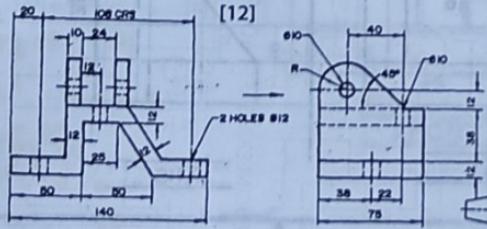
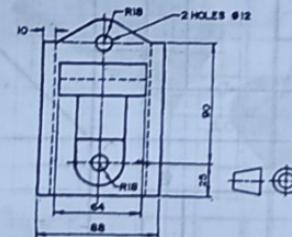
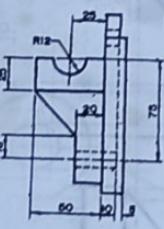
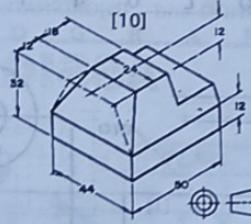
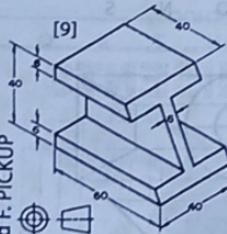
NOTE: THESE ASSIGNMENT QUESTIONS ARE GOTTEN FROM AN ENGINEERING TEST BOOK FOUNDATION

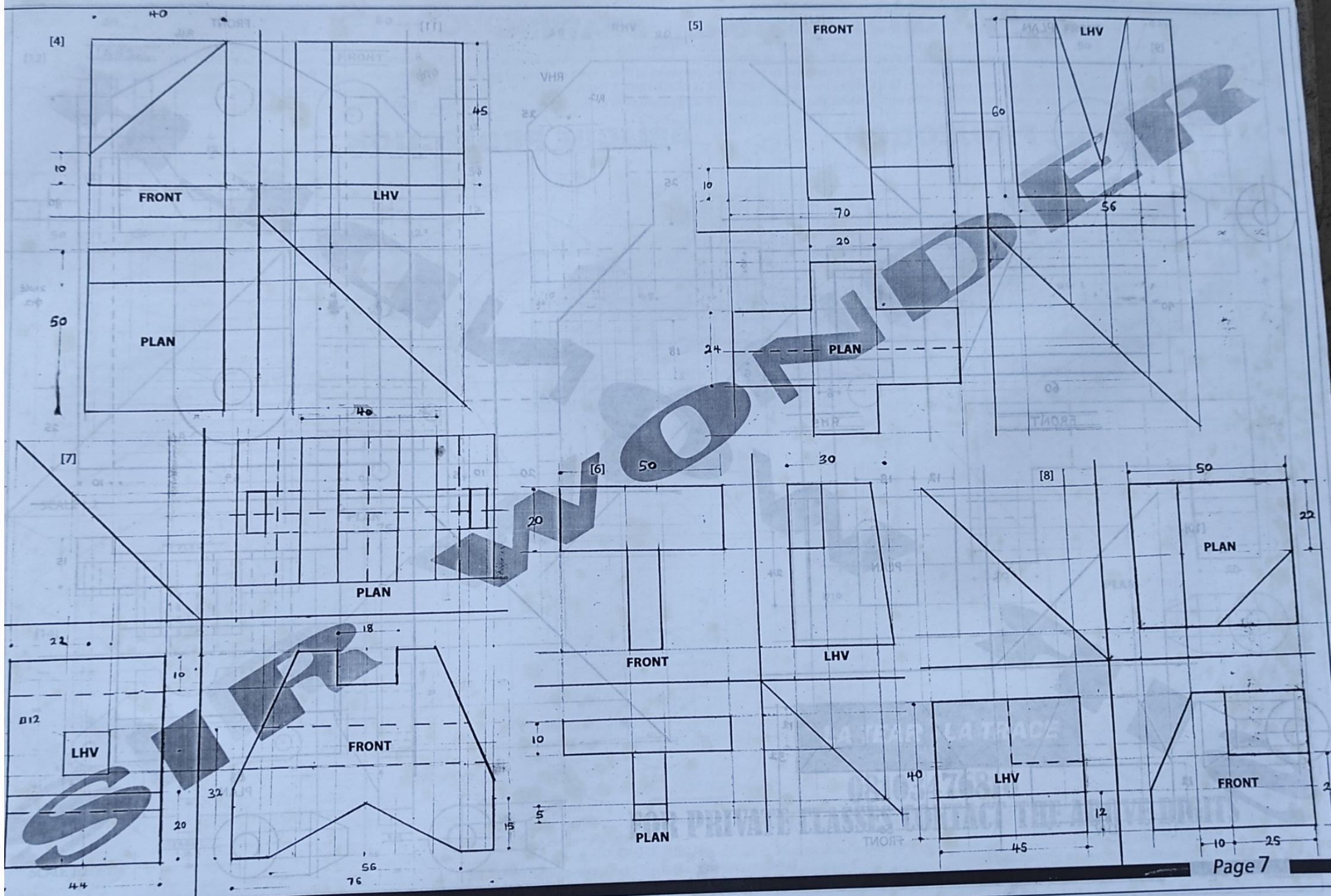
ПРОЕКЦИЯ НА ПЛОСКОСТИ

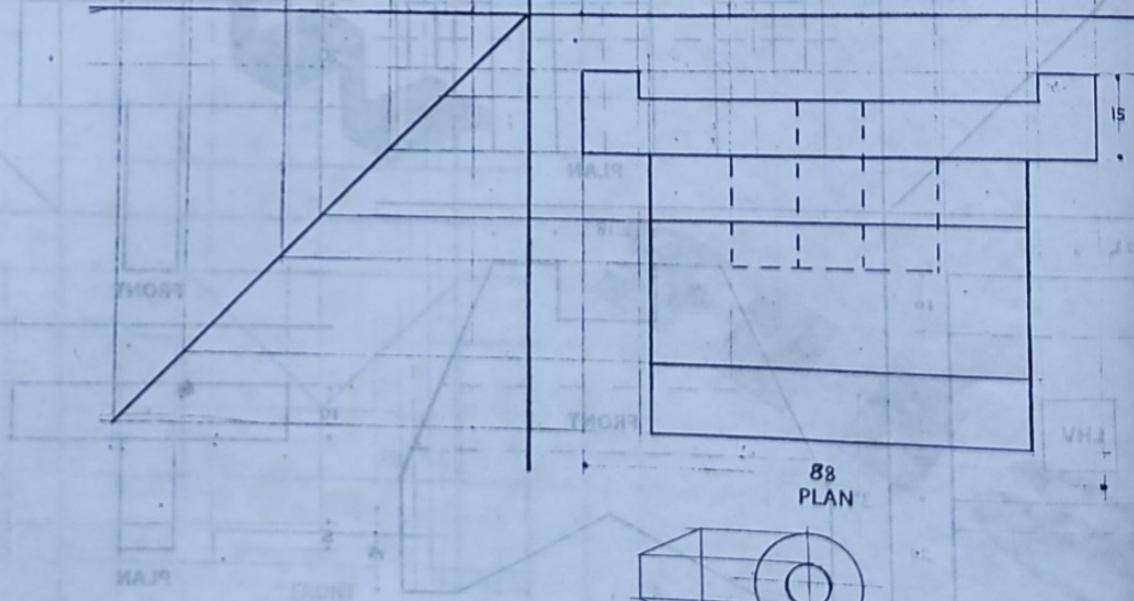
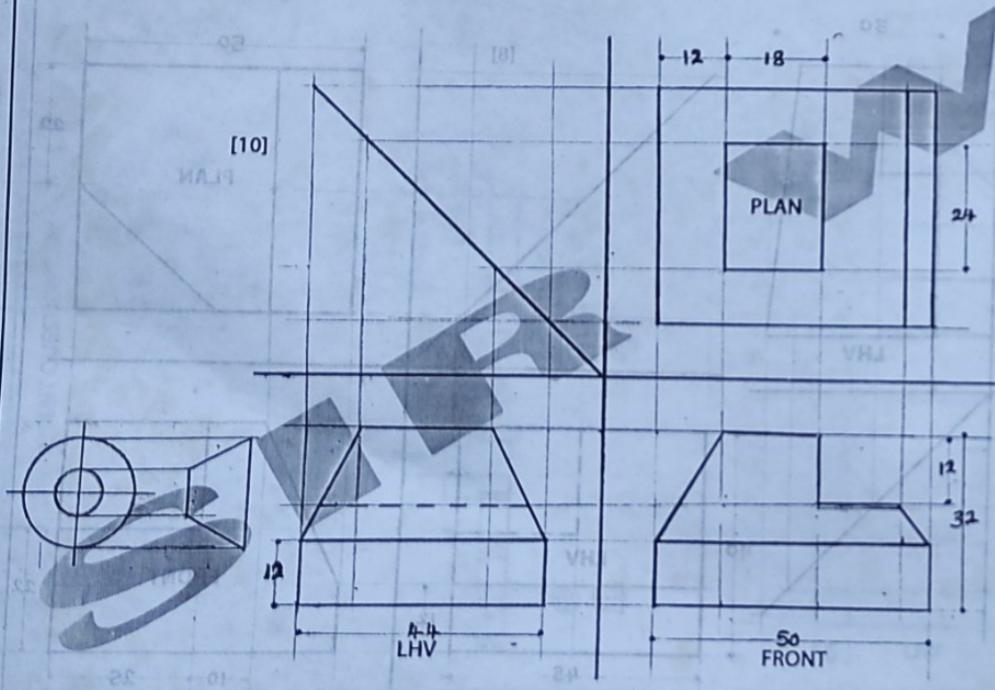
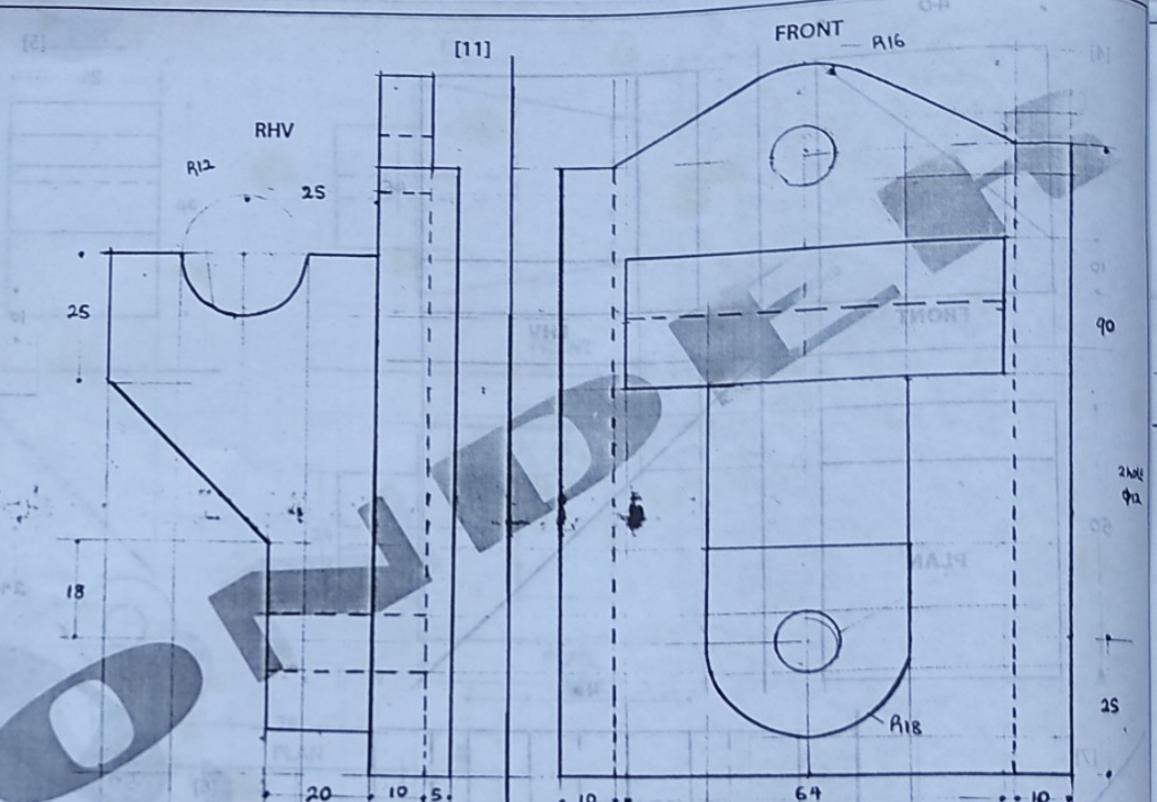
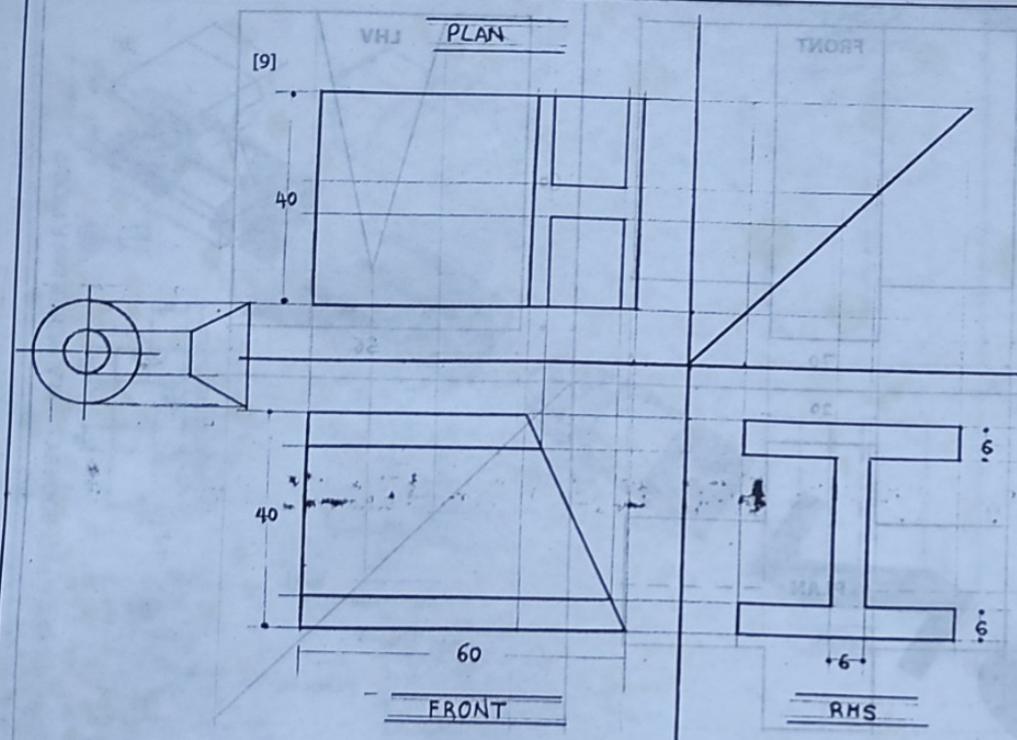
S O L U T I O N S

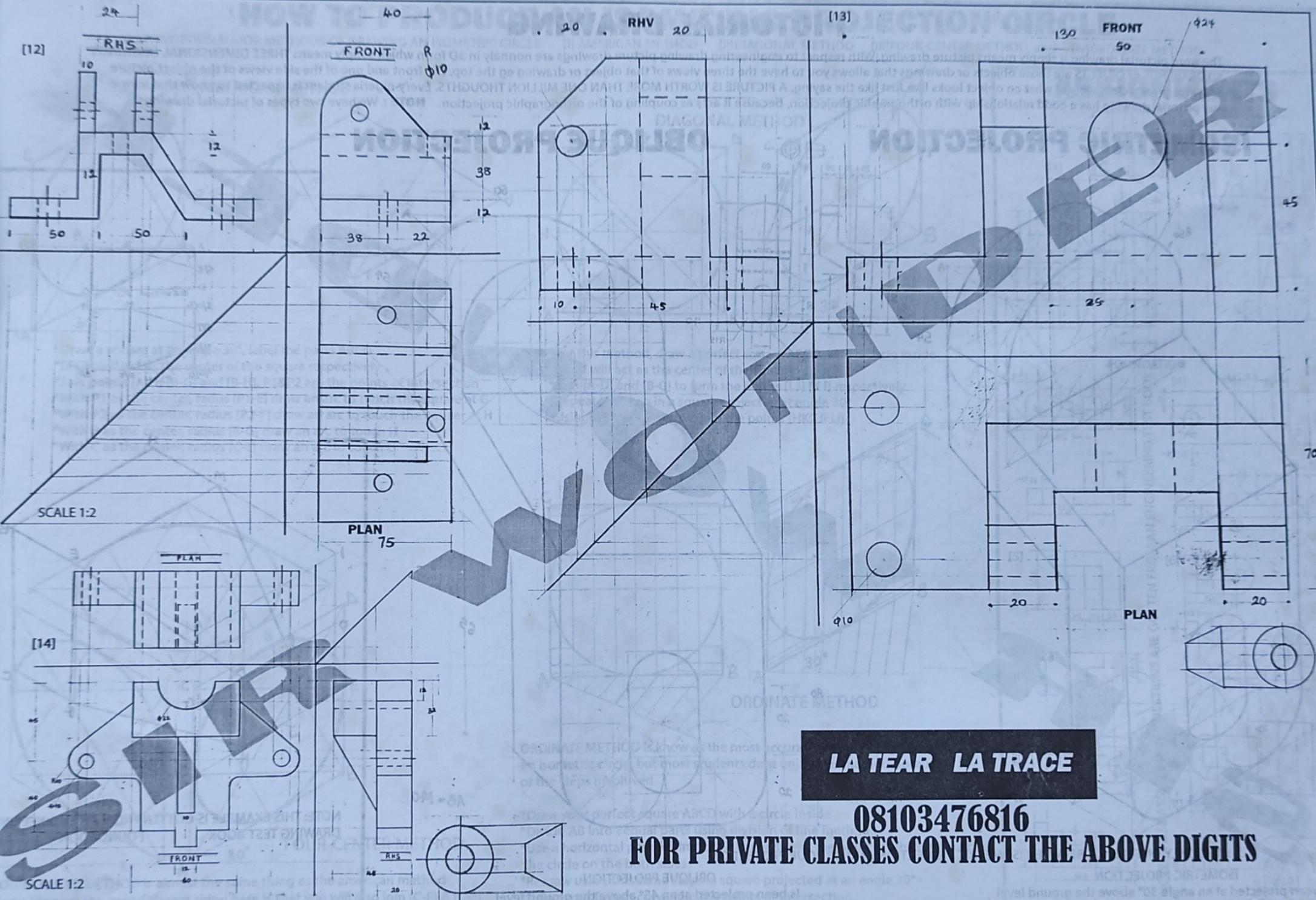












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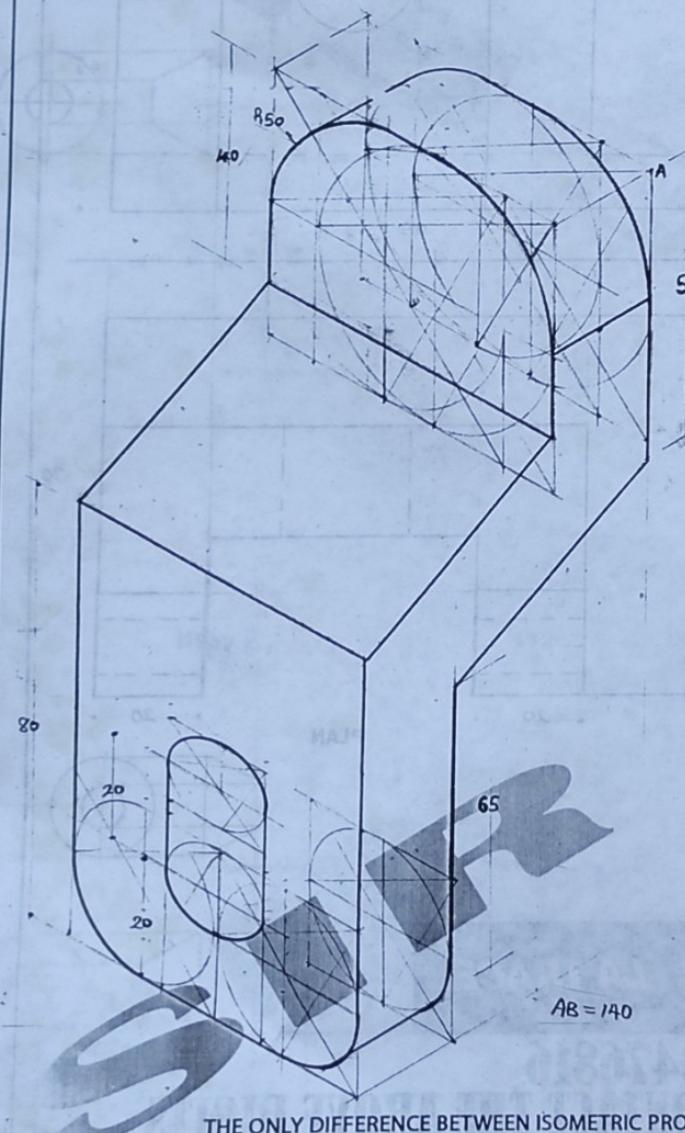
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FOR PRIVATE CLASSES CONTACT THE ABOVE DIGITS

PICTORIAL DRAWING

The word pictorial drawing, it simply means picture drawing. With respect to engineering drawing picture drawings are normally in 3D form which simply means THREE DIMENSIONAL DRAWINGS. 3D DRAWINGS OR OBJECTS are those objects or drawings that allows you to have the three views of that object or drawing eg the top, the front and one of the side views of the object. picture drawings gives a clear view of what an object looks like. Just like the saying, A PICTURE IS WORTH MORE THAN ONE MILLION THOUGHTS. Every nigerian student is expected to know that in one way pictorial drawing has a good relationship with orthographic projection, because it acts as coupling of the orthographic projection. **NOTE:** We have two types of pictorial drawings.

