GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

REMOTE LEARNING ACTIVITY BOOK

(RELAB)

SUBJECT: WELDING & METALWORK

GRADE: 11

LEARNER ACTIVITY BOOK

INTRODUCTION AND PURPOSE OF THE RELAB

The Covid 19 pandemic has caused serious impact to schooling resulting in major learning loss and instructional time. This scenario has resulted in school implementing rotational timetables-where learners attend school on alternate days or weeks. The Remote Learning Activity Book was conceptualized to engage learners in constructive learning on days they are at home. Hence the RELAB was developed as a strategy to enhance remote learning.

The RELAB is underpinned by the following Legislative demands:

a) Responding to GDE Strategic goal 2 promoting quality education across all classrooms and schools
b) **DBE Circular S13 of 2020** the requires the GDE to support the implementation of the Recovery Annual Teaching Plan (RATP)
c) **GDE Circular 11 of 2020** requiring districts to issue Learning Activity Packs to support schools for lockdown learning. Understanding learning constraints at home as majority of learners do not have access to devices or data to use for online learning. Many households are depending on schools to provide them with learning resources packs

RELAB is designed as workbook with activities based on the Revised Annual Teaching Plan. The exercises are pitched at a standard to expose learners at Grade 10 & 11 to content at different cognitive levels. The NSC diagnostic reports in different subjects have revealed that learners fail to analyse questions and as a result fail to respond accordingly.

The RELAB is intended to ensure that learners work on exercises that consolidate and reinforce topics taught while at school. These exercises are be completed at home and would receive feedback as groups or individually when at school. It is therefore of paramount importance that teachers assess the work with learners in class, as a way of providing constructive feedback. Teacher are also required to diagnose learner responses, remediate where necessary and plan further intervention.

Educators are encouraged to create whatsapp groups to remind learners on what is expected of them in a particular week/ day(s). Effective utiisation of the RELAB activity book would further ensure that all topics in the RATP are covered simultaneously. Feedback from learners at home will confirm usage of the RELAB material and assist to prepare learners for formal assessments.

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WELDING AND METALWORK - Grade 11

TERM ONE

Lesson 1- Safety-HIV/AIDS

1) Write an essay (not more than 250 words) about your understanding around the following issues about HIV/AIDS:
    - Your understanding about the illness and its causes
    - How it affects our community and specially in the workplace
    - How to prevent HIV/AIDS
2) Write a short paragraph why you think if it is important to know your status. (Not more than 80 words).
3) In your opinion, why do you think it is important to have first aid kits?
4) Name at least 10 basic contents that must be in a first aid kit.

Lesson 2- First aid multiple choice Questions

First aid multiple choice questions

1) How should you open the airway of an unconscious casualty?

A. Head tilt and chin lift.

B. Jaw thrust.

C. Head tilt and jaw thrust.

D. Lift the chin.

2) How long would you check to see if an unconscious casualty is breathing normally?

A. No more than 10 seconds.

B. Approximately 10 seconds.

C. Exactly 10 seconds.

D. At least 10 seconds.

3) You are a lone first aider and have an unconscious non-breathing adult, what should you do first?

A. Start CPR with 30 chest compressions.

B. Give five initial rescue breaths.

C. Call 911/112 requesting AED (defibrillator) and ambulance.

D. Give two initial rescue breaths.

4) Which is the correct ratio of chest compressions to rescue breaths for use in CPR of an adult casualty?

A. 2 compressions: 30 rescue breaths.

B. 5 compressions: 1 rescue breath.

C. 15 compressions: 2 rescue breaths.

D. 30 compressions: 2 rescue breaths.

5) Which of the following is the correct sequence for the chain of survival?

A. 911/112. CPR. Defibrillation. Advanced care.

B. CPR. Defibrillation. 911/112. Advanced care.

C. Defibrillation. CPR. 911/112. Advanced care.

D. Defibrillation. 911/112. CPR. Advanced care.

6) What is the cause of angina?

A. Insufficient blood reaching the lungs.

B. Insufficient blood reaching the brain.

C. Insufficient blood reaching the heart muscle.

D. Insufficient blood reaching the leg muscles.

7) What should a casualty with a severe allergy carry at all times?

A. Insulin.

B. Acetaminophen/Paracetamol.

C. Adrenaline (Epipen).

D. Aspirin.

8) Which test should you use if you suspect that a casualty has had a stroke?

A. Face, Arms, Speech, Test.

B. Alert, Voice, Pain, Unresponsive.

C. Response, Airway, Breathing, Circulation.

D. Pulse, Respiratory Rate, Temperature

9) Which of the following can cause a stroke?

A. A blood clot in an artery in the brain.

B. A blood clot in an artery in the heart.

C. A blood clot in an artery in the leg.

D. A blood clot in an artery in the lungs.

10) What should your first action be when treating an electrical burn?

A. Ensure that the casualty is still breathing.

B. Wash the burn with cold water.

C. Check for danger and ensure that contact with the electrical source is broken.

D. Check for level of response.

11) What is an open fracture?

A. A fracture in which the bone ends can move around.

B. A fracture in which the bone is exposed as the skin is broken.

C. A fracture which causes complications such as a punctured lung.

D. A fracture in which the bone has bent and split.

12) Which medical condition will develop from severe blood loss?

A. Shock.

B. Hypoglycaemia.

C. Anaphylaxis.

D. Hypothermia.

13) What names are given to the three different depths of burns?

A. Small, medium and large.

B. First, second and third degree.

C. Minor, medium and severe.

D. Superficial, partial thickness, full thickness.

14) What is a faint?

A. A response to fear.

B. An unexpected collapse.

C. A brief loss of consciousness.

D. A sign of flu.

15) What steps would you take to control bleeding from a nosebleed?

A. Sit casualty down, lean forward and pinch soft part of nose.

B. Sit casualty down, lean backward and pinch soft part of nose.

C. Lie casualty down and pinch soft part of nose.

D. Lie casualty down and pinch top of nose.

Lesson 3 – Grinder

- When working with an angle grinder, you must follow safety rules. Name six.
- Name five safety precautions to observe when working with a grinding wheel.
- Name five steps to follow when installing a grinding wheel.
- Name five safety precautions to remember when working with a surface grinder.
- Name six rules you must adhere to when working with a portable drilling machine.
- Name five safety precautions to follow when working with a drill press.
- Power saws are dangerous power tools. Name five safety precautions that must be observed when working with them.

Lesson 4 – Press machines, Arc Welding, Gas Welding, Gas Cylinders

1. Discus how the OHS act 85 of 1993 regulates the safeguarding of press machines.
2. Give 4 examples of how press machines can be safe guarded.
3. Name four safety precautions to observe when working with an arc welding machine.
4. Name six safety precautions to he observed when welding with a gas welding apparatus.
5. Which nine particulars must be visible on a gas cylinder?
6. Name five precautions when handling gas cylinders.