ISOMETRIC PROJECTION

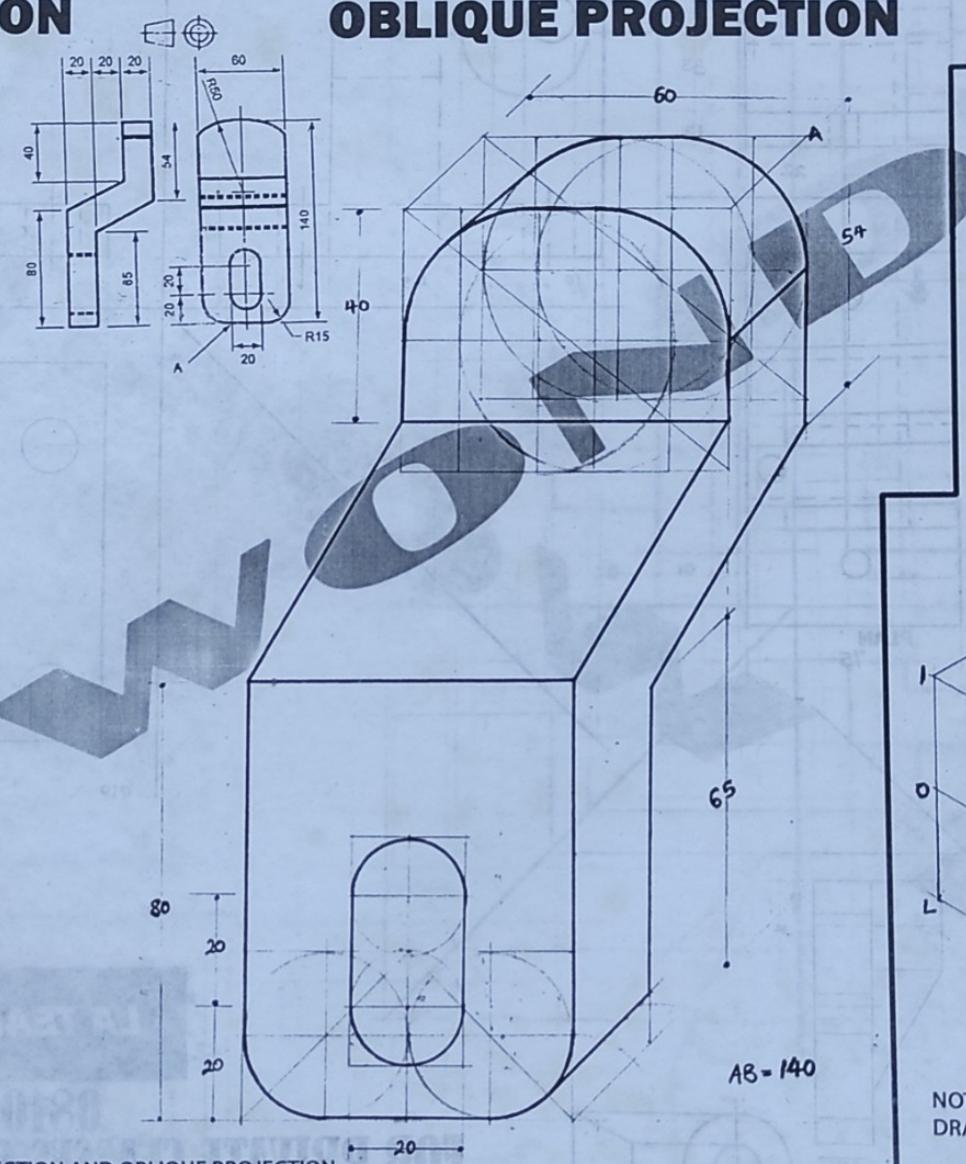


THE ONLY DIFFERENCE BETWEEN ISOMETRIC PROJECTION AND OBLIQUE PROJECTION

ISOMETRIC PROJECTION

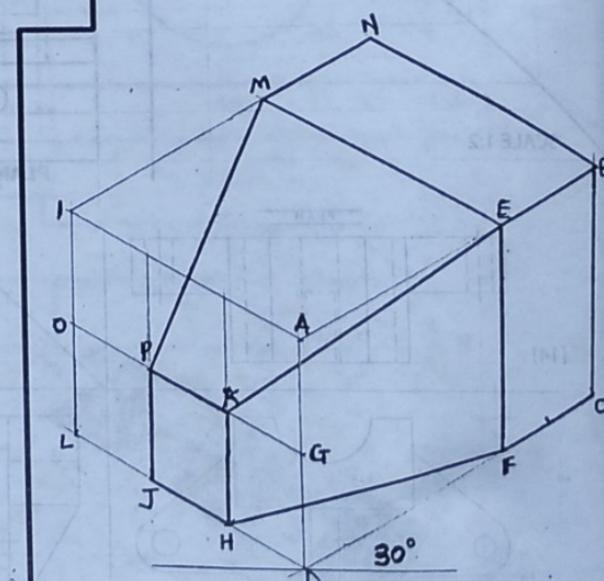
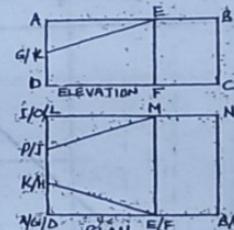
Is been projected at an angle 30° above the ground level

OBLIQUE PROJECTION



OBLIQUE PROJECTION

Is been projected at an 45° above the ground level

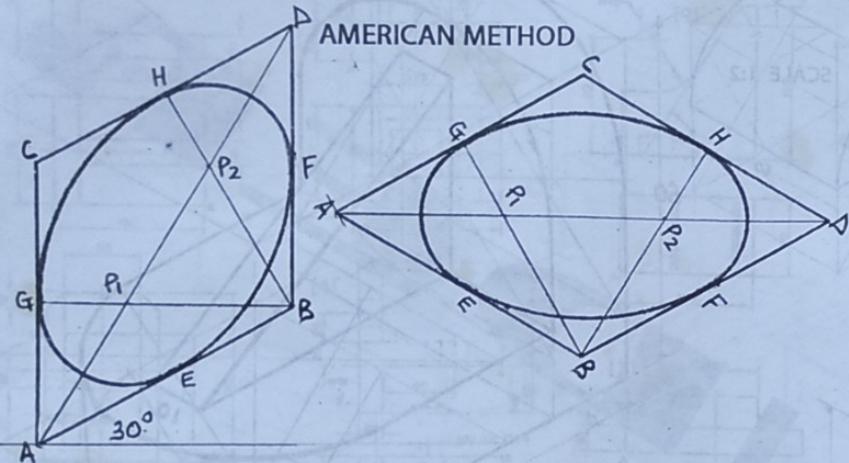


NOTE: THIS EXAMPLE IS GOTTEN FROM AN ENGINEERING DRAWING TEST BOOK
FOUNDATION

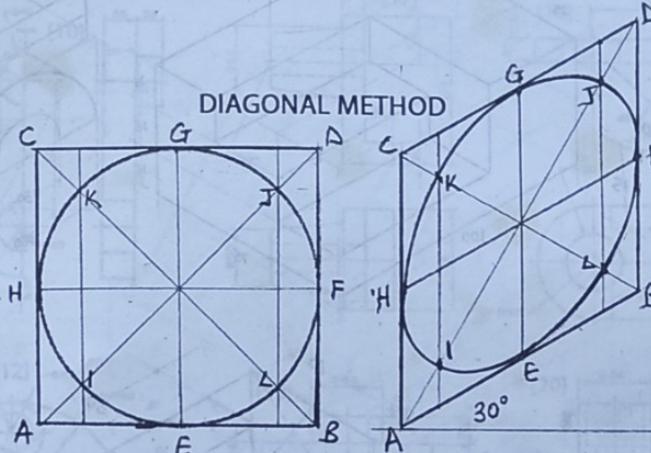
HOW TO PRODUCE AN ISOMETRIC PROJECTION CIRCLE

WE HAVE FOUR MAJOR METHODS OF DRAWING AN ISOMETRIC CIRCLE

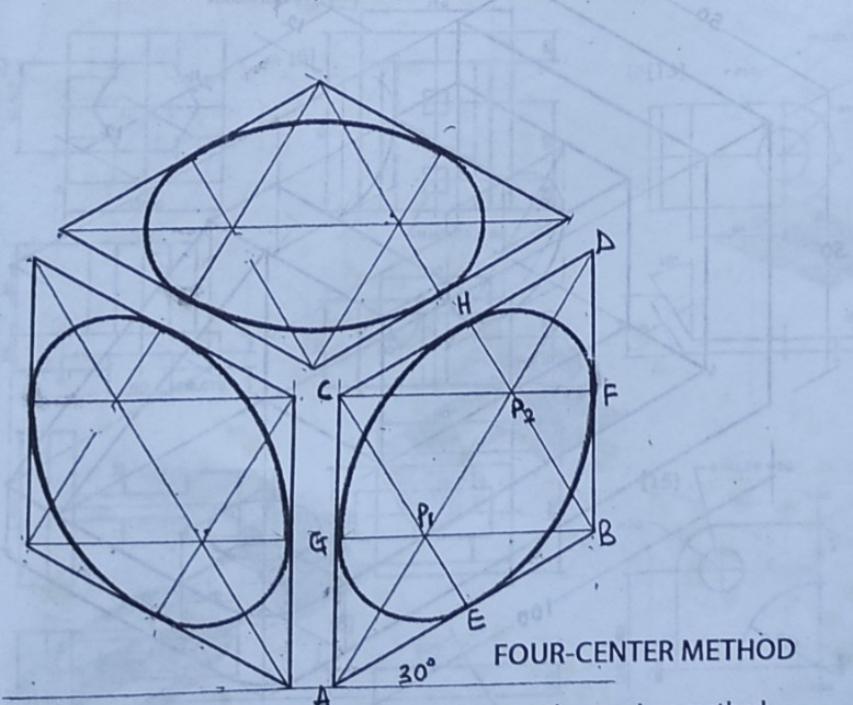
[i] AMERICAN METHOD [ii]DIAGONAL METHOD [iii]FOUR-CENTER METHOD and [iv]ORDINATE METHOD



- *Draw a square at an angle 30°, label the parts ABCD
- *EFGH will act as the center of the square respectively
- *Join points [A-D] [B-G] and [B-H]. P1&P2 are the points of intersection
- *With P1 as the center, radius [P1-E] draw an arc to touch the square at G
- *With P2 as the center, radius [P2-F] draw an arc to touch the square at H
- *With B as the center, radius [B-G] draw an arc to touch H
- *With C as the center, radius [C-E] draw an arc to touch G

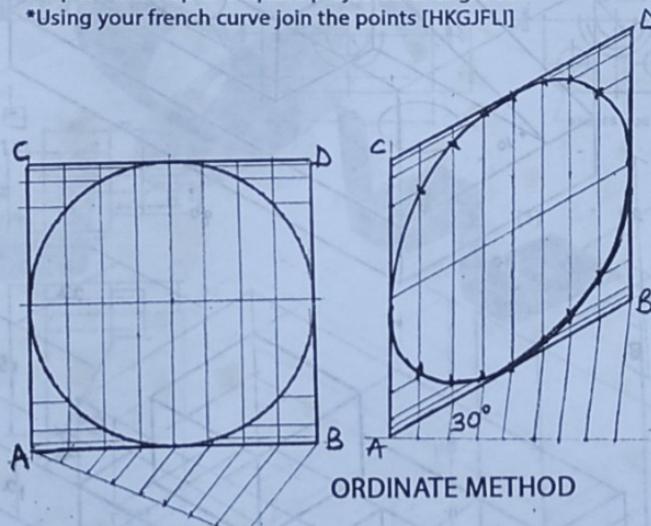


- *For this method, draw a perfect square ABCD, with a circle inside
- *EFGH will act as the center of the square
- *Join [A-D] and [B-C] to form the points [I J] [K L] respectively
- *Repeat this step in a square projected at angle 30°
- *Using your french curve join the points [HKGFLJ]



FOUR-CENTER METHOD

FOUR-CENTER METHOD is almost the same thing as the american method
If you observe the only different thing here is that you will also join [C-E] & [C-F]



ORDINATE METHOD

ORDINATE METHOD is known as the most accurate method of drawing an isometric circle, but most students don't enjoy this method because of the steps involved.

- *Draw your perfect square ABCD with a circle inside
- *Divide AB into 8 equal parts using division of line method
- *Use a horizontal parallel line, draw every line to the point at which it touches the circle on the both sides
- *Redraw using this same steps a square projected at an angle 30°
- *Using your french curve join the points of intersection

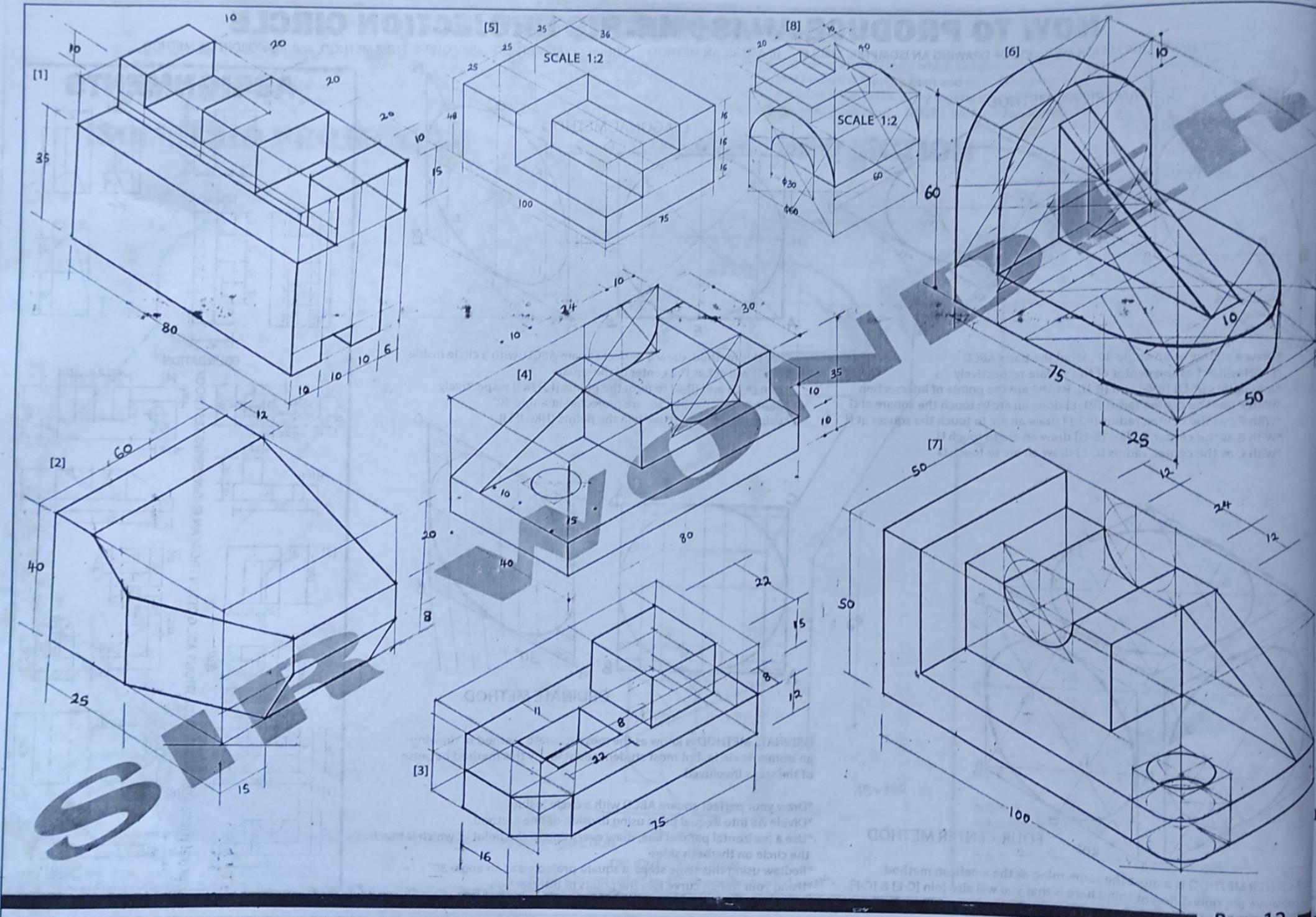
ASSIGNMENTS

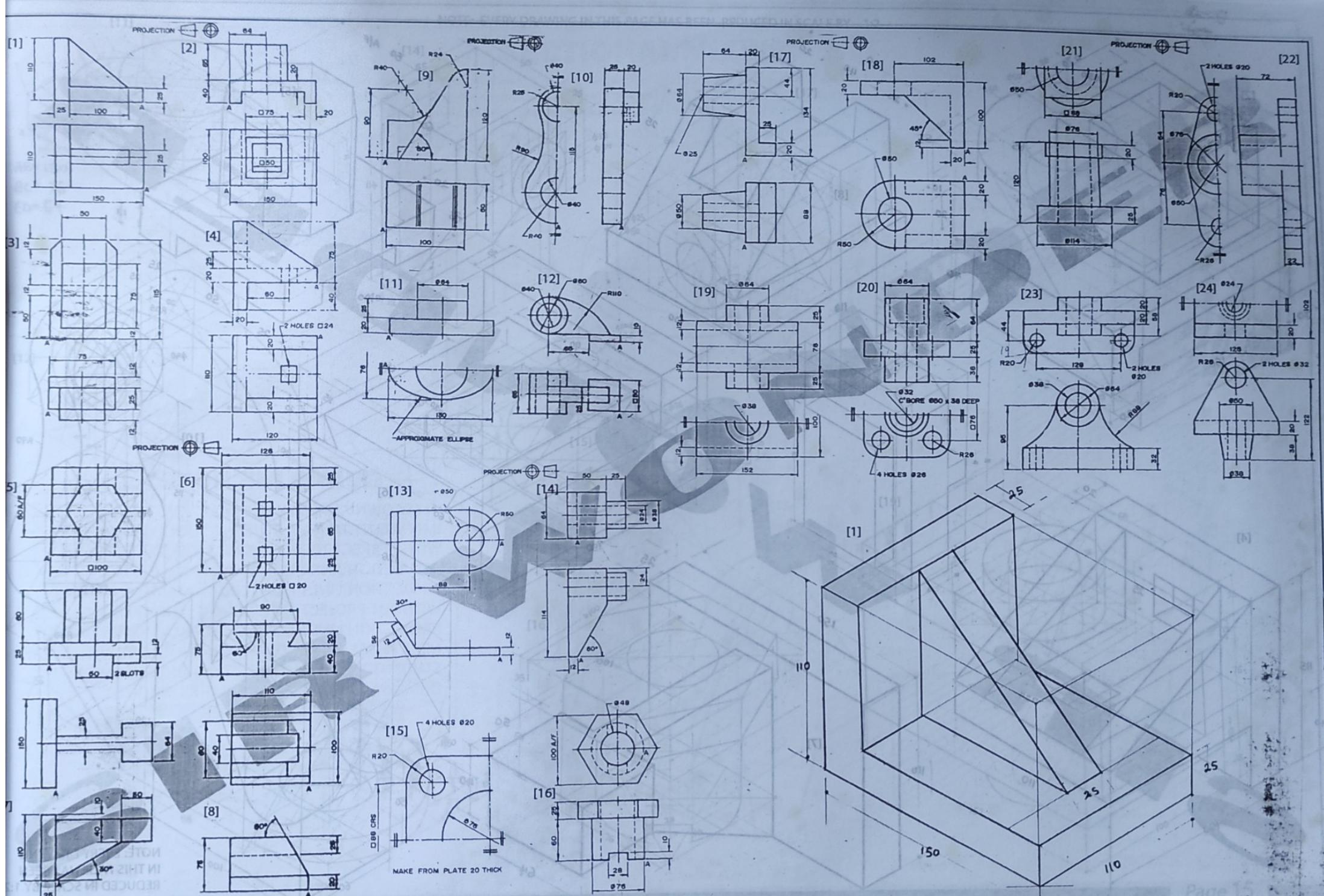
[1] [2] [3] [4] [5] [6] [7] [8]

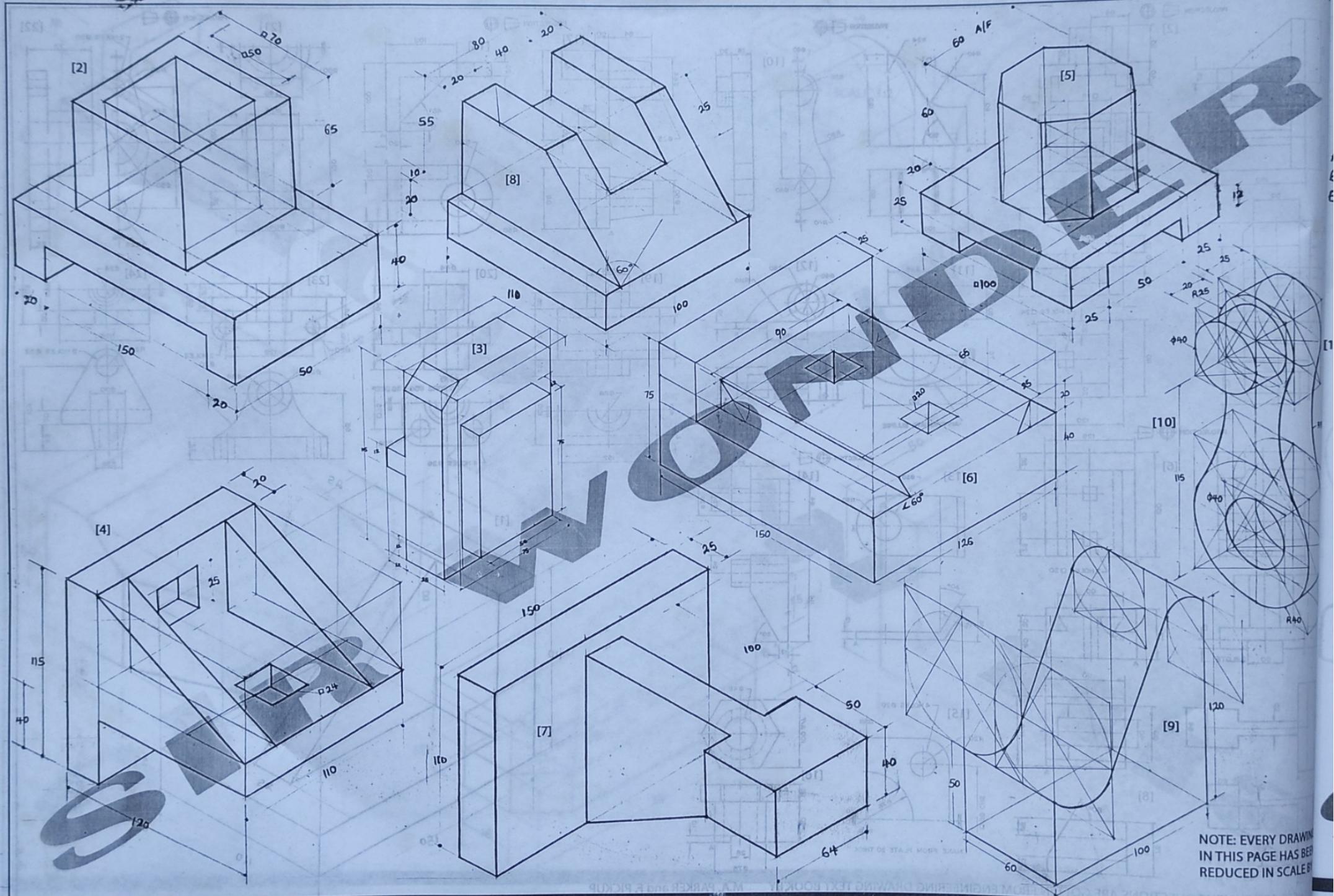
FOUNDATION

NOTE: THESE ASSIGNMENT QUESTIONS ARE GOTTEN FROM AN ENGINEERING TEST BOOK

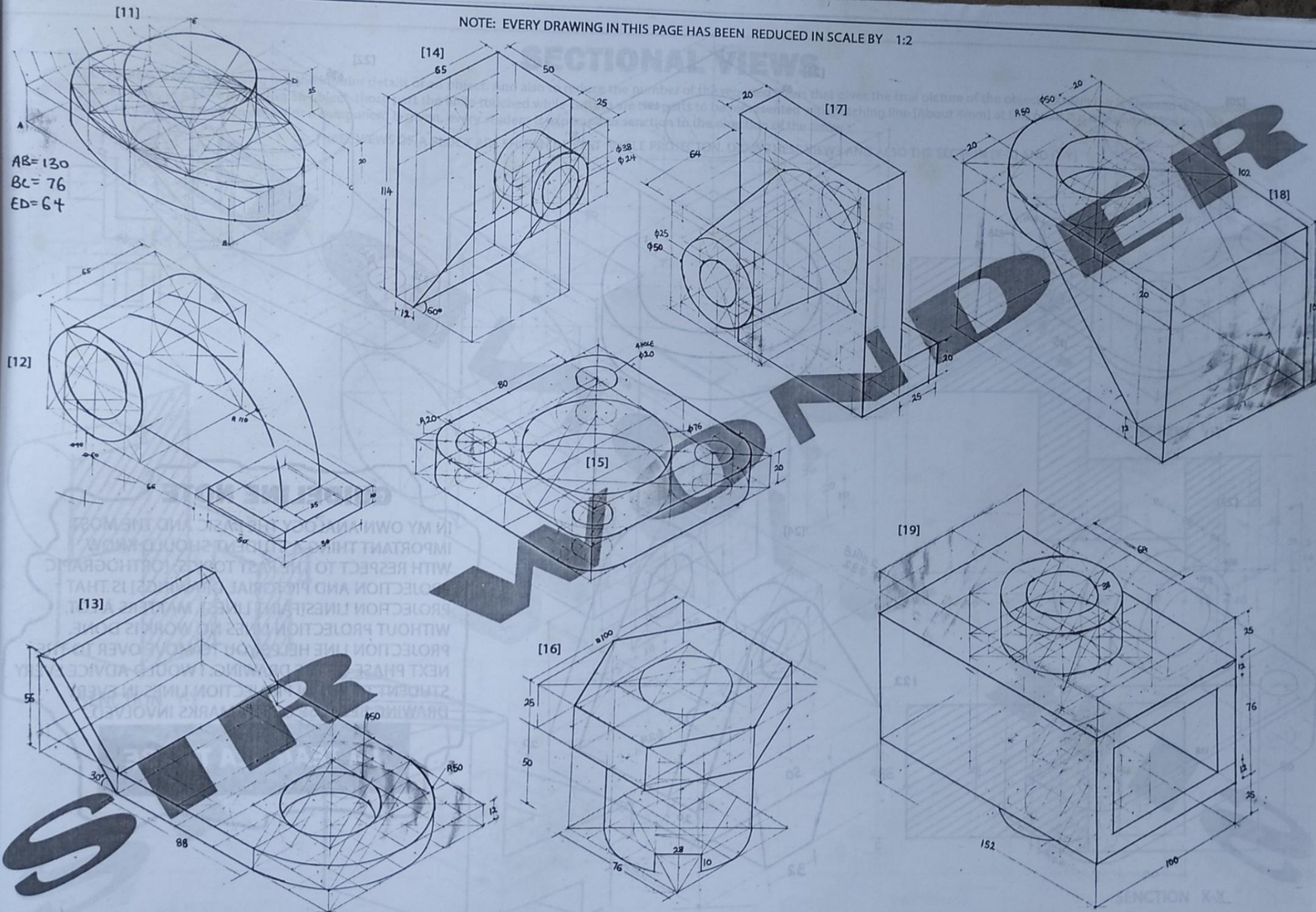
[1] [2] [3] [4] [5] [6] [7] [8]



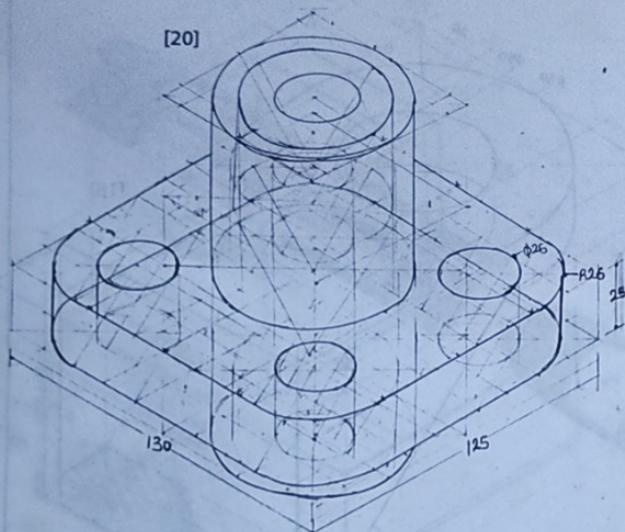




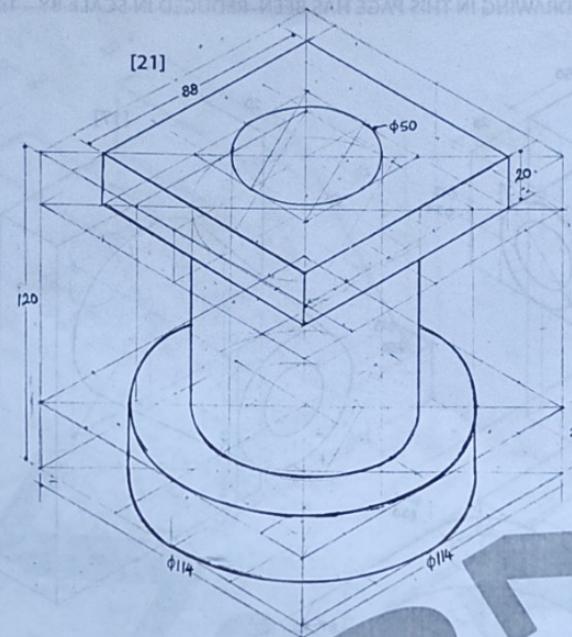
NOTE: EVERY DRAWING IN THIS PAGE HAS BEEN REDUCED IN SCALE BY 1:2



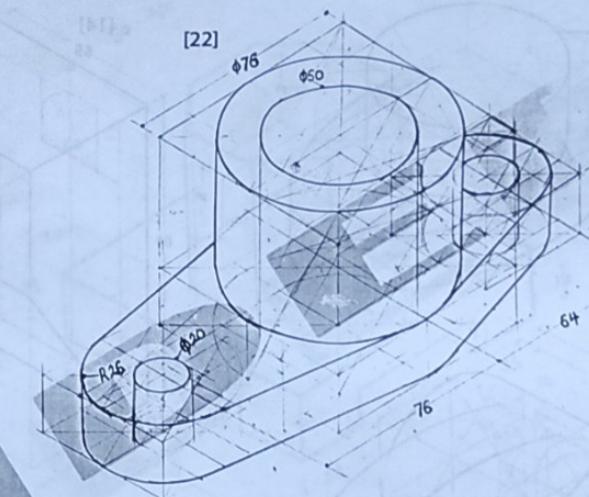
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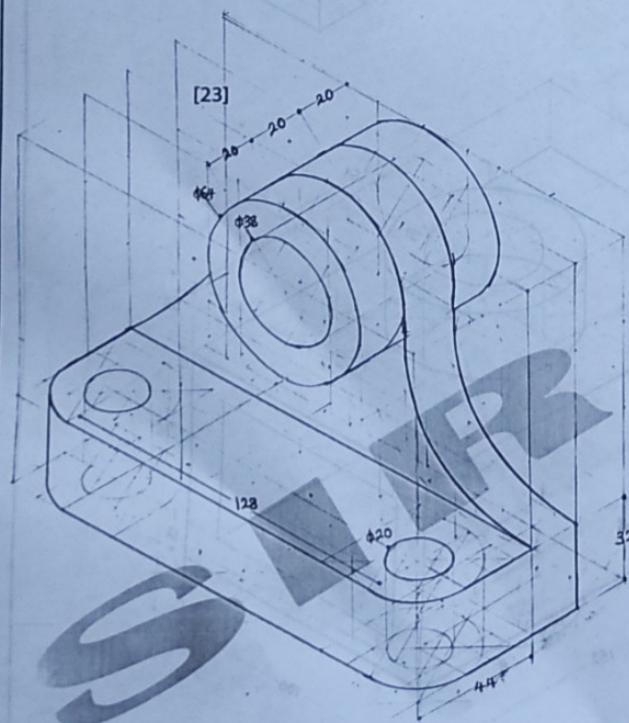
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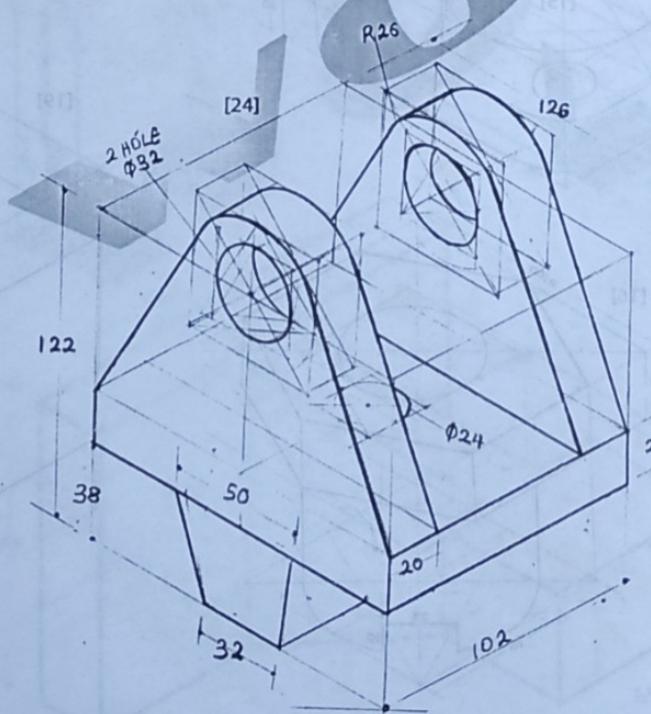
[22]



[23]



[24]



GUIDELINE NOTE

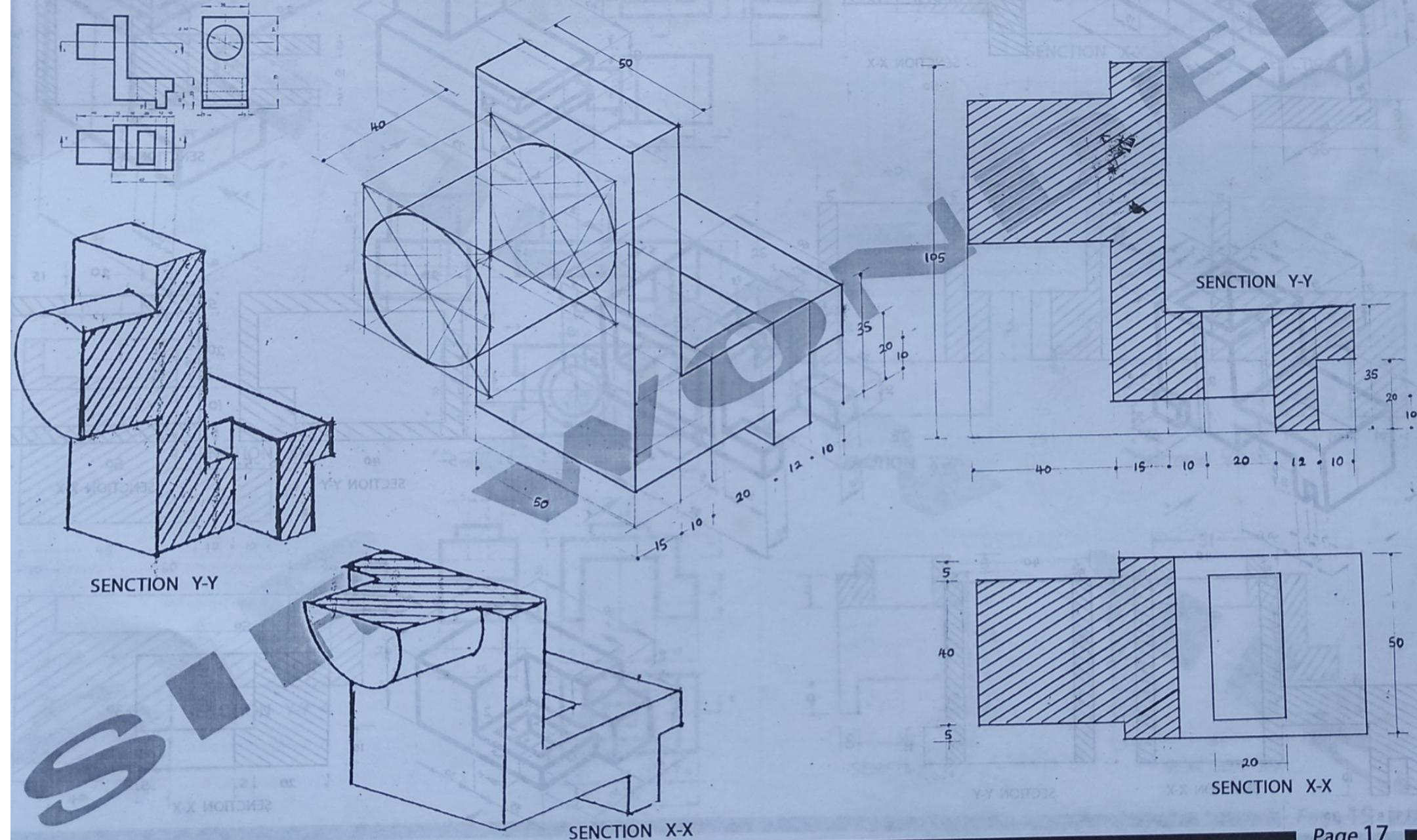
IN MY OWN ANALOGY THE BASIC AND THE MOST IMPORTANT THING A STUDENT SHOULD KNOW WITH RESPECT TO THE PAST TOPICS; [ORTHOGRAPHIC PROJECTION AND PICTORIAL DRAWINGS] IS THAT PROJECTION LINES [FAINT LINES] MATTERS A LOT, WITHOUT PROJECTION LINES NO WORK IS DONE. PROJECTION LINE HELPS YOU TO MOVE OVER TO THE NEXT PHASE OF THE DRAWING. I WOULD ADVICE EVERY STUDENT TO PUT IN PROJECTION LINES IN EVERY DRAWING, BECAUSE OF THE MARKS INVOLVED.

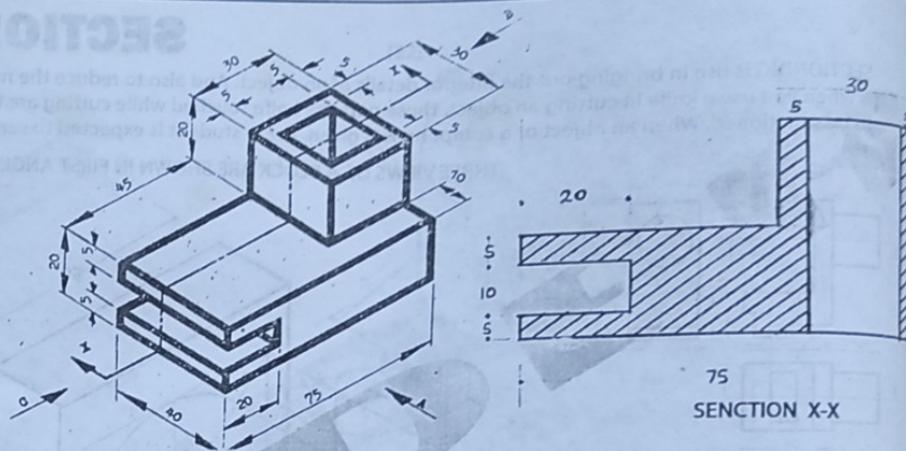
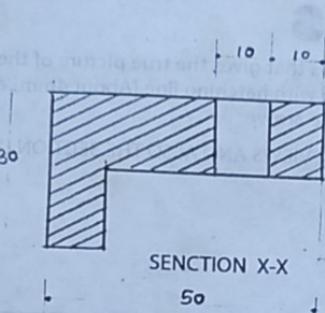
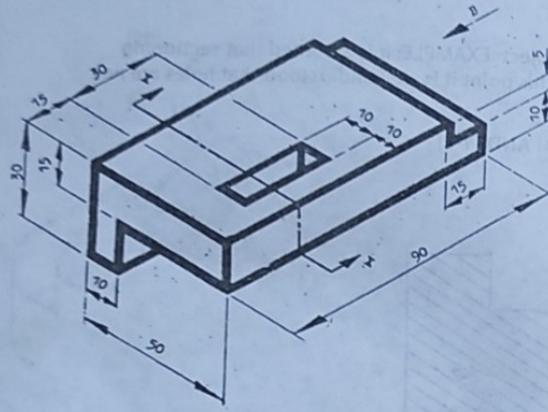
LA TEAR LA TRACE

SECTIONAL VIEWS

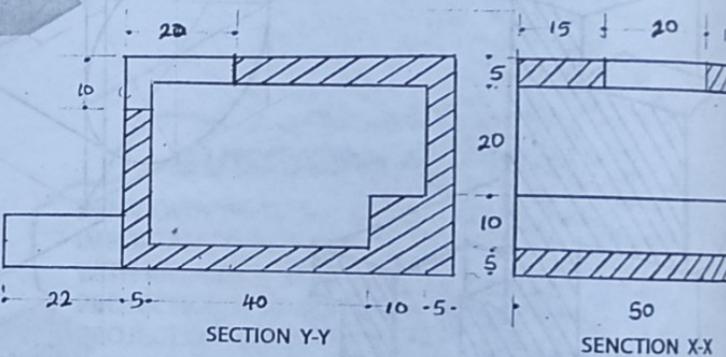
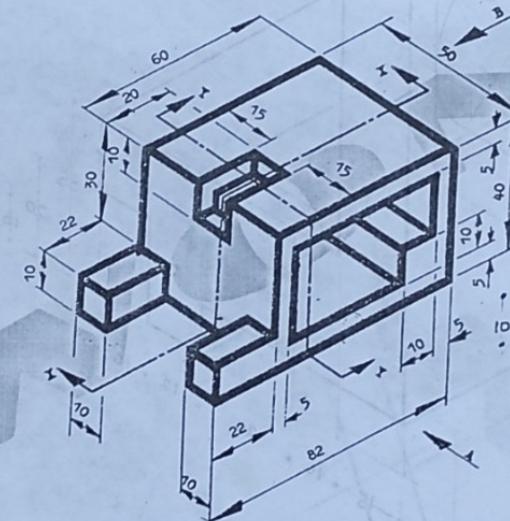
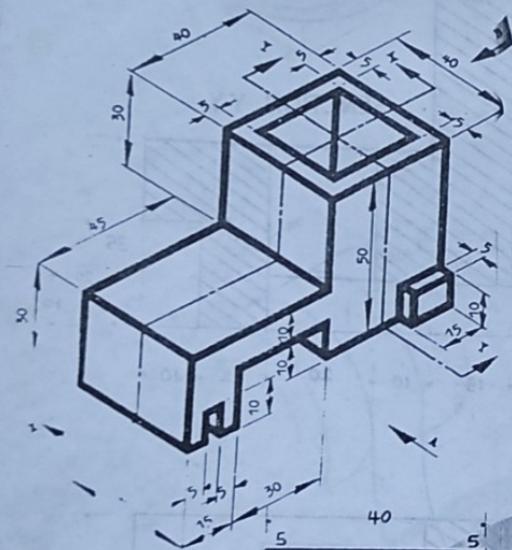
SECTIONING is used in bringing out the interior details of an object. And also to reduce the number of required views that gives the true picture of the object. EXAMPLE; it is assumed that sectioning is when you use a knife in cutting an object, those parts the knife touched while cutting are the parts to be represented with hatching line [About 4mm] at this point it is well understood that holes are not to be sectioned. When an object or a component is given, every student is expected to section to the direction of the arrow.