Lesson 5- Hydraulic press

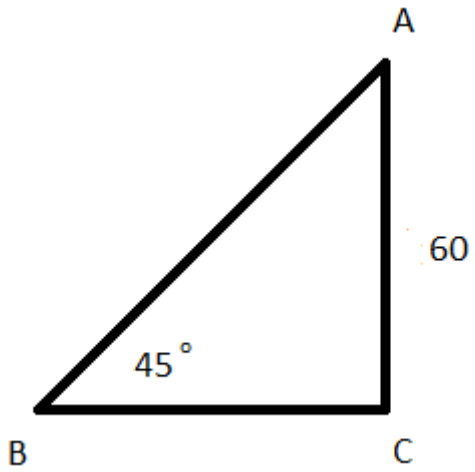
1. A hydraulic press is an important tool in the workshop. Name eleven precautions to observe when working with this equipment.

Lesson 6- Templates

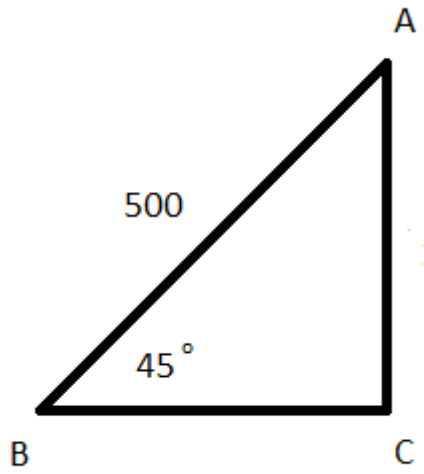
1 Five criteria of effective marking out are?
2 Name five tools used to make templates?
3 Describe why wood is used in the making of templates?
4 How should a template loft's floor be constructed?
5 How do you transfer a set out project to a template?
6 A 15 m ladder leans up against a building. The foot of the ladder is 5 m from the base of the building. How high up the wall, to the nearest meter does the ladder reach?
7 The Pythagorean Theorem can be used only on _____triangles.
8 When should the Pythagorean Theorem be used?
9 What should be done first when solving a word problem involving the Pythagorean Theorem?
10 What must be done before writing the answer to a Pythagorean Theorem problem?
11 Where is the 3, 4 ,5 rule used in setting out of projects?

Lesson 7- 45 and 60 degree setting out

1. Determine the length of AB



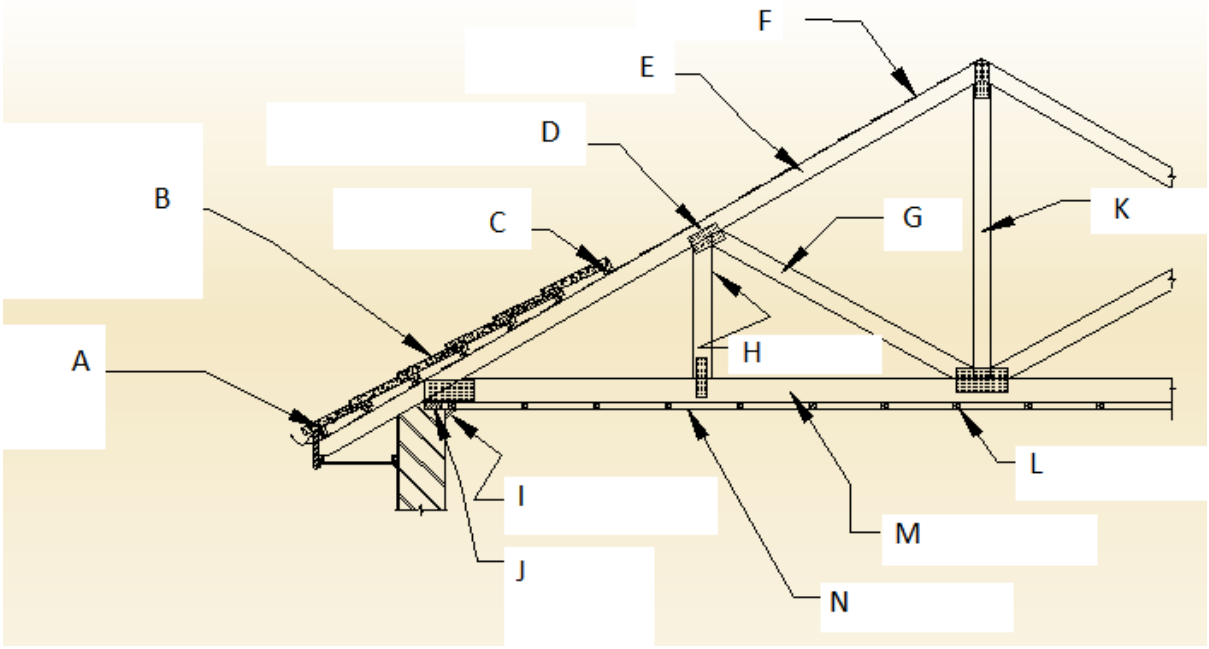
2. Determine the length of BC



Lesson 8- Back marks and cross centre

1. Where do we use back marks?
2. Where do we use cross centres?
3. Name 5 criteria for cross centres and back marks?

Lesson 9- roof trusses- slope



1. Identify sections A – N?
2. Calculate the slope of the roof truss?
3. Calculate the rise of the roof truss?
4. Calculate the pitch of the roof truss?

Lesson 10– Roof truss layout

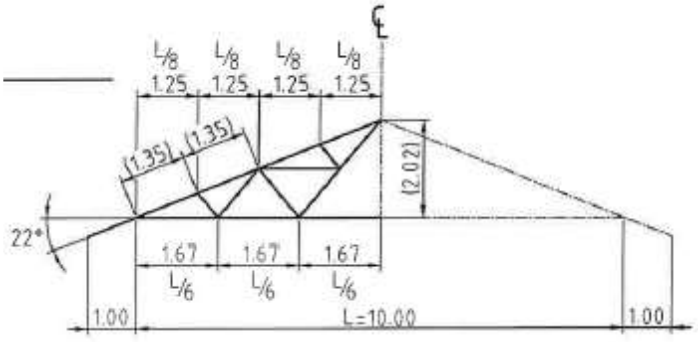
1. What is a roof truss?
2. Where are roof trusses fabricated?
3. Identify the different sections on the roof?
4. Different truss configurations can be used. Name four that can be used for a roof with a span more than 10 meters.

Lesson 11- Template- calculating of cost

1. Name two factors that influence production cost.
2. Welding material cost is determined by which factors?
3. How can payment for work be done?
4. What is indirect cost?

Lesson 12- Template compiling cost for roof trusses

1. Determine the cost for producing the following roof truss



Double Pitch Roof; Single Angle Bars, 10 m span

Roof Slope min 19°, max. 30°

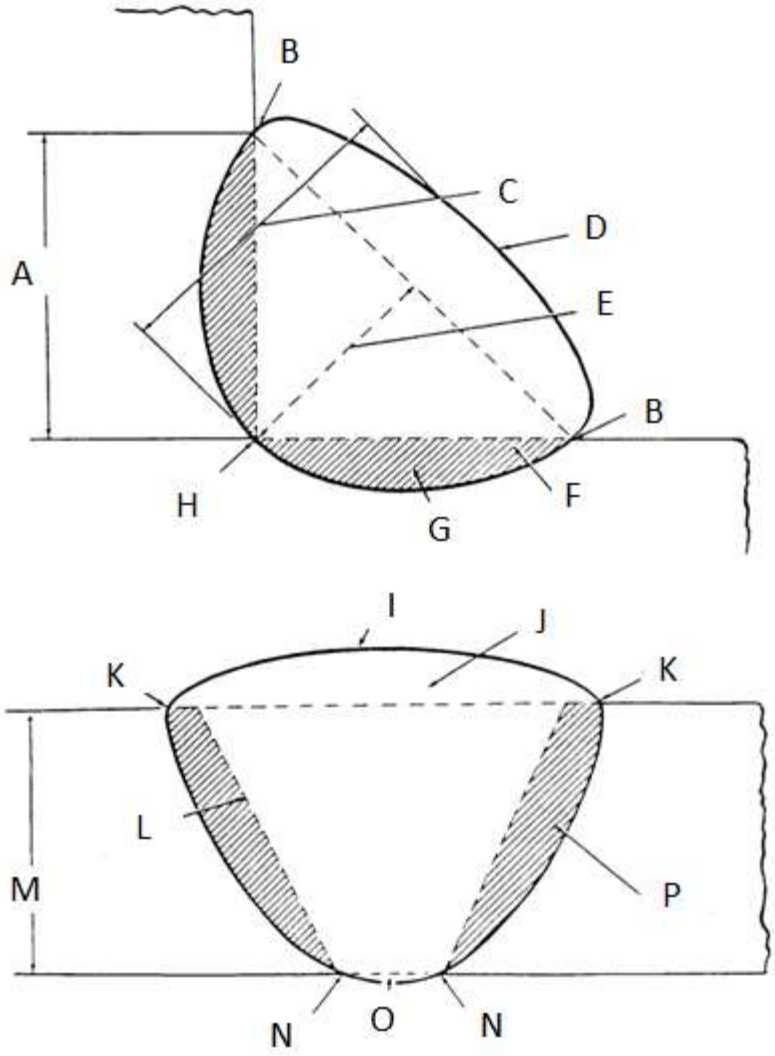
Bracing system according to Section 6.6.4 above

Spacing of truss 2.5 m

Total load 1.0 kN/m^2

Lesson 13- Welding terms

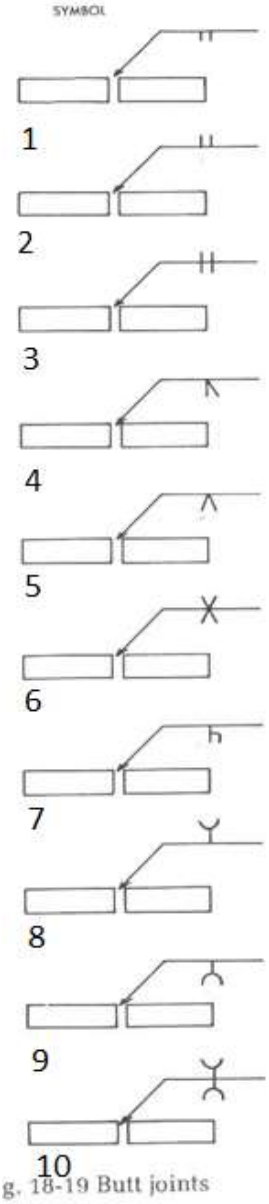
1. Name four advantages of welding?
2. Identify A – P



3. What is the deposition rate?

Lesson 14- Welding symbols

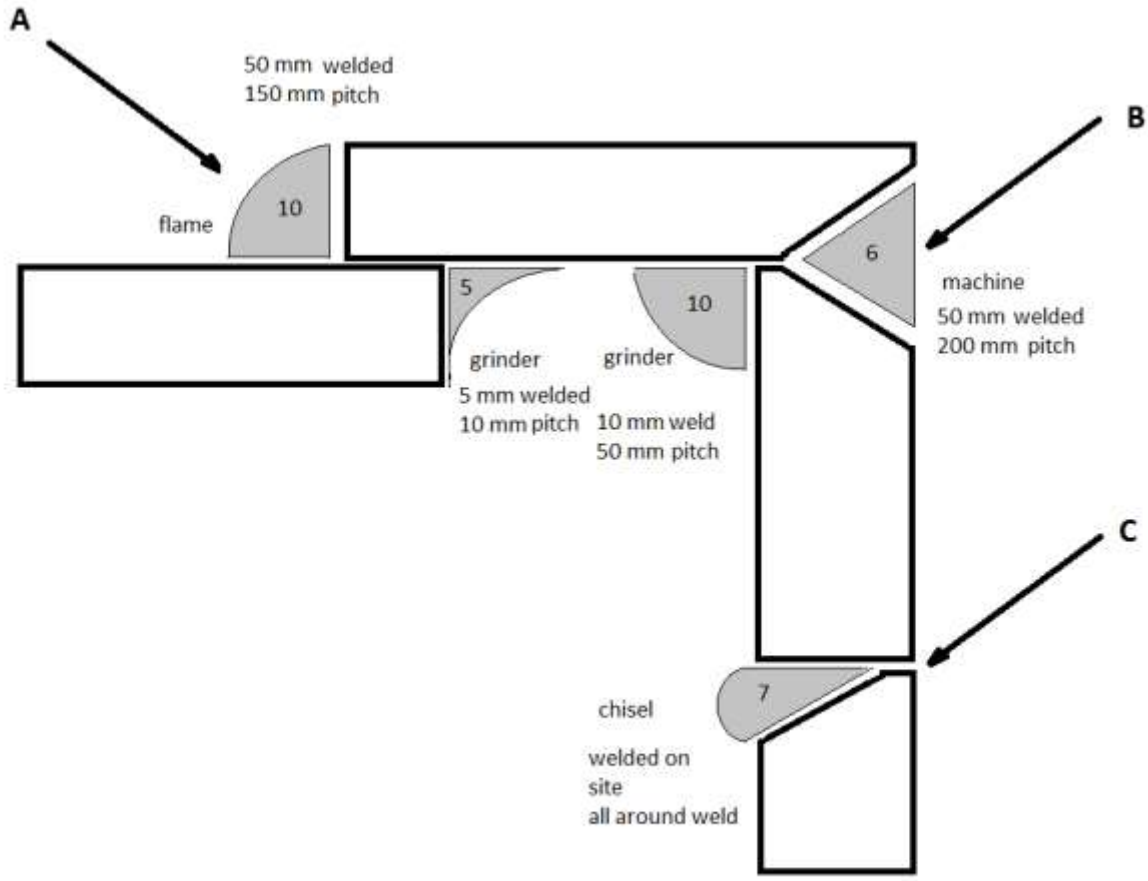
1. Draw how the following butt welds must be welded:



g. 18-19 Butt joints

Lesson 15- Welding symbols

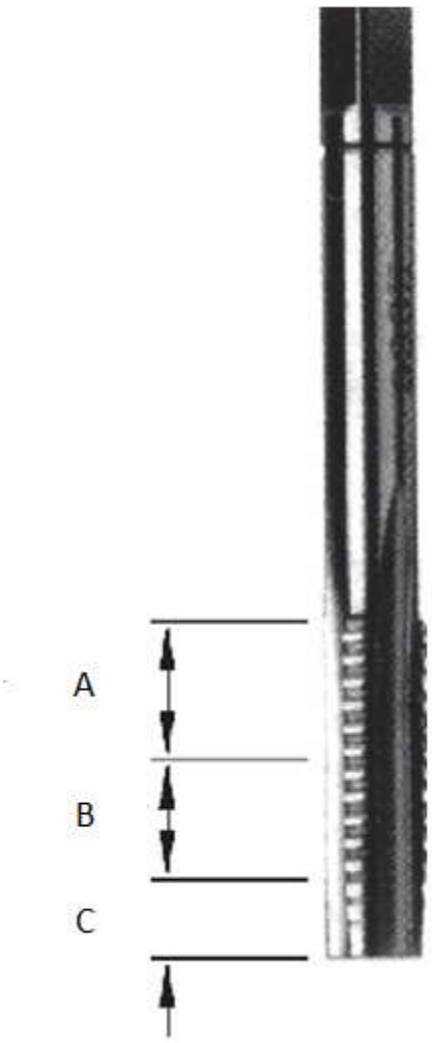
1. Write welding symbols for the following welding artefact.



2. Draw a neat orthographic top view of the artefact that indicates where the artefact must be welded. The length of the plates that must be welded is 400 mm. All the dimensions must be shown. Number the welds i.e. A1, B1 etc.

Lesson 16- Tools-Taps and Dies

1. Identify A-C?



2. Where do you usually use the bottoming taps?
3. Discuss the precautions then using taps and dies?

Lesson 17- Tools- Grinding machines

1. What should be checked before a grinder is used?
2. What type of blades can be used on an angle grinder?
3. How should a pedestal grinding stone be checked for cracks?
4. What is a surface grinder?

Lesson 18- Tools- Cutting machines

1. List five different cutting methods for cutting steel?
2. What are the basic principles for cutting machines?

Lesson 19- Tools- Guillotine

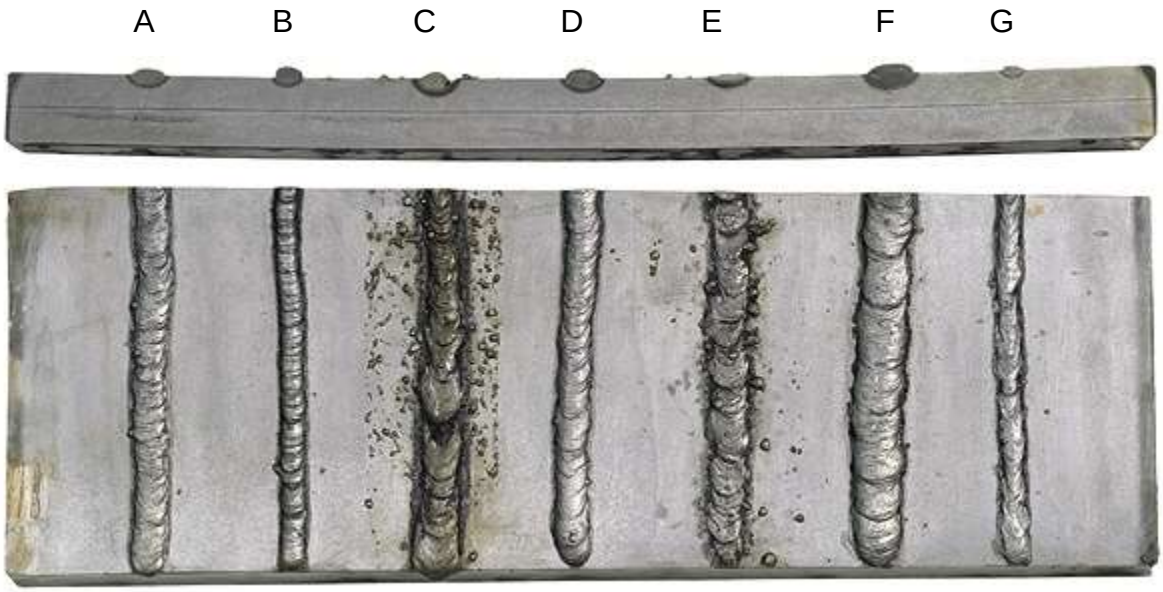
1. Describe the working principle of a guillotine?
2. Name two factors to produce a clean cutting edge?
3. How much should the blade clearance be increased for every 1mm increase in metal thickness?

Lesson 20- Tools- Press machines

1. Watch the clip. “Hydraulic press doing fabrication for Stainless steel pot, sink forming process”
2. Discuss the safety issues observed in the clip.
3. Is the safety adequate?
4. How can the operation be improved?

Lesson 21- Tools- Joining equipment machines

1. Name 3 advantages of shielded metal arc welding (SMAW)?
2. Name 3 limitations of SMAW?
3. Describe the process of SMAW?
4. What is a duty cycle?
5. Discuss the following welds



Lesson 22- Tools- Resistance Welding

1. Describe the process of resistance welding?
2. Name 3 different tip configurations?
3. Name 3 advantages of resistance welding?
4. Name 3 different types of resistance welding?