THREE VIEWS OF A BLOCK ARE SHOWN IN FIRST ANGLE PROJECTION. DRAW THESE VIEWS AND ALSO THE SECTION [X-X] AND [Y-Y]

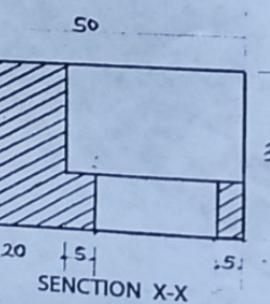
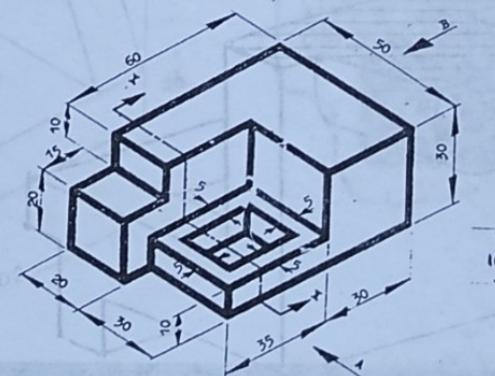
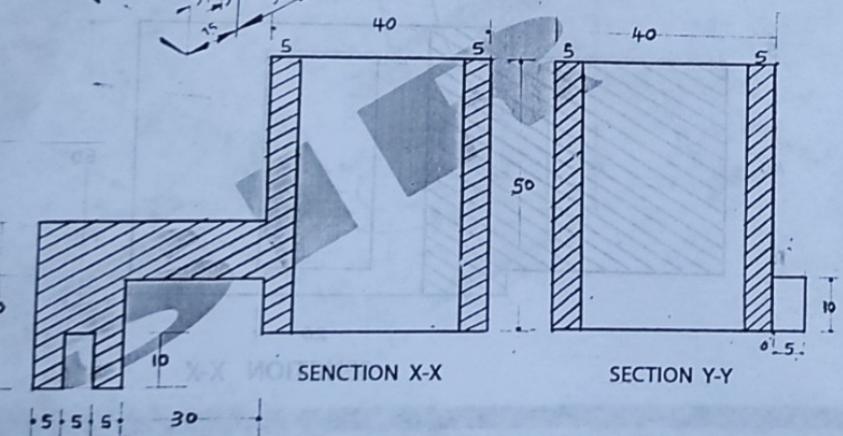


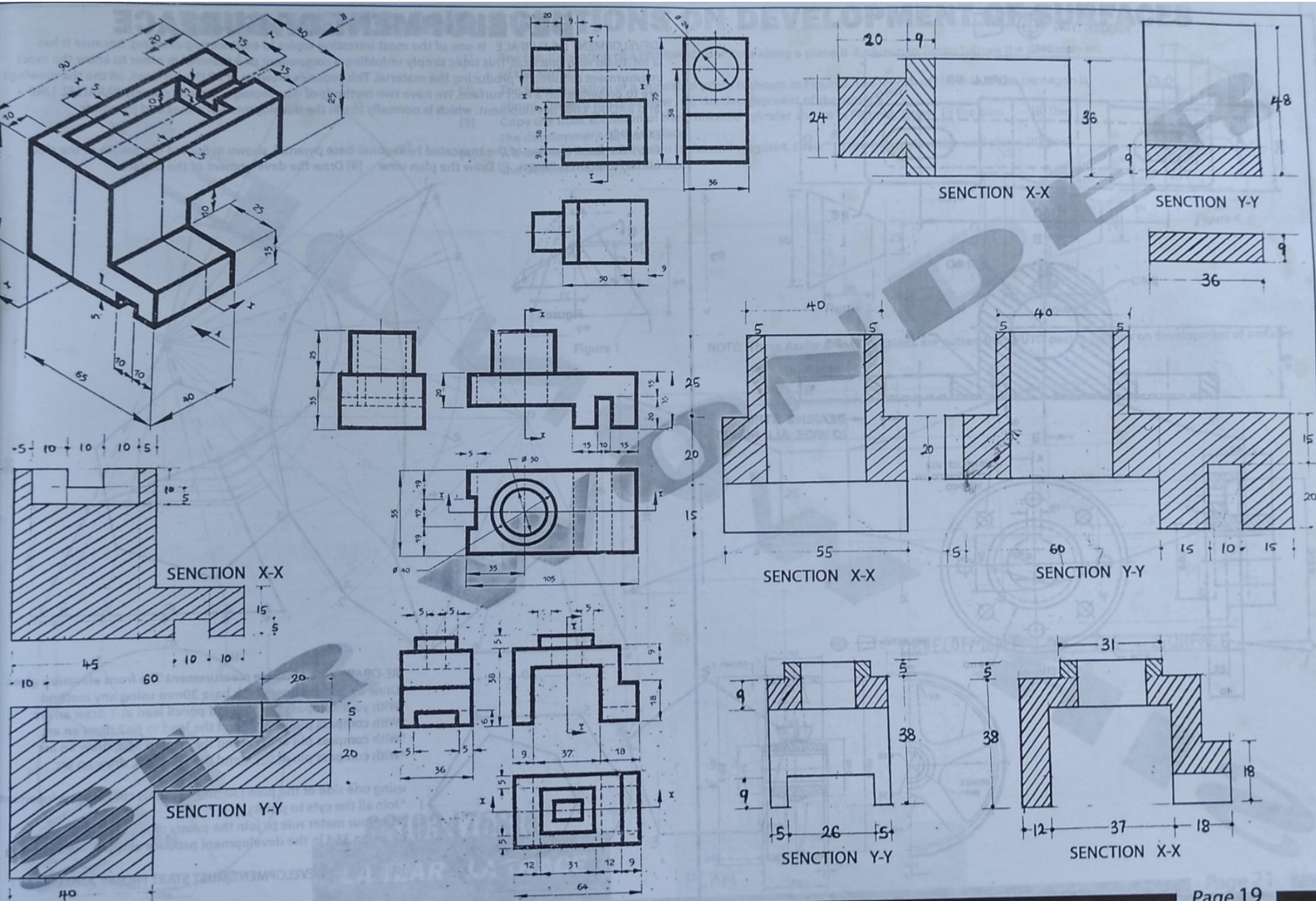


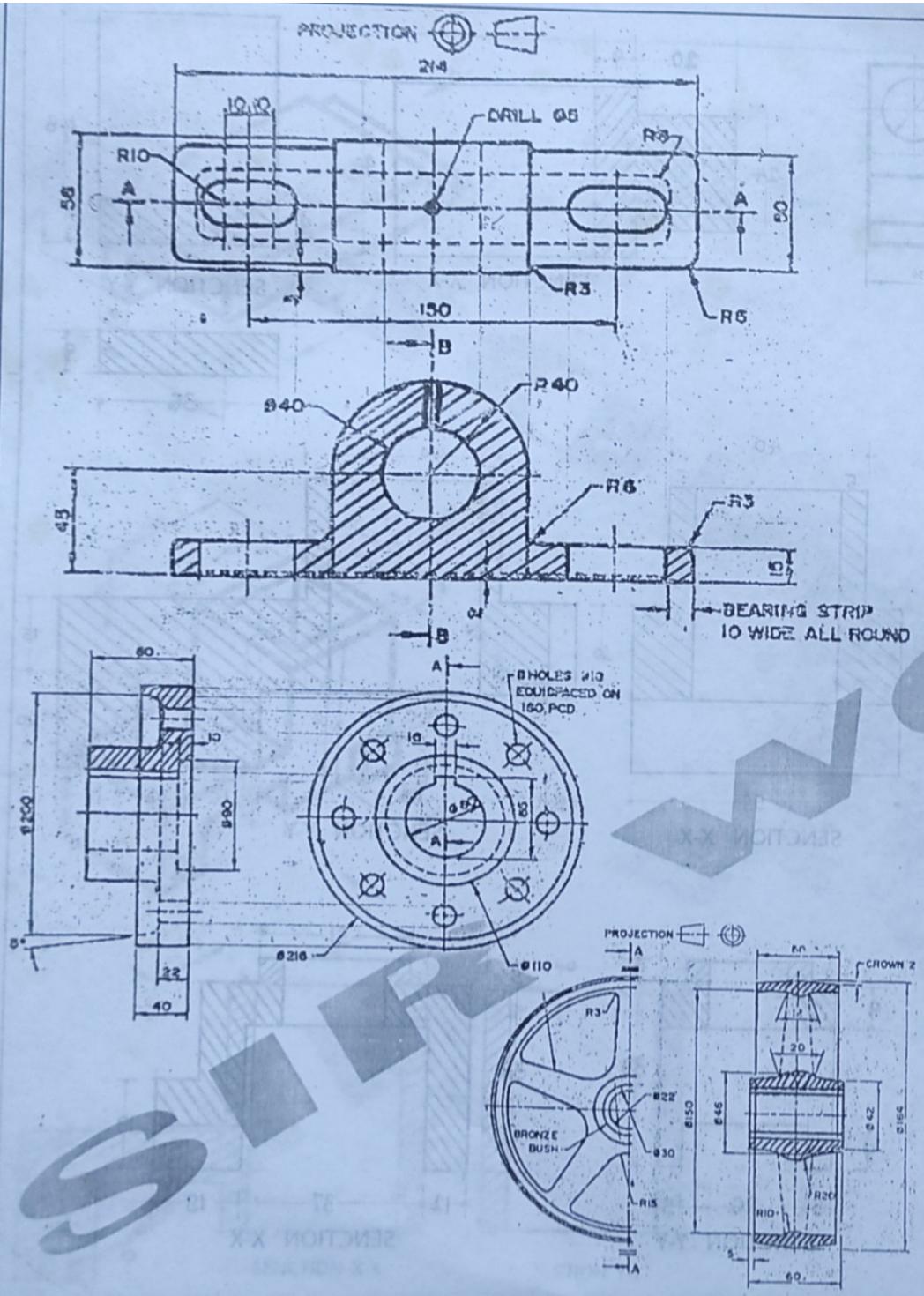
SECTION X-X



SECTION X-X





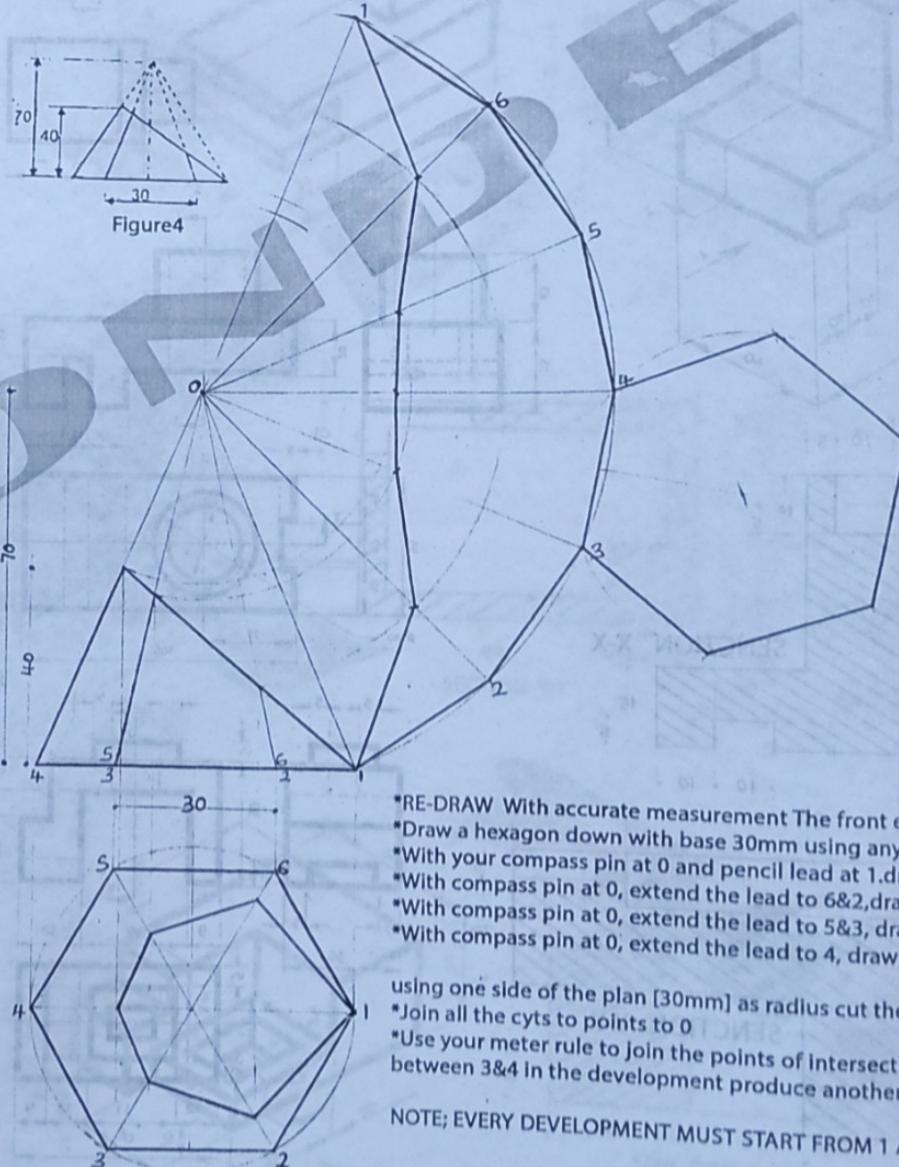


DEVELOPMENT OF SURFACE

DEVELOPMENT OF SURFACE is one of the most interesting topics in engineering drawing, because it has a lot to do with practical. This topic simply unfolding a component or a material in order to know the exact measurement required in producing the material. This requires drawing of all the surfaces, all the the drawings are to be presented on a flat surface. We have two methods of developing a surface, namely PARALLEL LINE and RADIAL LINE development, which is normally used in the development of cones and pyramids.

EXAMPLE

Copy the front elevation of the truncated hexagonal-base pyramid, shown in figure 4 the length of the side of the hexagon is 30mm [i] Draw the plan view [ii] Draw the development of the surface

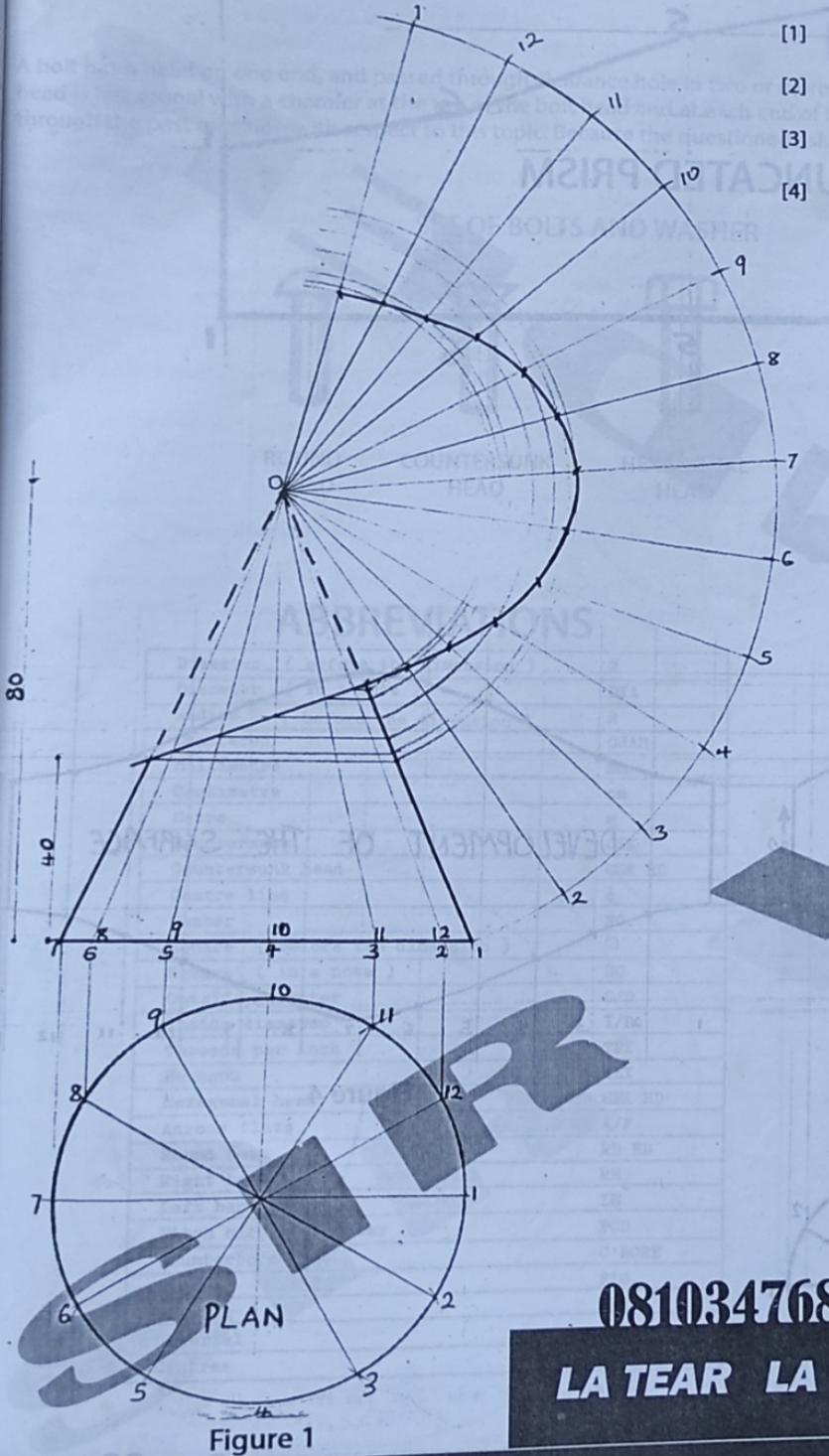


- *RE-DRAW With accurate measurement The front elevation
- *Draw a hexagon down with base 30mm using any method
- *With your compass pin at 0 and pencil lead at 1, draw an arc
- *With compass pin at 0, extend the lead to 6&2, draw an arc
- *With compass pin at 0, extend the lead to 5&3, draw an arc
- *With compass pin at 0, extend the lead to 4, draw an arc

using one side of the plan [30mm] as radius cut the development
 *Join all the cts to points to 0
 *Use your meter rule to join the points of intersection
 between 3&4 in the development produce another hexagon

NOTE; EVERY DEVELOPMENT MUST START FROM 1 AND END AT 1

ASSIGNMENTS AND SOLUTIONS ON DEVELOPMENT OF SURFACES



- [1] The front elevation of a truncated cone cuts along a plane B-B, shown in Figure1. Draw the development of the surface
- [2] The front elevation of a truncated prism is shown in Figure2, The length of the side of the pentagon is 30mm. Draw [i] the plan view [ii] the development of the surface
- [3] Copy the front elevation of the truncated cylinder shown in Figure3. Draw [i] the plan [ii] the development of the surface
- [4] A truncated hexagonal prism is shown in Figure4. Draw [i] the given elevation and plan [ii] Draw the development of the surface

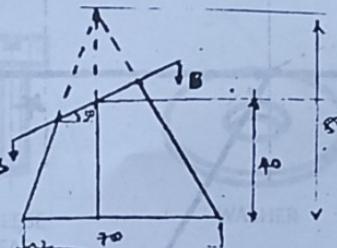


Figure 1

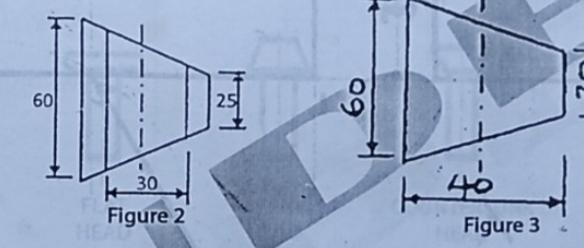


Figure 2

NOTE: These Assignment Questions are gotten from FUTO past questions on development of surfaces

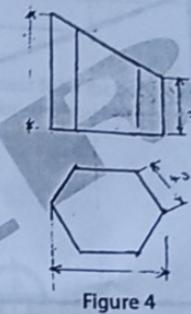
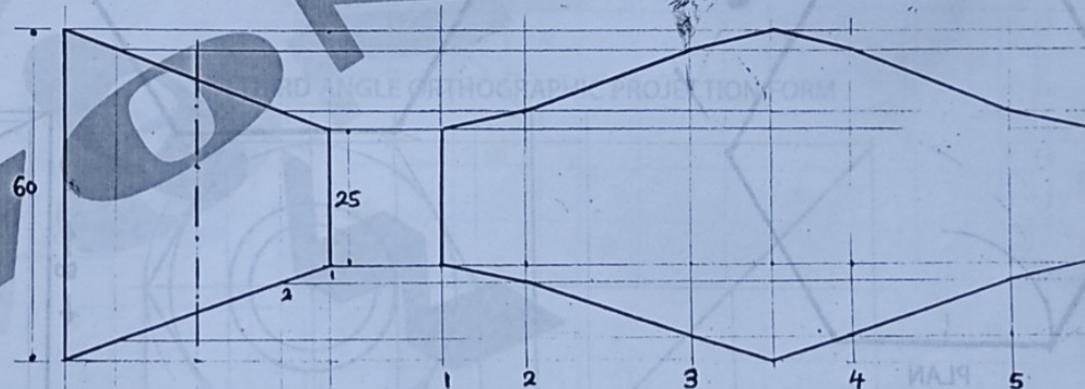