Lesson 23- Tools- Gas Welding

1. Discuss how to assemble the equipment?

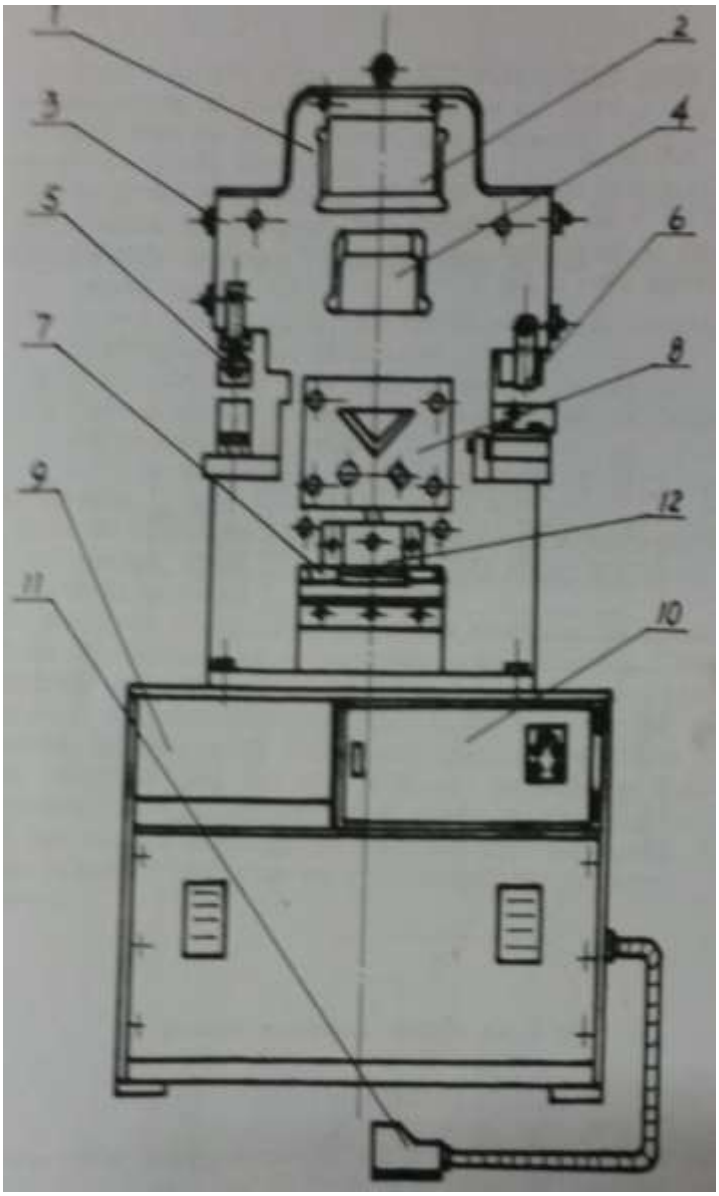
2. Discuss the shutting down process?

Lesson 24- Tools- Rolling machine

1. Describe the working principle of the slip roll?
2. How do you get rid of the flat spot on the work piece?
3. How do you get your work piece out of the machine?

Lesson 25- Tools- Cropper

1. Identify the parts of the machine.



Lesson 26- Tools- Plasma cutting

Question 1: Which metals will plasma cut?

A) Mild steel
B) Stainless
C) Aluminium
D) All of the above

Question 2: What is Plasma?

A) Gas is heated to a point where it is capable of conducting electricity
B) Electric shock cutting
C) Using the welding arc for cutting steels
D) Electric oxy-fuel cutting

Question 3: Which of the following is NOT an advantage of Plasma cutting

A) Cuts any conductive material
B) Easy to use
C) No preheat
D) Noise and fumes

Question 4: Which is not a commonly used Plasma application

A) Steel less than 25 mm
B) Aluminium
C) Stainless
D) Materials greater than 35 mm

Question 5: Nitrogen is a suitable gas for Plasma cutting. (Circle the most appropriate answer)

True

False

Question 6: Which of the following is NOT a plasma cutting consumable?

A) Electrode
B) Nozzle
C) Drag Cup
D) Contact tip

Question 7: Is gouging possible with plasma?

Yes

No

Lesson 27- Tools- Cutting off machine

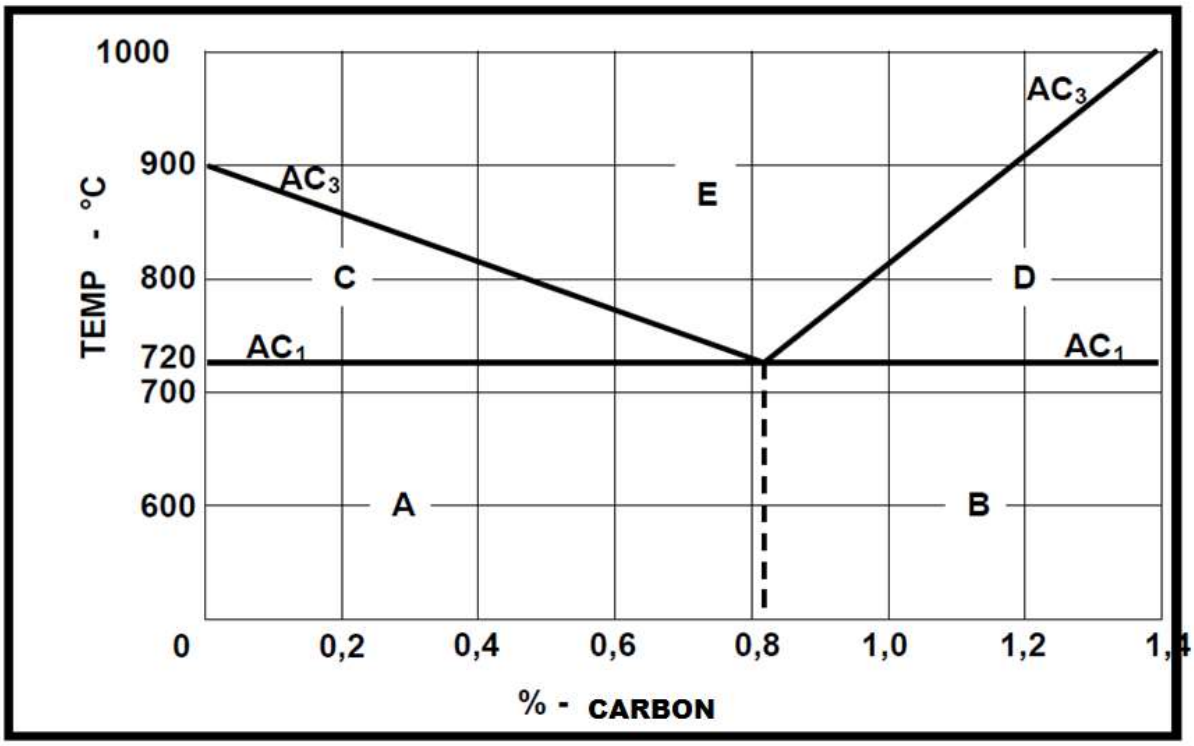
1. Discuss the working principle of the cut off machine?
2. Discuss the advantages and disadvantages of the machine?

Lesson 28 - Heat treatment

1. List the three key elements of the heat treatment process?
2. Name the different methods of heat treatment?
3. Name the different quenching methods?
4. Explain the tempering process.?

Lesson 29 - Iron Carbon Equilibrium Diagram

The graph below depicts the Carbon Iron Equilibrium diagram. Answer the questions below:



1. Identify sections A – E
2. What happens at line AC1?

Lesson 30- materials

1. Name 3 materials used in steel production?
2. Describe the steel production process in the blast furnace?
3. Draw and describe a flow line for the whole steel production process?