Figure 3



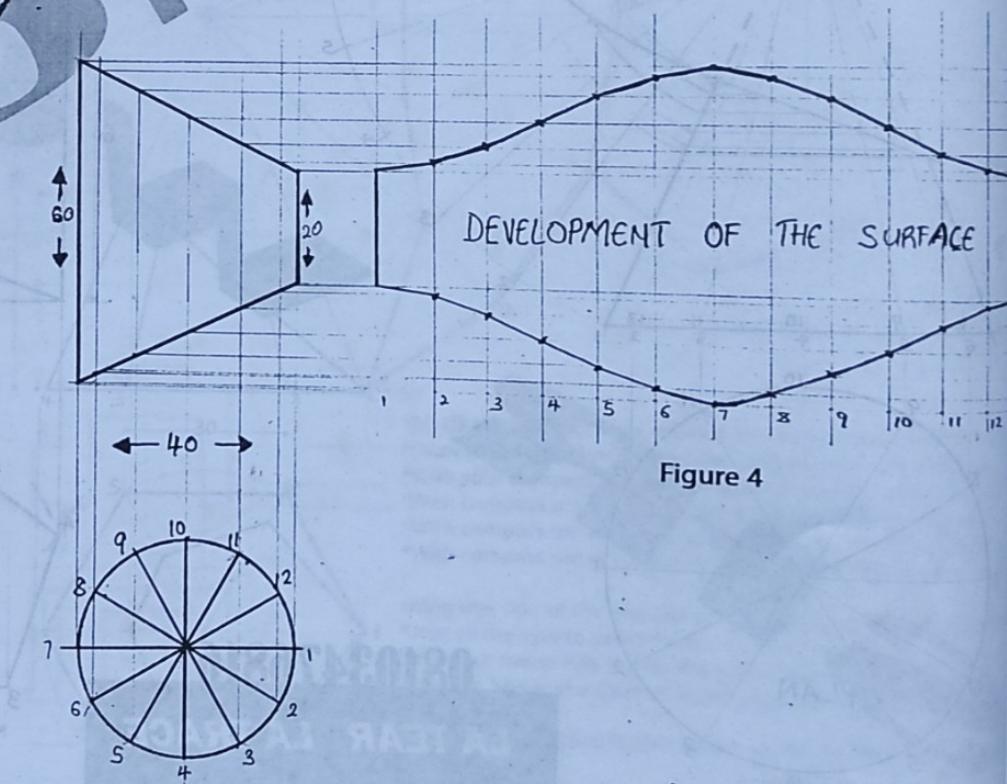
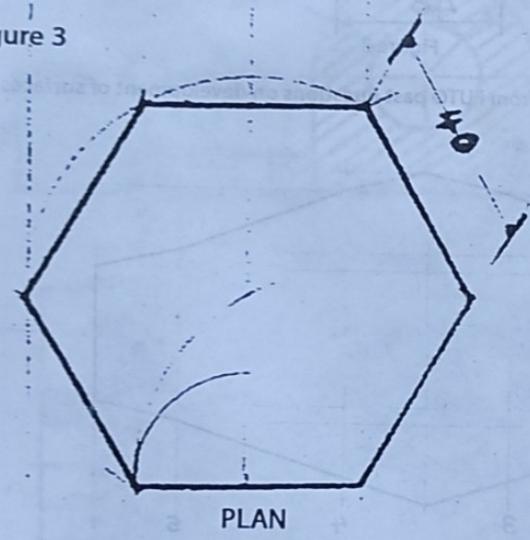
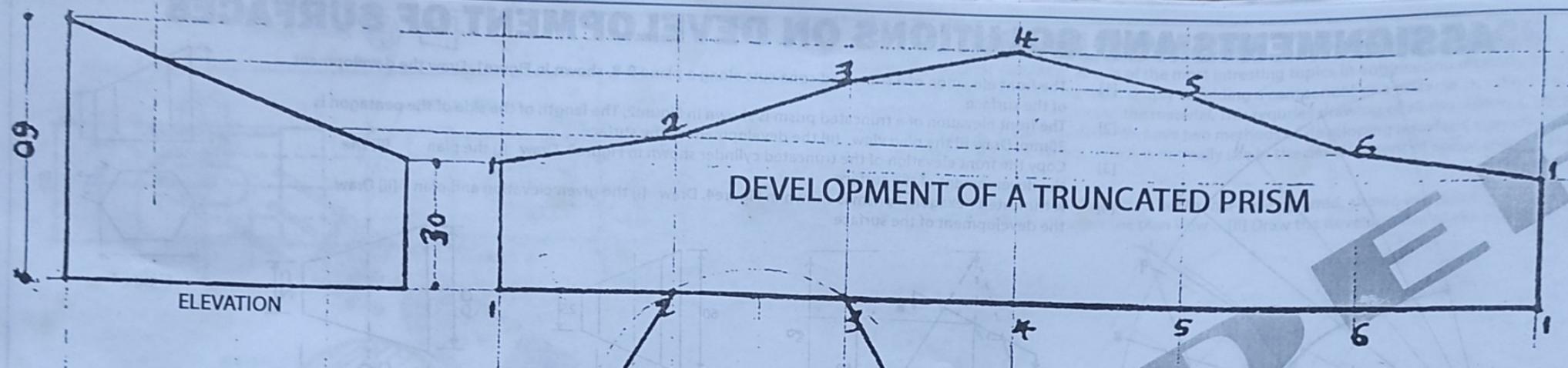
DEVELOPMENT OF THE SURFACE

Figure 2

08103476816

LA TEAR LA TRACE

Figure 1



08103476816

LA TEAR LA TRACE

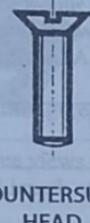
BOLTS AND NUTS

bolt has a head on one end, and passed through clearance hole in two or more aligned parts and its threaded on the other end to receive a nut tighten and hold the parts together. The commonest form for bolts and nuts head is hexagonal with a chamfer at the top of the bolt head and at each end of the nut to remove the corners. Without spending much time on this before you sit for any exam on this course make sure you have gone through the past question with respect to this topic. Because the questioned asked are always the same

SET OF BOLTS AND WASHER



ROUND
HEAD



COUNTERSUNK
HEAD



HEXAGONAL
HEAD



CHEESE
HEAD



WASHER



FLAT
HEAD



PAN
HEAD



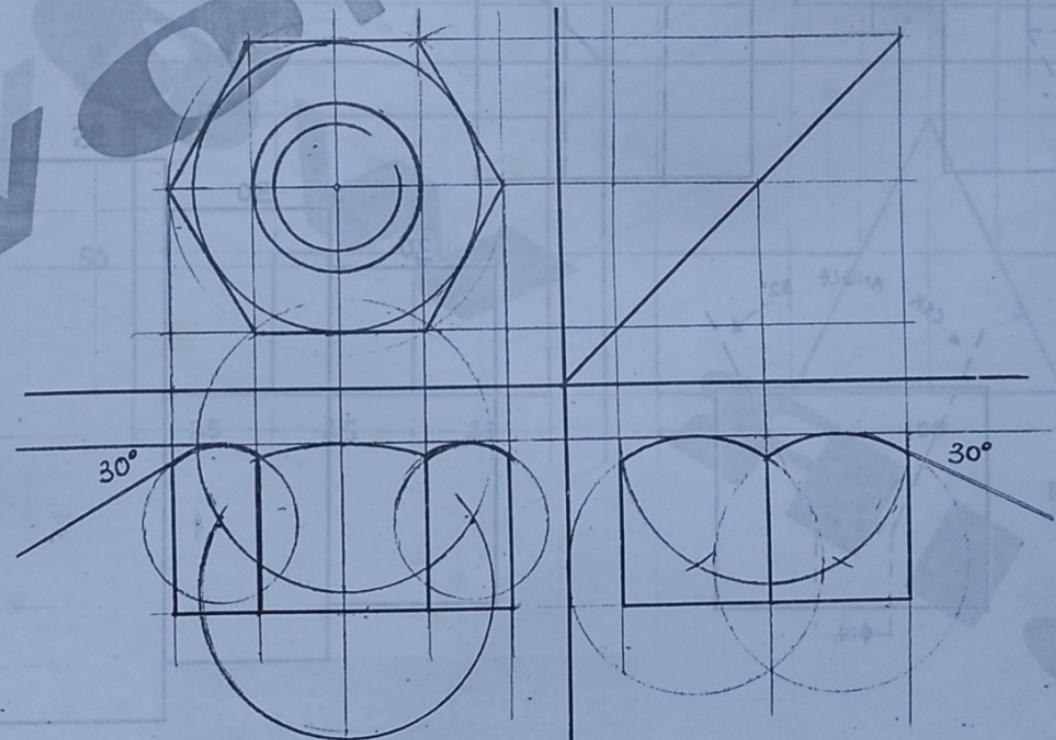
COUNTERSUNK
HEAD



SNAP
HEAD

RIVETS

IN THIRD ANGLE ORTHOGRAPHIC PROJECTION FORM



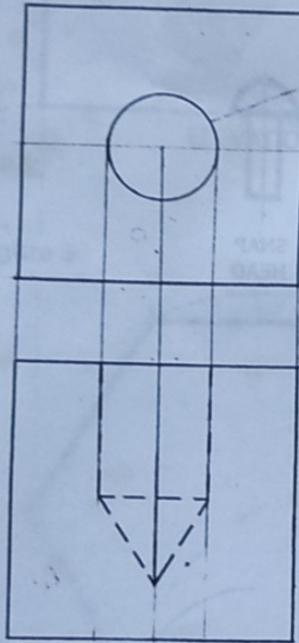
THREE VIEWS OF A HEXAGONAL NUT.

| | |
|-----------------------------------|-------------|
| Diameter (before the dimension) | \emptyset |
| Diameter (in a note) | DIA |
| Radius (before the dimension) | R |
| Chamfered | CHAM |
| Millimetre | mm |
| Centimetre | cm |
| Metre | m |
| Countersunk | CSK |
| Countersunk head | CSK HD |
| Centre line | CL |
| Number | NO. |
| Square (before the dimension) | □ |
| Square (in a note) | SQ |
| Outside diameter | O/D |
| Inside diameter | I/D |
| Threads per inch | TPI |
| Hexagon | HEX |
| Hexagonal head | HEX HD |
| Across flats | A/F |
| Round head | RD HD |
| Right hand | RH |
| Left hand | LH |
| Pitch circle diameter | PCD |
| Counterbore | C'BORE |
| Figure: | FIG. |
| Drawing | DRG |
| Material | MATL |
| Centres | CRS |

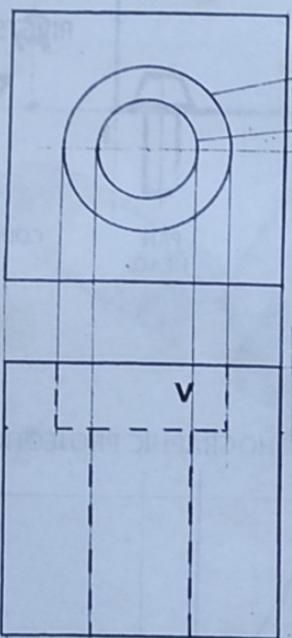
ASSIGNMENTS

- [1] Draw a revolutionary convention of the steering of an automobile using your own dimensions
- [2] Draw a conventional representation of these holes; [i] 19 Drill, 24Deep [ii] 18 Drill-30 C/bore,12deep [iii] 14 Drill 82 CSK 29 DIA
- [3] Draw the general convention of a four step pulley having diameters of 60mm, 50mm, 40mm, 30mm. And width 25mm, 35mm, 30mm,30mm for each pulley respectively

[2i]



[2ii]



19 DRILL

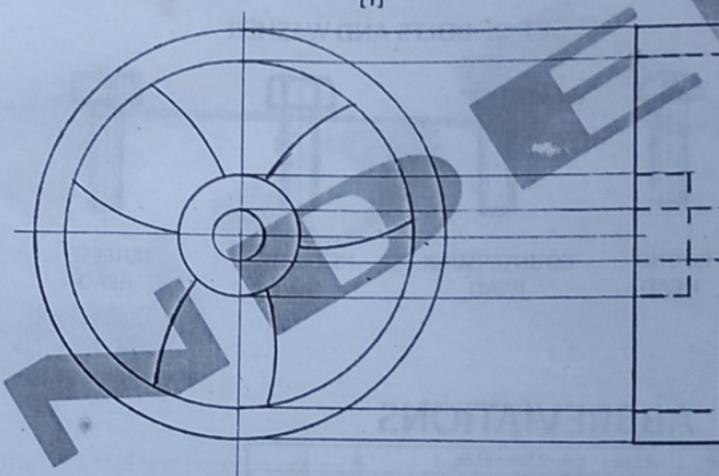
24 DEEP

$\phi 30$ C/BORE

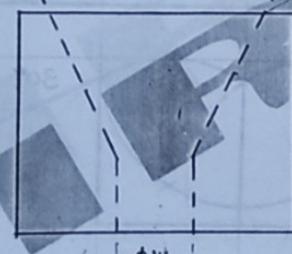
18 DRILL DIA

12 DEEP

[1]



[2iii]



$\phi 14$

ANGLE 82°

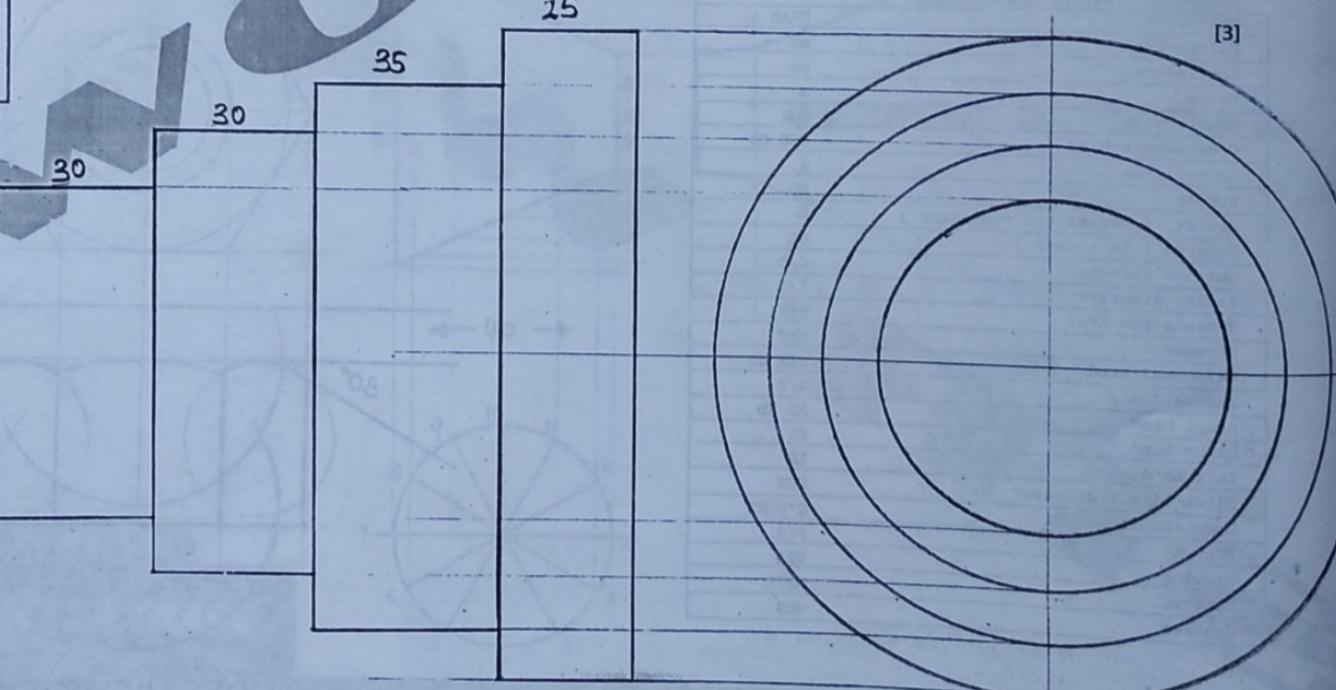
CSK

30

35

25

[3]



SCALE 2:1

5-YEARS BACK PAST QUESTIONS AND ANSWERS

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI

SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY

DEPARTMENT OF AGRICULTURAL AND BIORESOURCES ENGINEERING

2016/2017 RAIN SEMESTER EXAMINATION

COURSE: ENG 104 - ENGINEERING DRAWING 11. TIME: 3 HOURS. DATE: 16/11/2017

INSTRUCTIONS: (i) Answer question 1 and any other three questions (ii) Write your name (in full) and registration number with ink (iii) Submit the following assignments in your manual to your respectiveurers on/before 22/11/2017 [pg 4 nos 2&4 ; pg 8 nos 1&4; pg 14 fig 7; pg 17 no 1]

Draw the conventional representation of a spur gear using your own dimensions.

Using third angle orthographic projection, draw the front elevation, plan and the left hand side view of the object in Figure 1, viewed from direction A.

Make isometric drawing of the views in Figure 2, such that point A is the lowest point on the drawing.

Using third angle projection, draw three views of an M 30 hexagonal bolt with a washer faced end, having a pitch of 4 mm and a nominal length of 120 mm. Show the thread end chamfered.

Copy the views in Figure 2 and draw section Y-Y

Make an oblique drawing of the complete view of the plate in Figure 3.

The front elevation of a truncated cone, cut along plane B-B is shown in Figure 4. Copy the front elevation, draw the plan view, and draw the development of the surface.