Lesson 31- Properties of material

1. Describe **Toughness** in metal**.**
2. Describe **Elasticity** in metal.
3. Describe **Malleability** in metal.

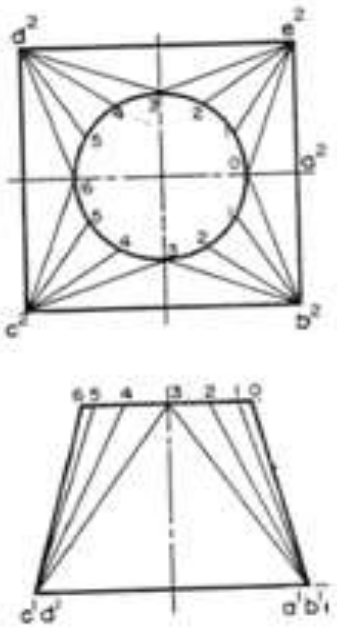
Lesson 32- Developments

DEVELOPMENT

PROJECTION

TRIANGULATION

The figure show a front and sideview of a round to square transition. Develop the transition



square = 60mmx60mm

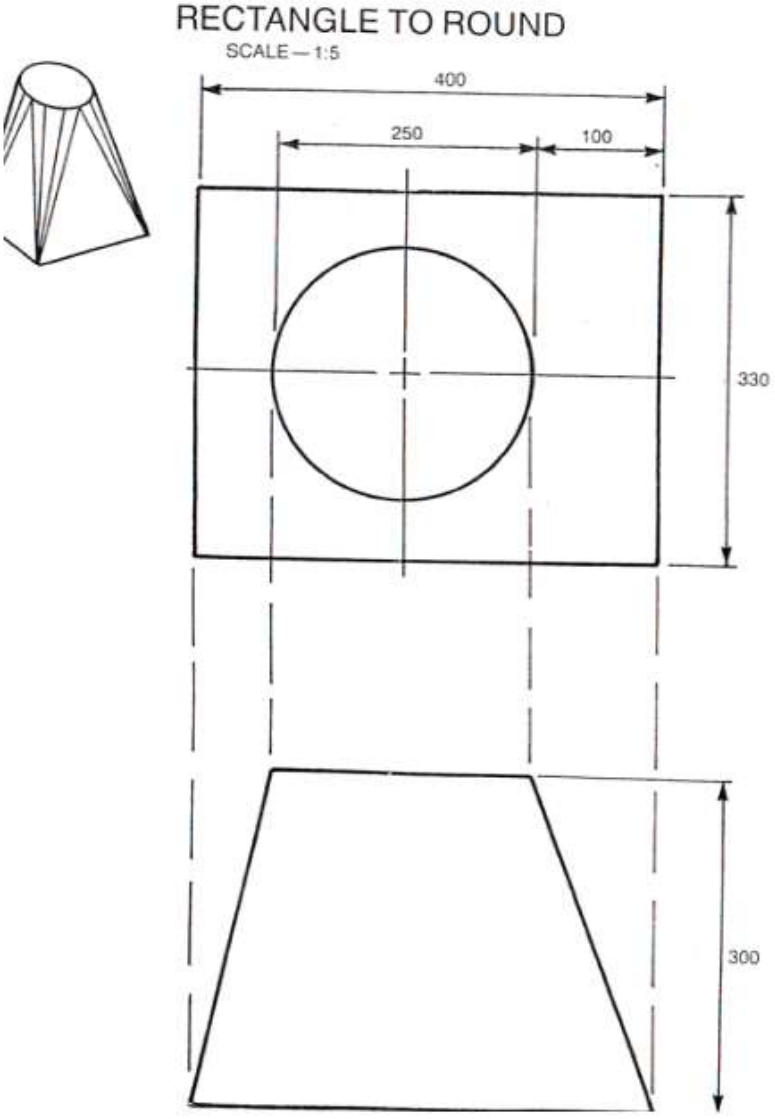
Circle = diameter 40mm

Height of transformer/ transition= 60mm (perpendicular height)

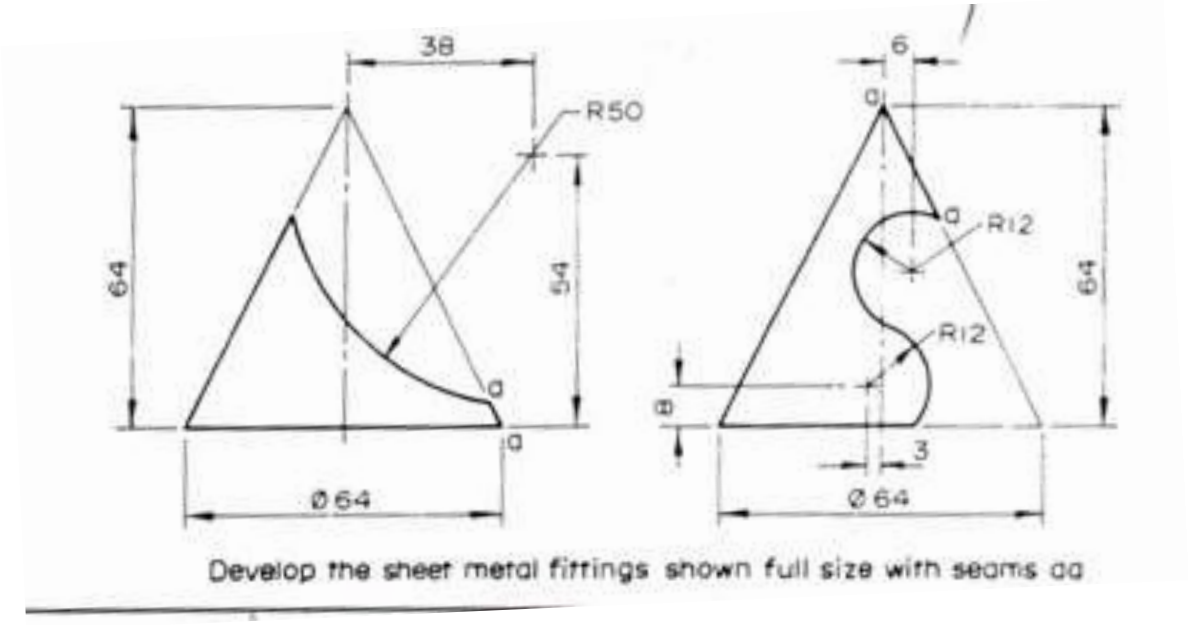
Lesson 33- Developments

Developments- TRANSITIONS Rectangle to round

The figure show a rectange to round transition. Develop the tranition to a scale of

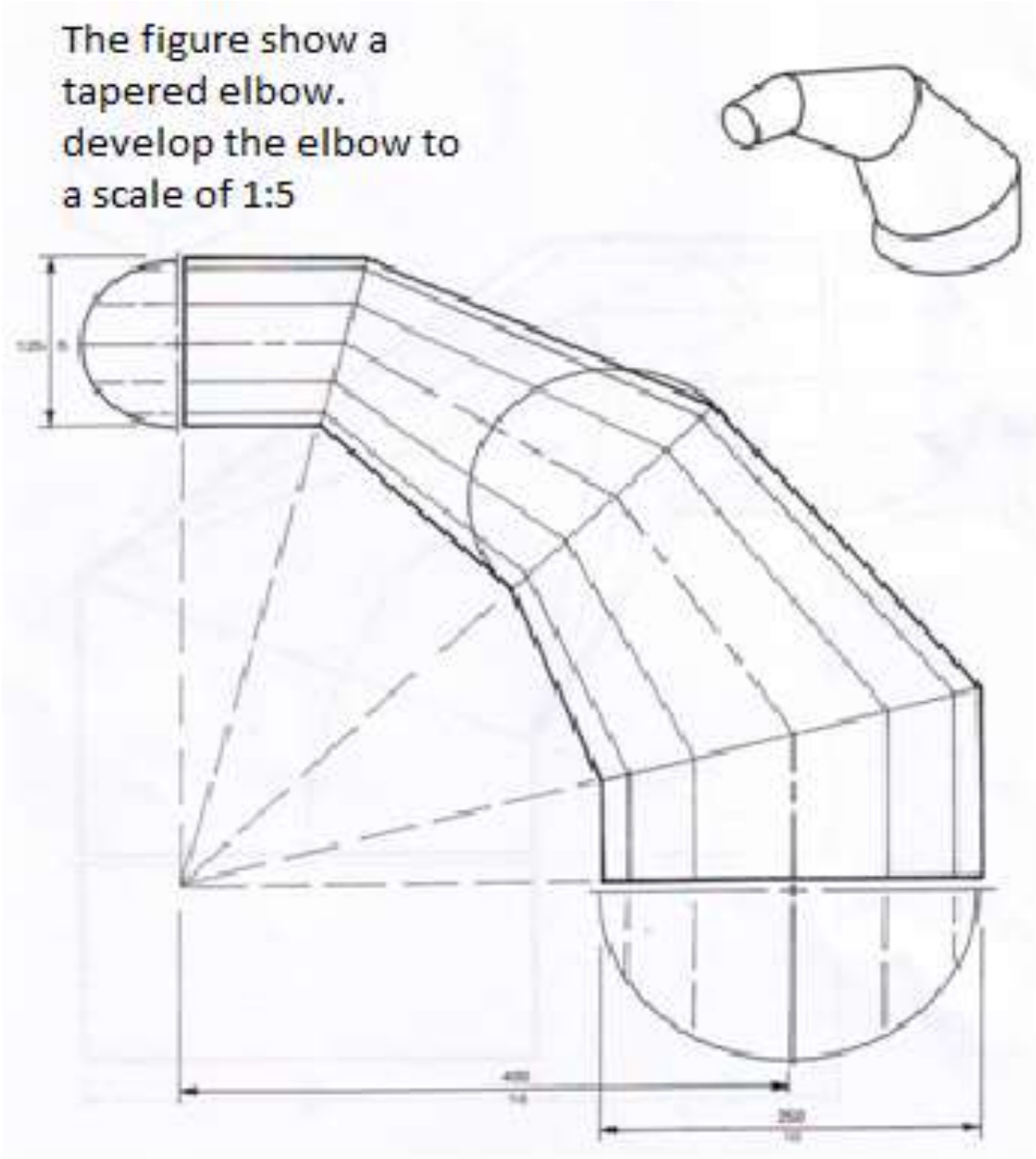


Lesson 34- Developments- cones



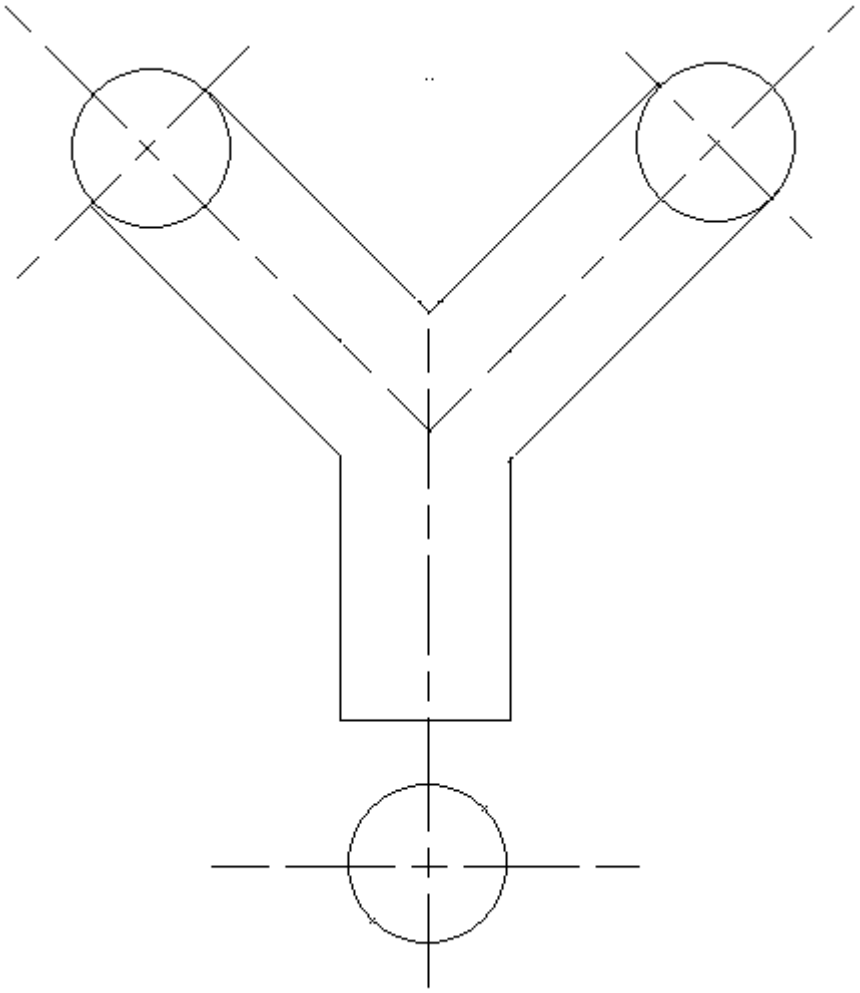
Develop the sheet metal fittings shown full size with seams aa

Lesson 35- Developments- Oblique cones



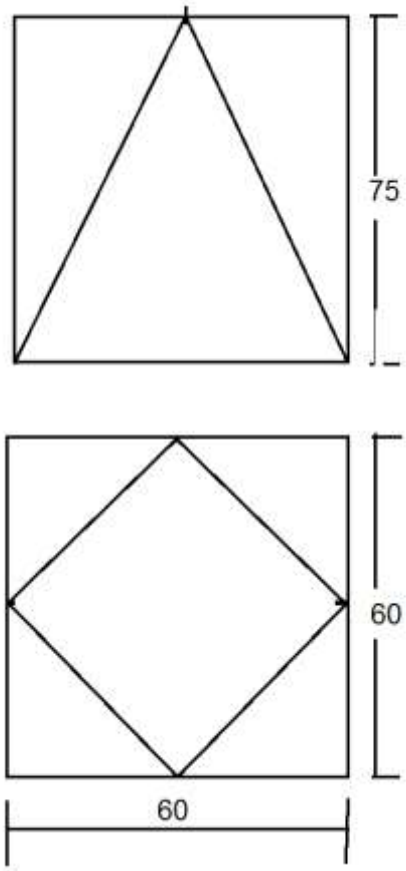
Lesson 36- Developments- Cylindrical Y - connection

1. Figure 1 shows a cylindrical Y – connection of pipe with a diameter of 43mm. Copy the connection and draw the development.