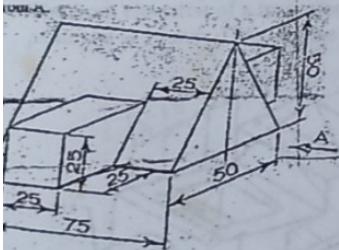


Figure 1

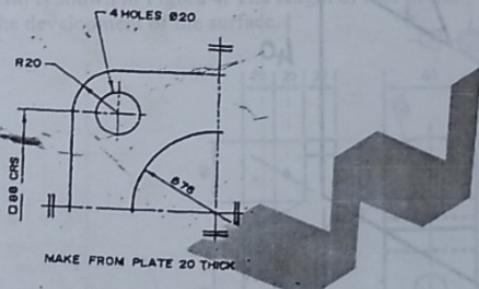


Figure 2

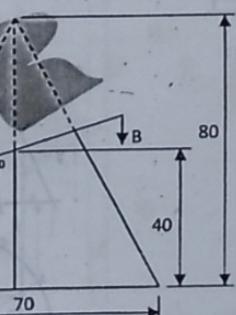


Figure 3

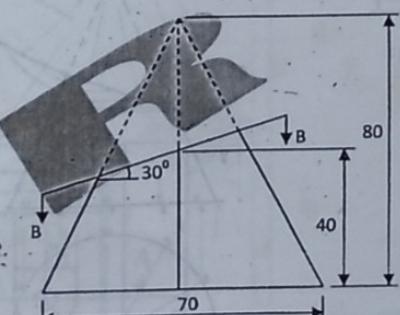
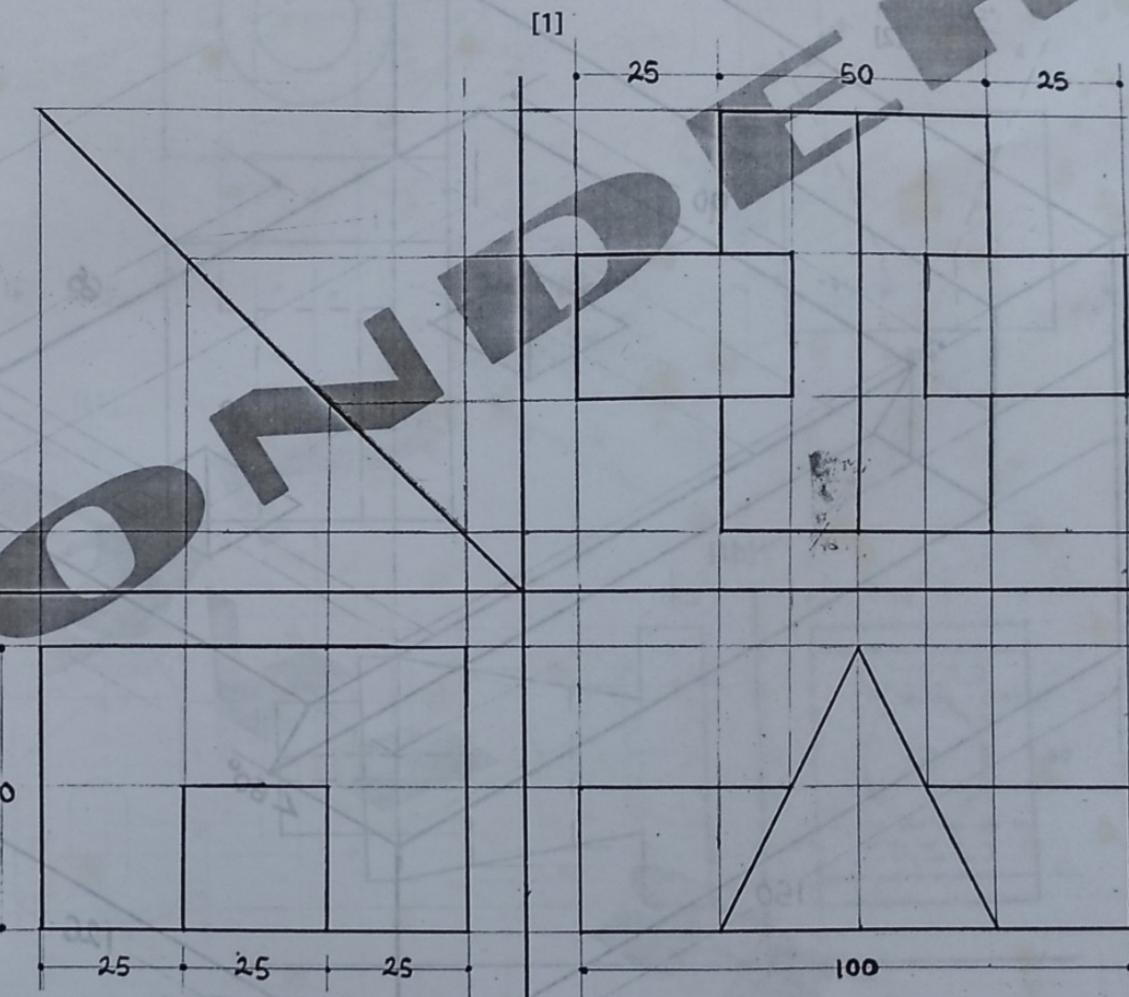
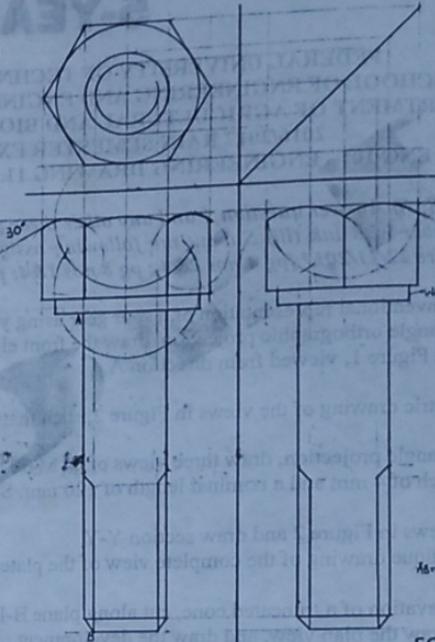
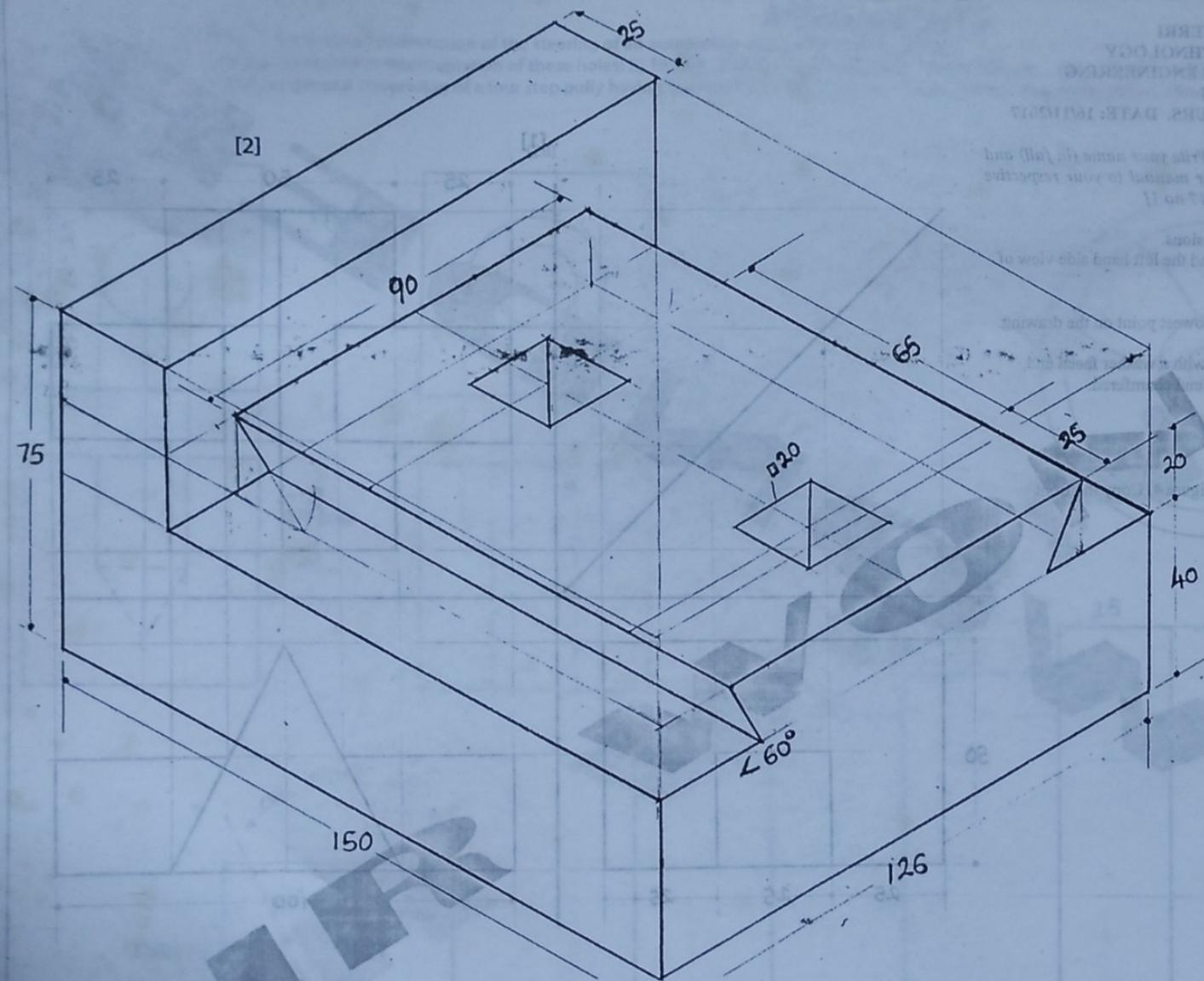


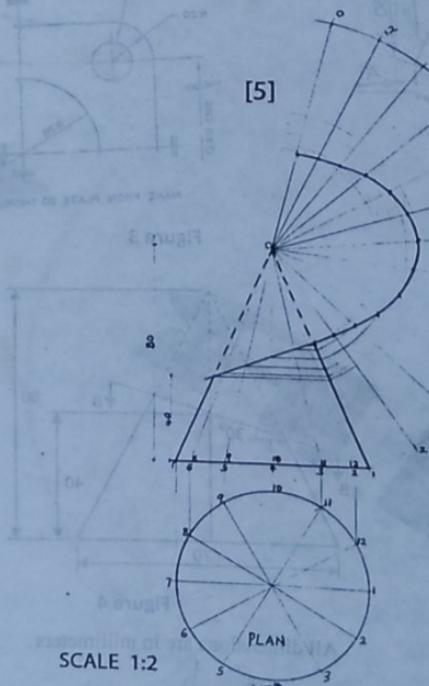
Figure 4

All dimensions are in millimeters





SCALE 1:2



SCALE 1:2

LA TEAR LA TRACE

FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
 SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY
 DEPARTMENT OF AGRICULTURAL AND BIORESOURCES ENGINEERING
 2015/2016 RAIN SEMESTER EXAMINATIONS
 COURSE: ENG 104 - ENGINEERING DRAWING 11. TIME: 3 HOURS. DATE: 23/09/2016

INSTRUCTIONS: (i) Answer question 1 and any other three questions (ii) Write your name (in full) and registration number with ink (iii) Submit the following assignments in your manual to your respective lecturers on/before 30/09/2016 [pg 4 nos 1&3 ; pg 8 nos 1&2; pg 10 no 1; pg 17 no 1]

1. a. Draw the conventional representation of these holes: (i) 18 Drill-30 C/Bore, 12 Deep (ii) 14 Drill 82° CSK, 29 DIA.
- b. Using first angle orthographic projection, draw the front elevation, plan and the left hand side view of the object in Figure 1, viewed from direction T.
2. Make isometric drawing of the views in Figure 2, such that point B is the lowest point on the drawing.
3. a. Draw the conventional representation of a five step pulley, having diameters: 30, 40, 48, 55 and 60 mm.
- b. Using third angle projection, draw three views of an M 30 hexagonal bolt with a washer faced end, having a pitch of 4 mm and a nominal length of 120 mm. Show the thread end chamfered.
4. a. Make an oblique drawing of the views in Figure 3 such that the face A faces the observer.
- b. Draw sections A-A as shown in Figure 2.
5. The front elevation of a truncated pentagonal prism is shown in Figure 4. The length of side of the pentagon is 30 mm. Draw (i) the plan view (ii) the development of the surface.

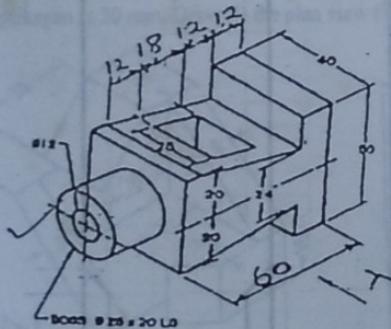


Figure 1

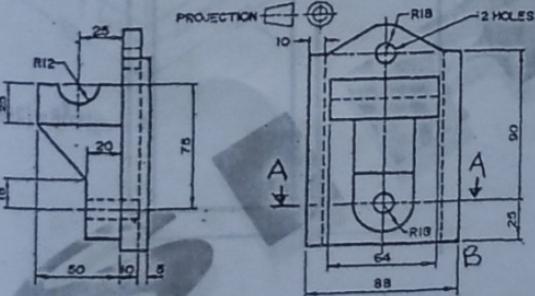


Figure 2

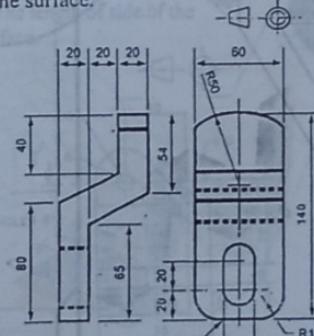


Figure 3

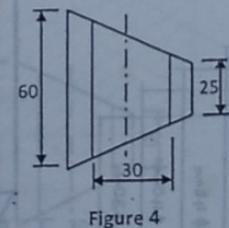
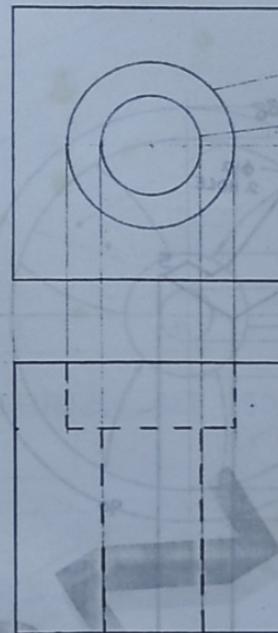


Figure 4

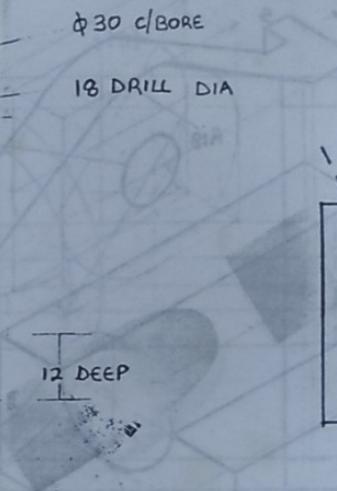
[1ai]



$\phi 30$ C/BORE

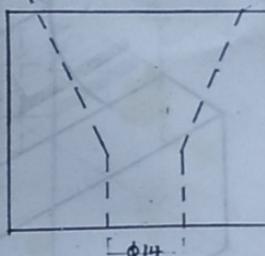
18 DRILL DIA

12 DEEP

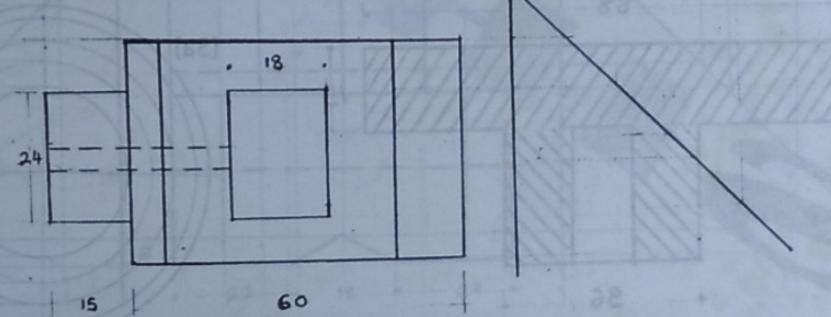
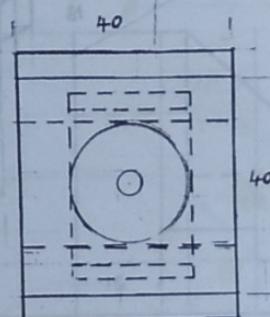
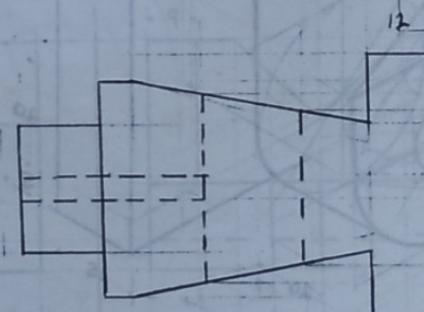


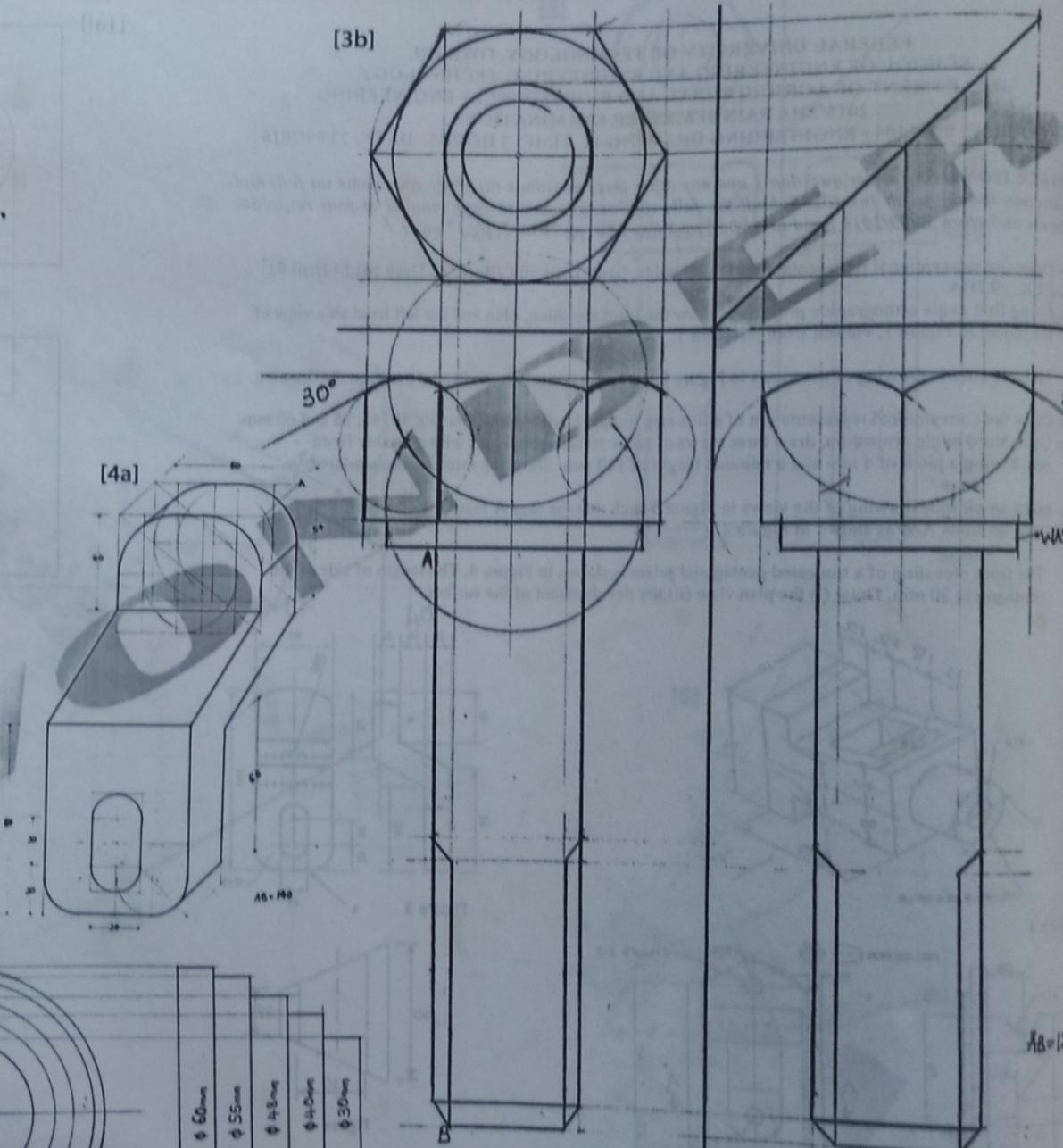
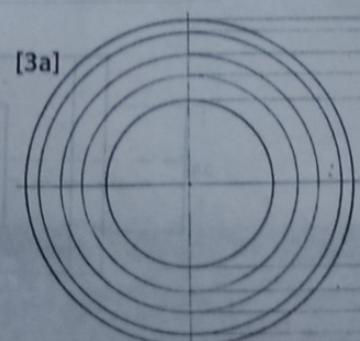
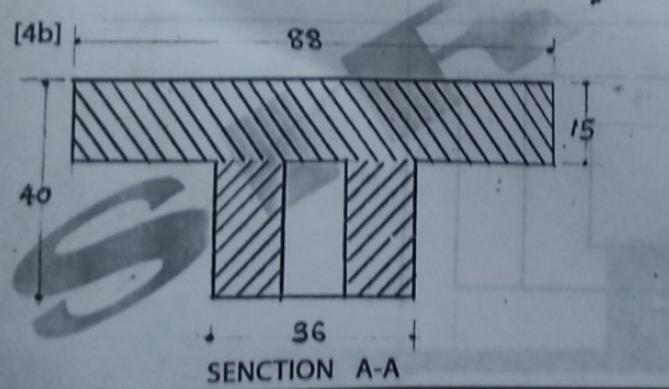
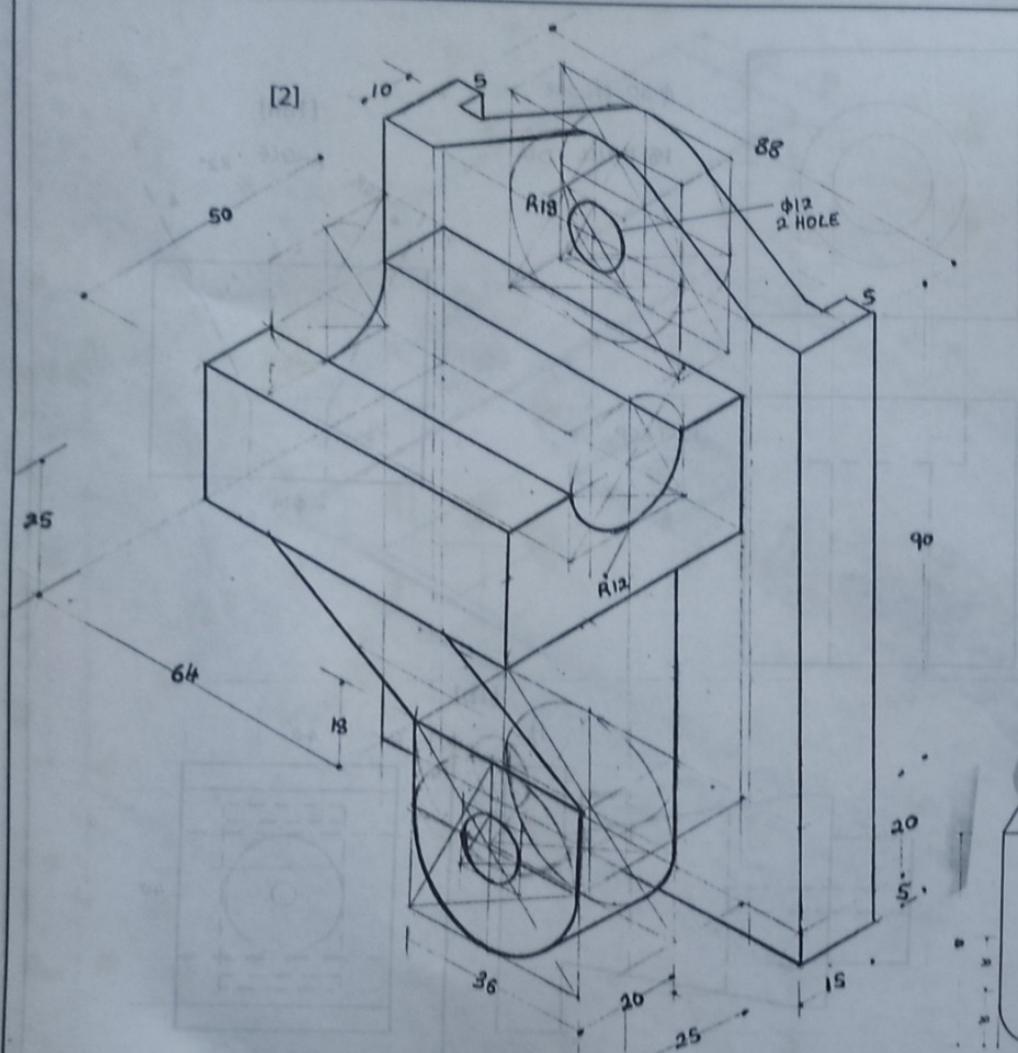
[1aiii]

ANGLE 82°



[1b]





FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
 SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY
 DEPARTMENT OF AGRICULTURAL ENGINEERING
 2014/2015 RAIN SEMESTER EXAMINATIONS

COURSE: ENG 104 - ENGINEERING DRAWING II. TIME: 3 HOURS. DATE: 27/08/2015

INSTRUCTIONS: (i) Answer question 1 and any other three questions (ii) Write your names (in full) and registration number with ink (iii) Submit the following assignments in your manual to your respective lecturers on/before 31/08/2015 [pg 4 nos 1&3 ; pg 8 nos 1&2; pg 10 no 1; pg 17 no 1]

- 1.a. Draw the revolution convention of the steering of an automobile using your own dimensions.
- b. Using first angle orthographic projection, draw the front elevation, plan and the left hand side view of the object in Figure 1, viewed from direction X.
- 2 Make isometric drawing of the views in Figure 2, such that point A is the lowest point on the drawing.
- 3 Two pieces of a material each 40 mm thick are to be secured together by a hexagonal bolt and nut, having major and minor diameters of 32 mm and 28 mm respectively. Draw a sectional view of the assembly. Nominal length of bolt is 120 mm.
- 4 Draw sections Y-Y as shown in Figure 2.

- 5 The front elevation of a truncated pentagonal prism is shown in Figure 3. The length of side of the pentagon is 30 mm. Draw (i) the plan view (ii) the development of the surface.

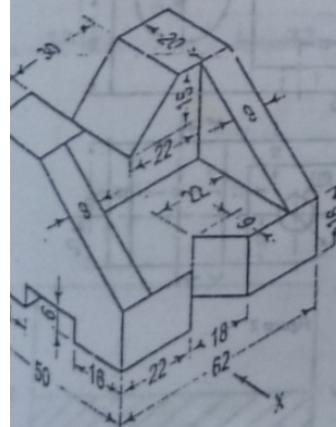


Figure 1

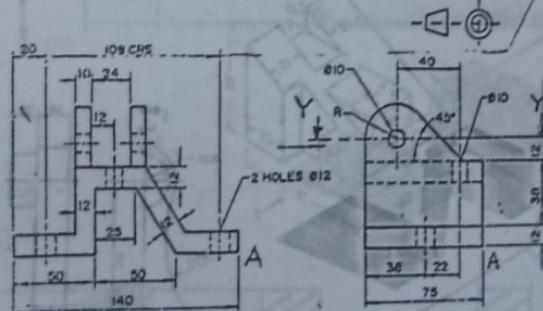


Figure 2

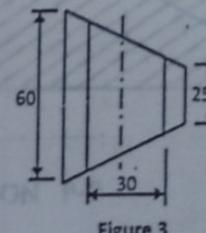
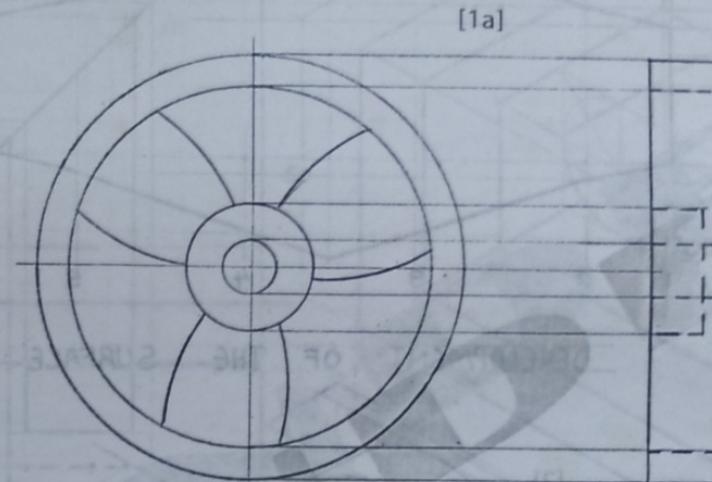
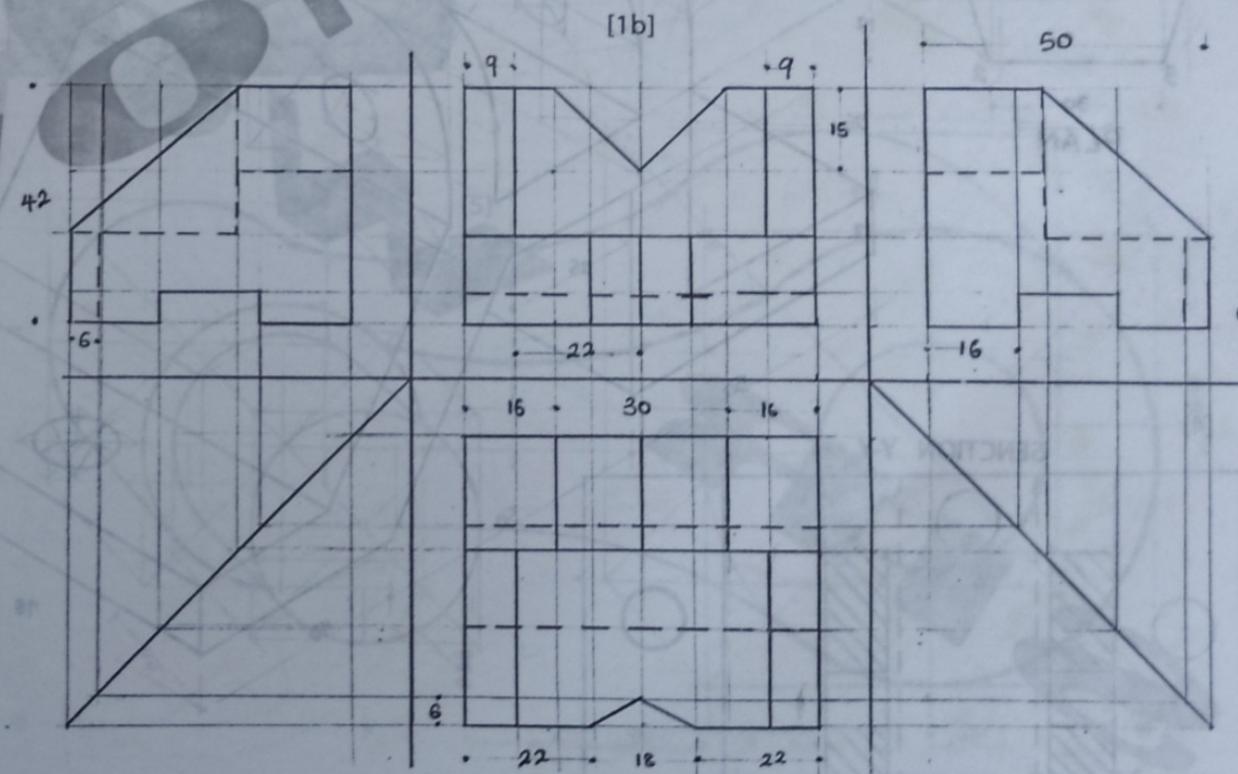


Figure 3

All dimensions are in millimeters



[1a]

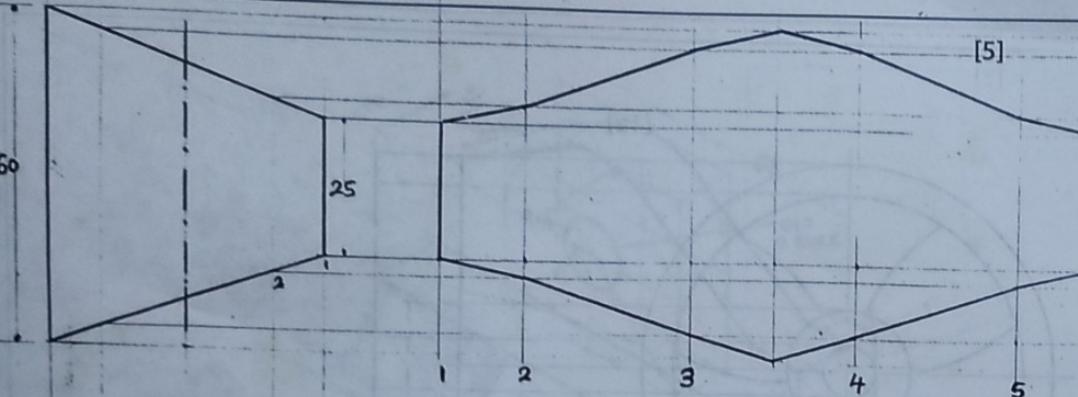


[1b]

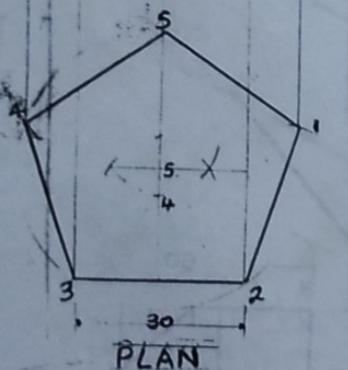
COURSE: ENG 104-ENGINEERING DRAWING II. TIME: 3HOURS. DATE: 02/10/2014

INSTRUCTIONS: (i) Answer question 1 and any other questions (ii) write your names (in full) and registration number with ink (iii) submit the following assignments in your manual to your respective Lecturers on/before 06/10/2014[pg 4 nos 3 & 4; pg 8 nos 1&2; pg 10 no 1; pg 17 no 1A]

1. Using third angle orthographic projection, draw the front elevation, plan and the two side views of the object in Figure 1, viewed from direction x
2. Make isometric drawing of the views in Figure 2, such that point B is the lowest point on the drawing
3. a. Draw the conventional representation of these holes: (i) 18 Drill-30 C/Bore, 12 Deep (ii) 14 Drill 82° CSK, 29 DIA
 b. Using third angle projection, draw three views of a hexagonal bolt with a washer faced end, having major and minor diameters of 32 and 26mm respectively and a nominal length of 120mm. Show the thread end chamfered.
4. Draw sections Y-Y and P-P as shown in Figure 2.
5. Make an oblique drawing of the views in Figure 3, such that point A is the lowest point on the drawing.



DEVELOPMENT OF THE SURFACE



[4]

SECTION Y-Y

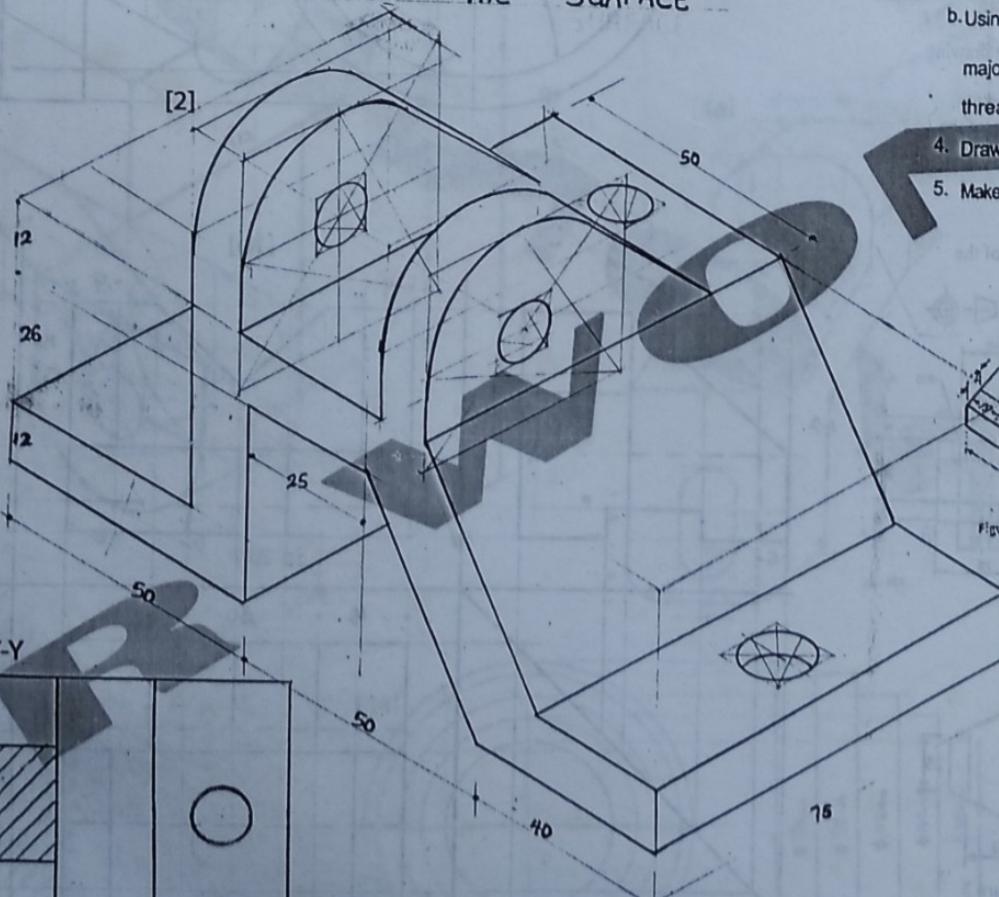
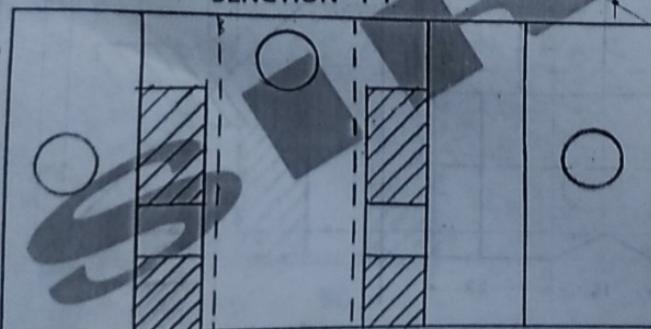


Figure 1



Figure 2

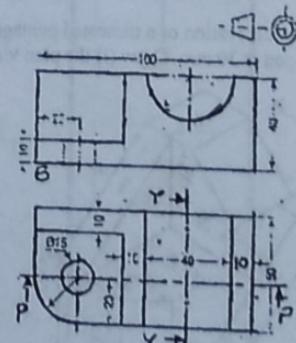
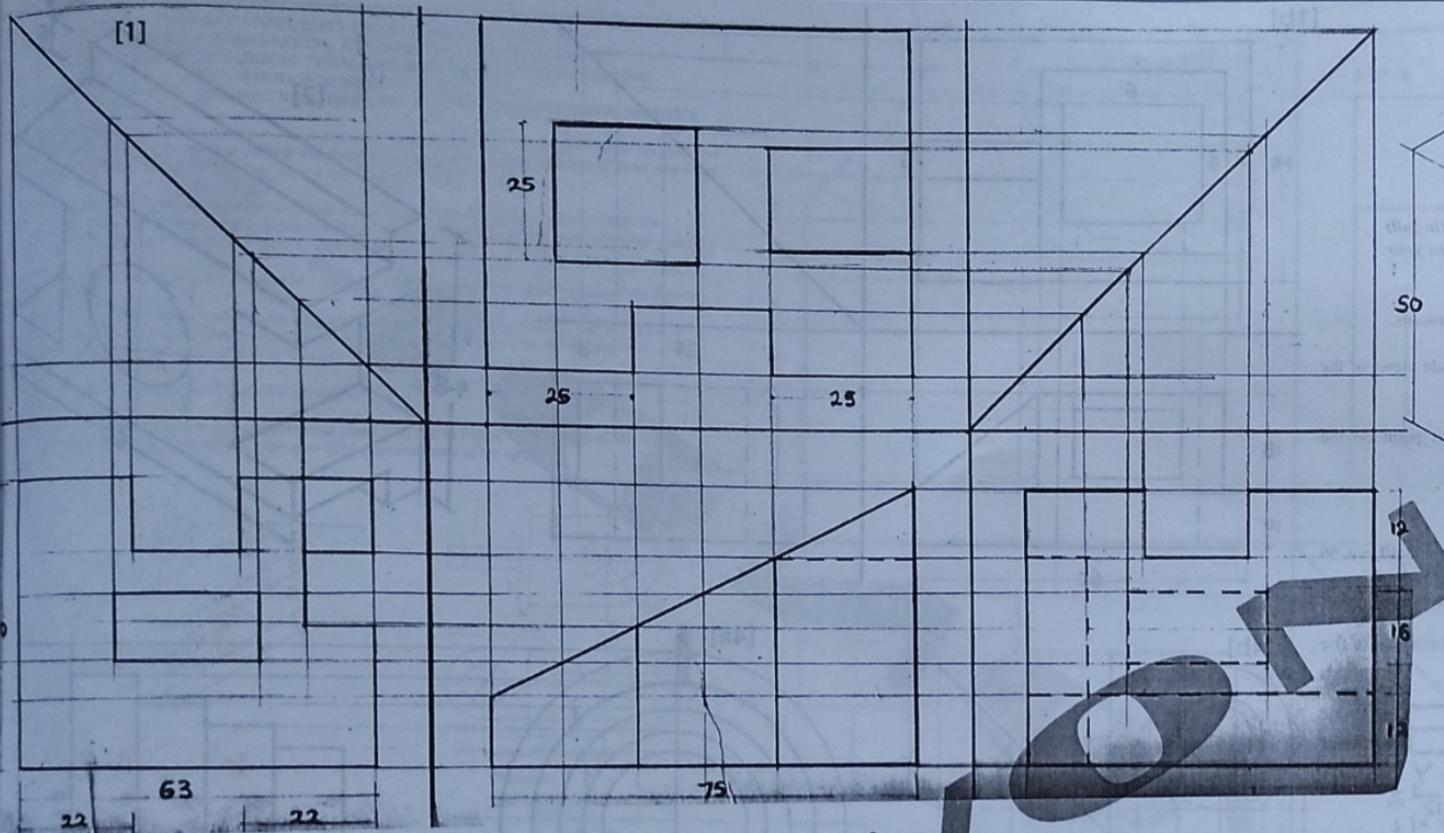


Figure 2

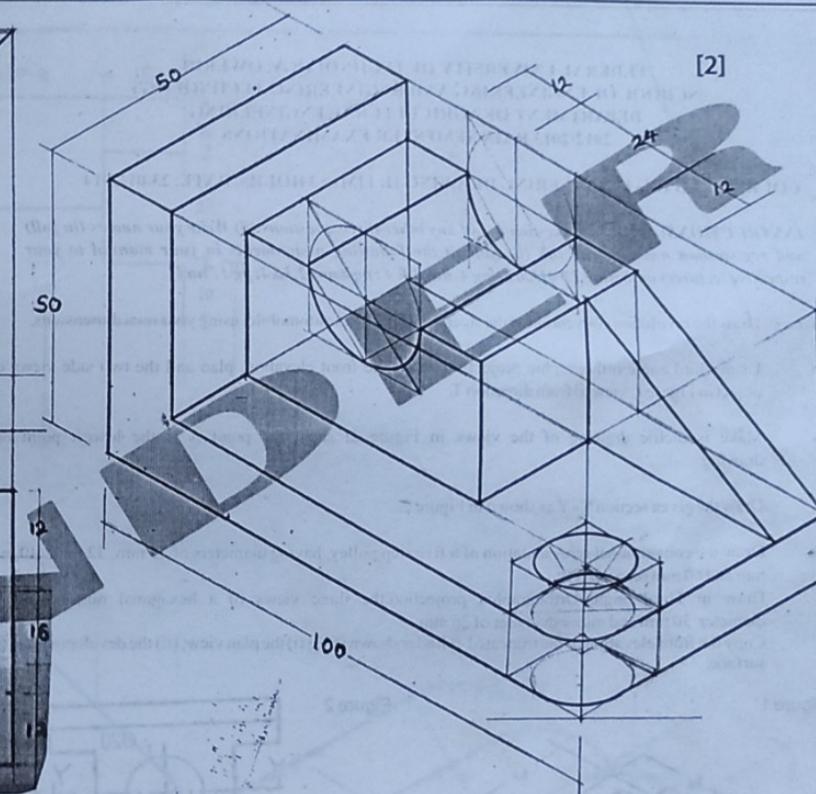
Figure 3

All dimensions in Millimeters

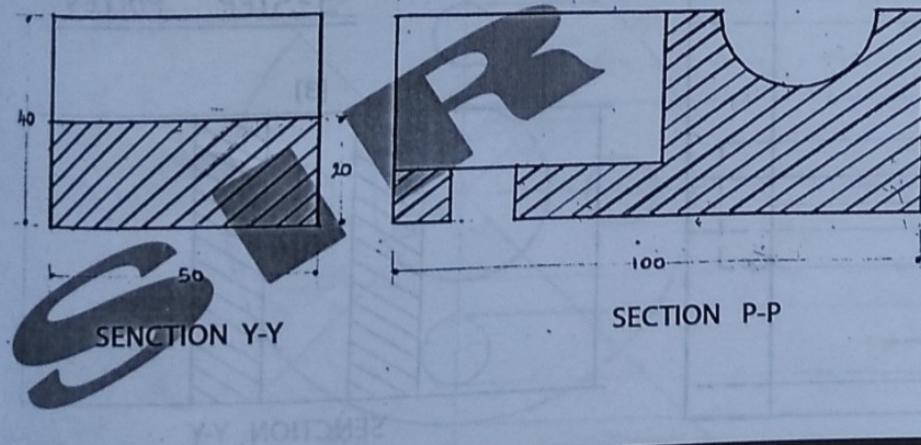
[1]



[2]

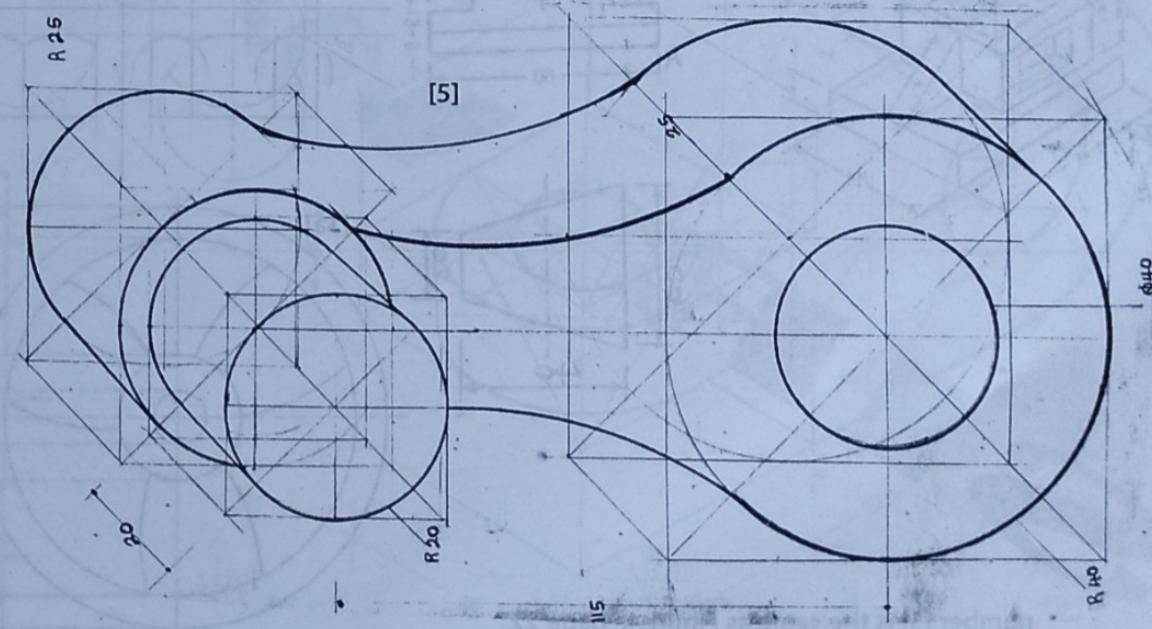


[4]



A 25

[5]



COURSE: ENG 104 - ENGINEERING DRAWING II, TIME: 3 HOURS, DATE: 23/01/2014

INSTRUCTIONS: (i) Answer question 1 and any other three questions (ii) Write your names (in full) and registration number with ink (iii) Submit the following assignments in your manual to your respective lecturers on/before 28/01/2014 [pg 4 nos 3 & 4; pg 8 nos 2,3 & 4; pg 17 no 1]

- 1a. Draw the revolution convention of the steering wheel of an automobile, using your own dimensions.
- b. Using third angle orthographic projection, draw the front elevation, plan and the two side views of the object in Figure 1, viewed from direction T.
2. Make isometric drawing of the views in Figure 2; such that point A is the lowest point on the drawing.
3. Draw the given section Y-Y as shown in Figure 2.
- 4a. Draw the conventional representation of a five step pulley, having diameters of 25 mm, 32 mm, 40 mm, 50 mm and 60 mm respectively.
- b. Draw in Third angle Orthographic projection, the three views of a hexagonal nut, having major diameter 30 mm and minor diameter of 26 mm.
5. Copy the front elevation of the truncated cylinder shown in fig (i) the plan view; (ii) the development of the surface.

Figure 1

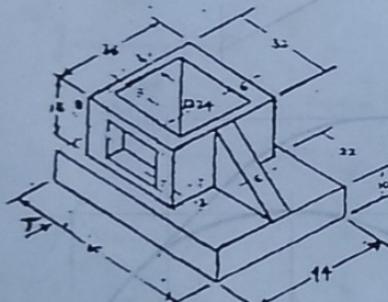
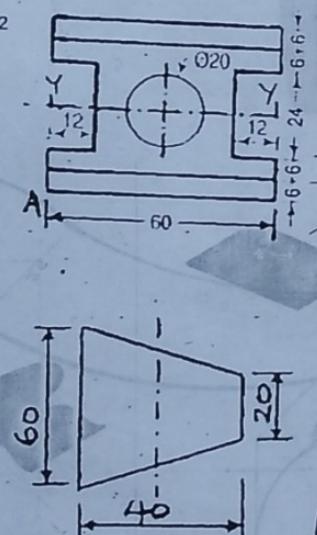
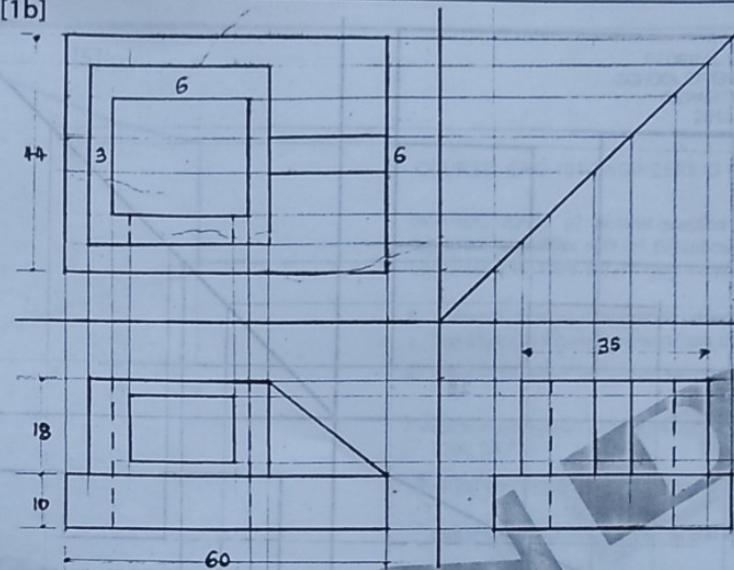


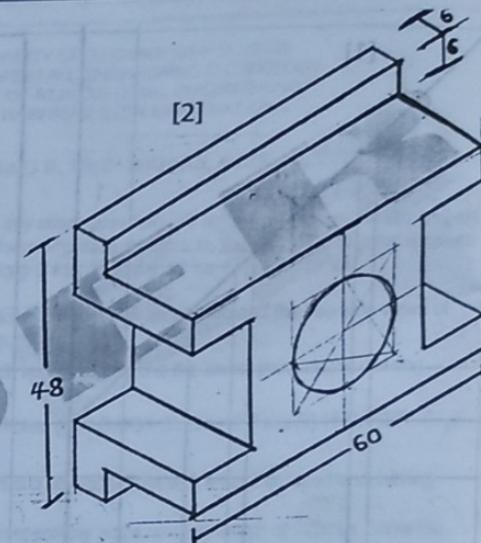
Figure 2



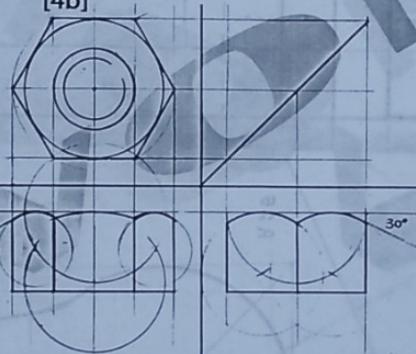
[1b]



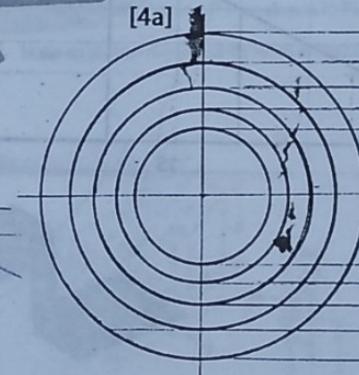
[2]



[4b]

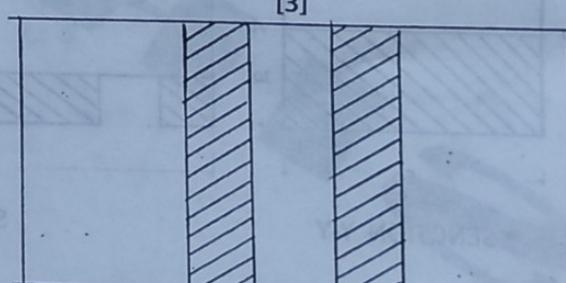


[4a]

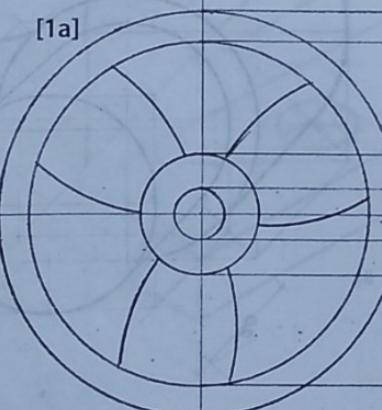


5-STEP PULLEY

[3]



number [5] is the same as Figure 4, page 22



SENCTION Y-Y

INSTRUCTIONS: (i) Answer question 1 and any other three questions (ii) Write your name (in full) and registration number with ink (iii) Submit the following assignments in your manual to your respective centers on/before 19/09/2018 [pg 4 no 3; pg 8 nos 2&3; pg 14 fig 7; pg 17 no 1].

- Draw the revolution convention of a circular flange of diameter 80 mm and thickness of 10 mm.
- Using first angle orthographic projection, draw the front elevation, plan, left hand side view, and right hand side view of the object in Figure 1, viewed from direction A.

Make isometric drawing of the views in Figure 2, such that point X is the lowest point on the drawing.

Two pieces of a material each 40 mm thick are to be secured together by a hexagonal bolt and nut, having major and minor diameters of 32 mm and 28 mm respectively. Draw a sectional view of the assembly. Nominal length of bolt is 120 mm.

- Copy the views in Figure 2 and draw section Y-Y

The front elevation of a truncated pentagonal prism is shown in Figure 3. The length of side of the pentagon is 30 mm. Draw (i) the plan view (ii) the development of the surface.

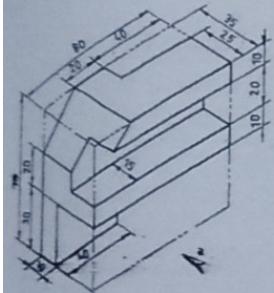


Figure 1

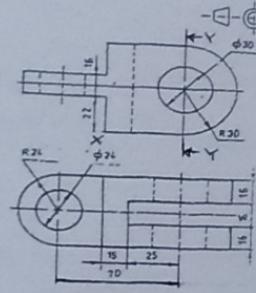


Figure 2

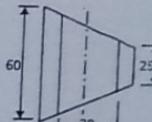
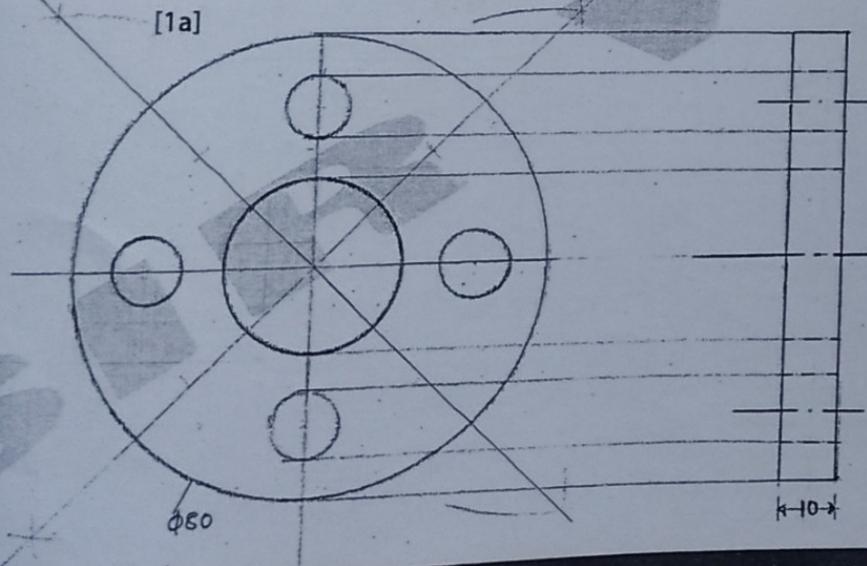
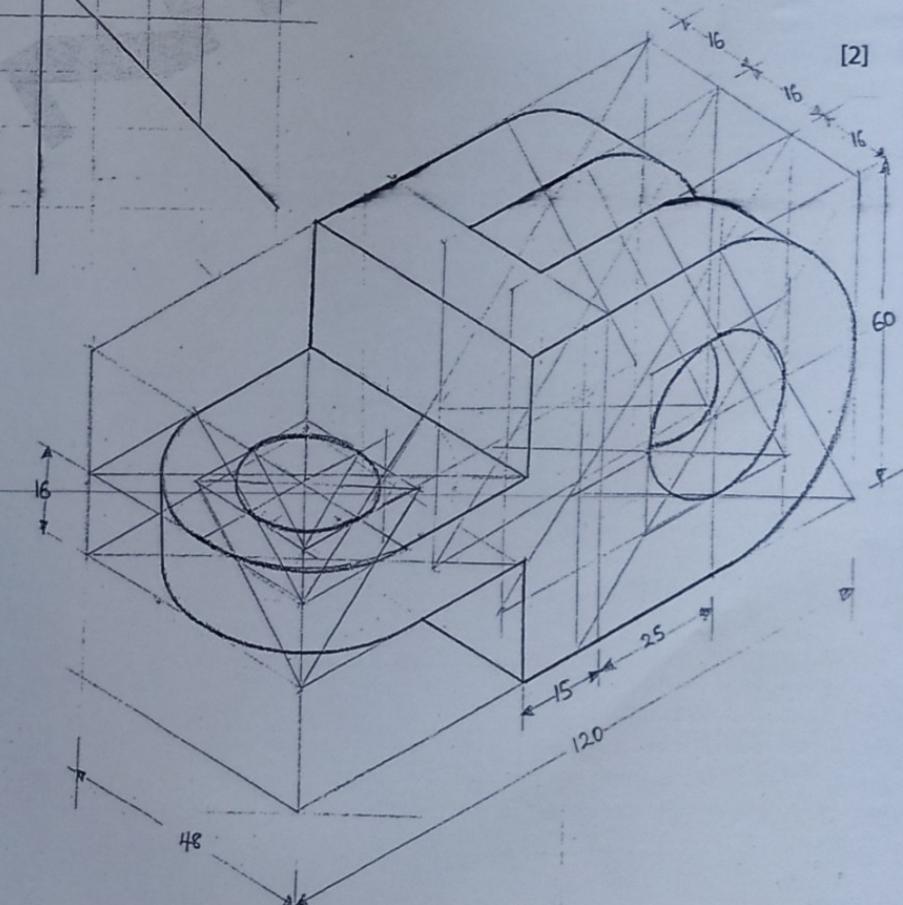
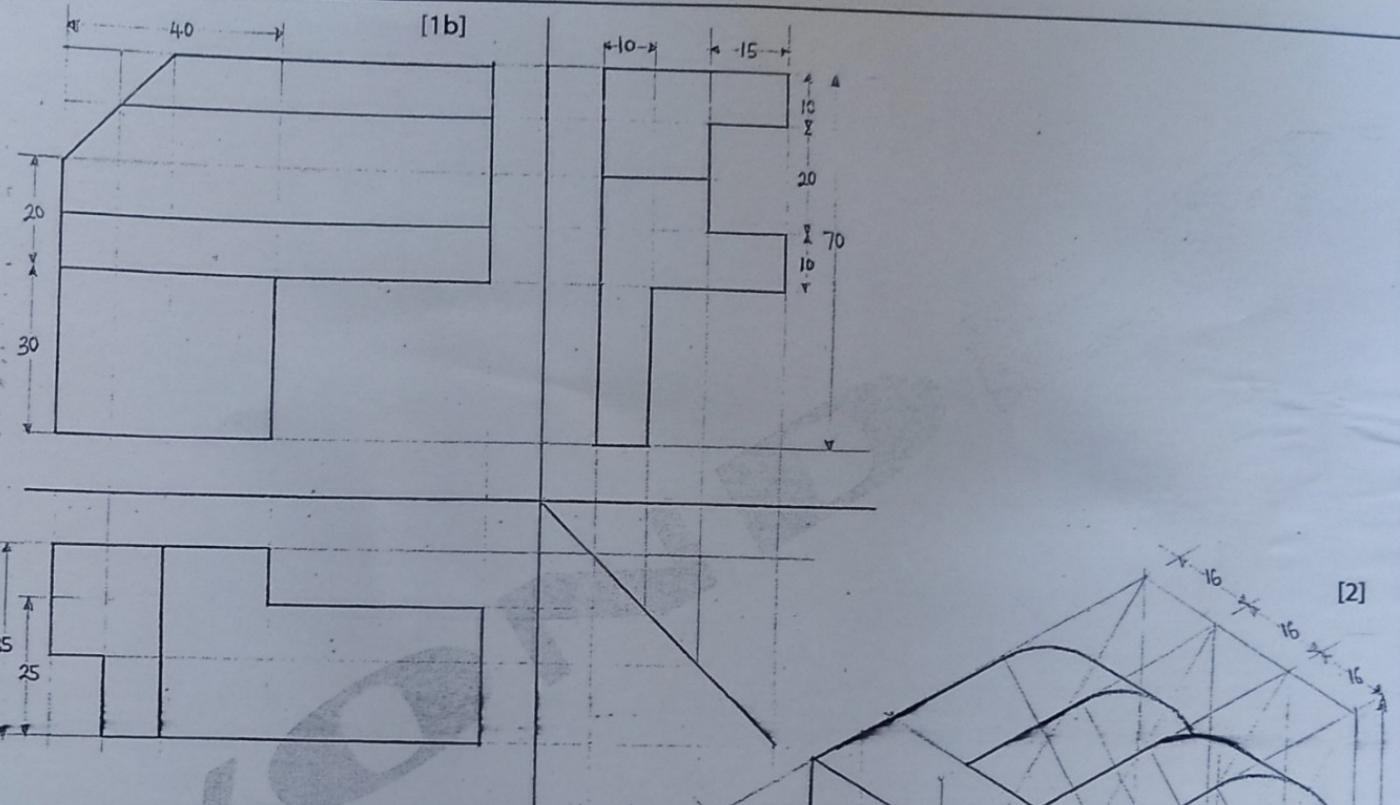
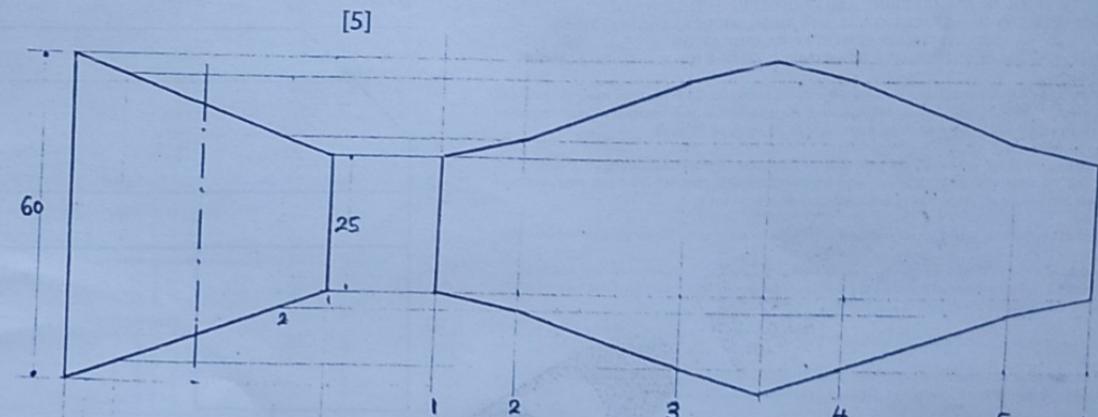
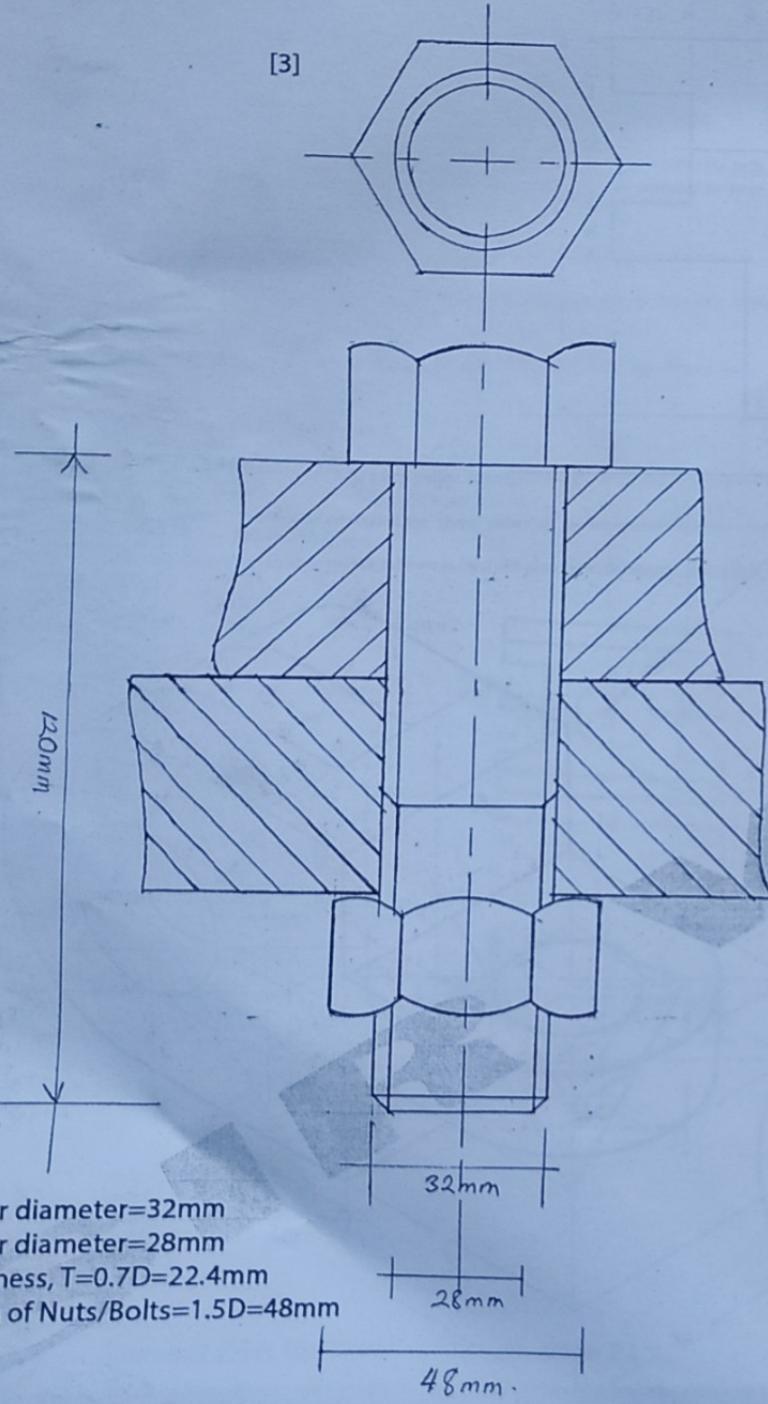
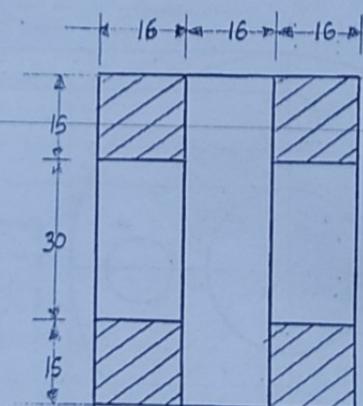


Figure 3





DEVELOPMENT OF THE SURFACE



[SENTION Y-Y]