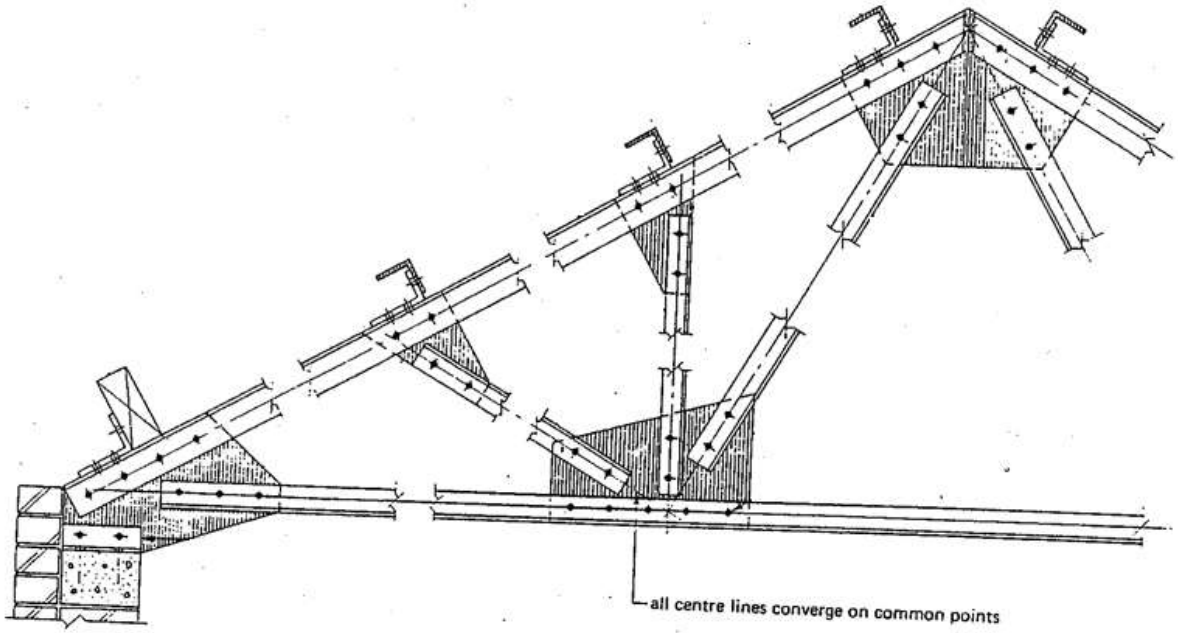
Lesson 37- Developments- Transitions- Square to Square

1. Draw a square to square transition.



Lesson 38- Angle Steel Sections

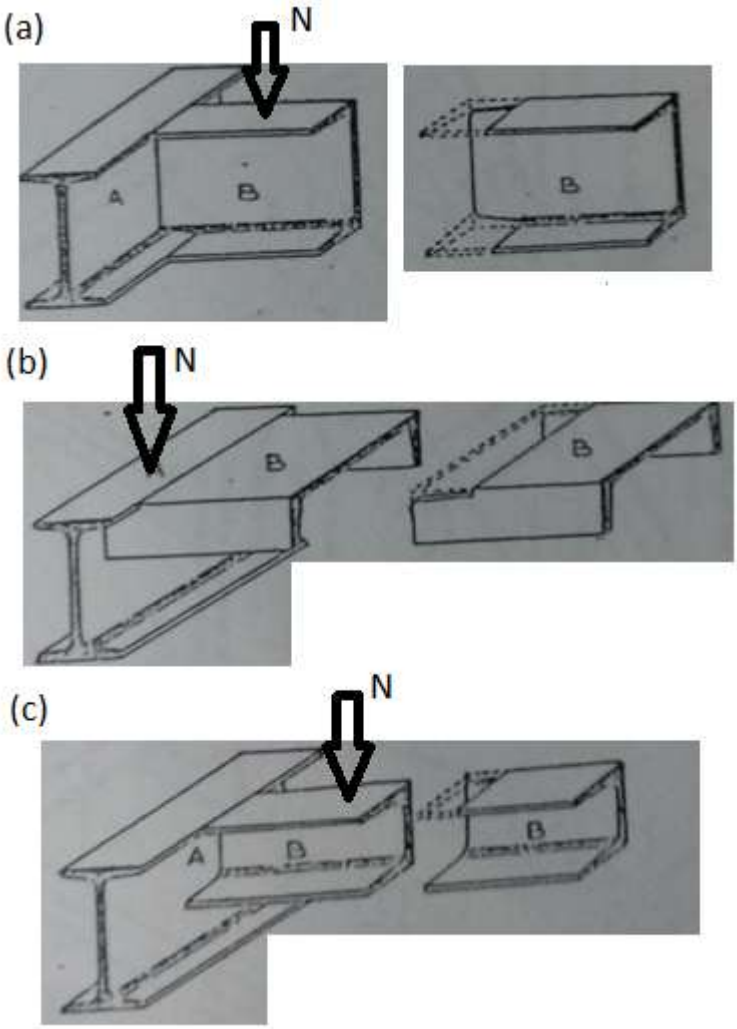
1. The following roof truss is being made out of angle iron. Identify the section of the truss and indicate the size of the angle you would use.



Typical medium span mild steel roof truss

Lesson 39- Channel Sections

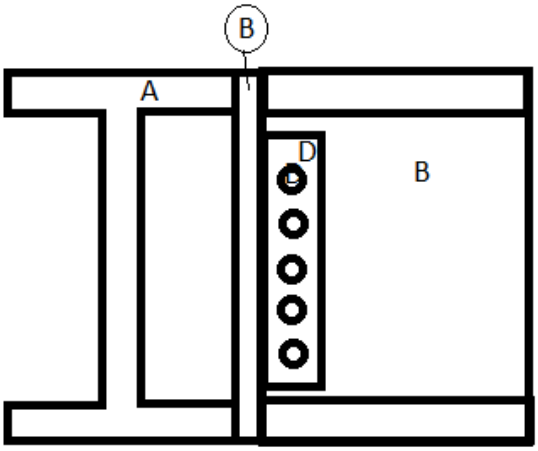
1. Figures a-c show connections with a force being applied at different points. Identify the forces inside the beam by indicating it with arrows.



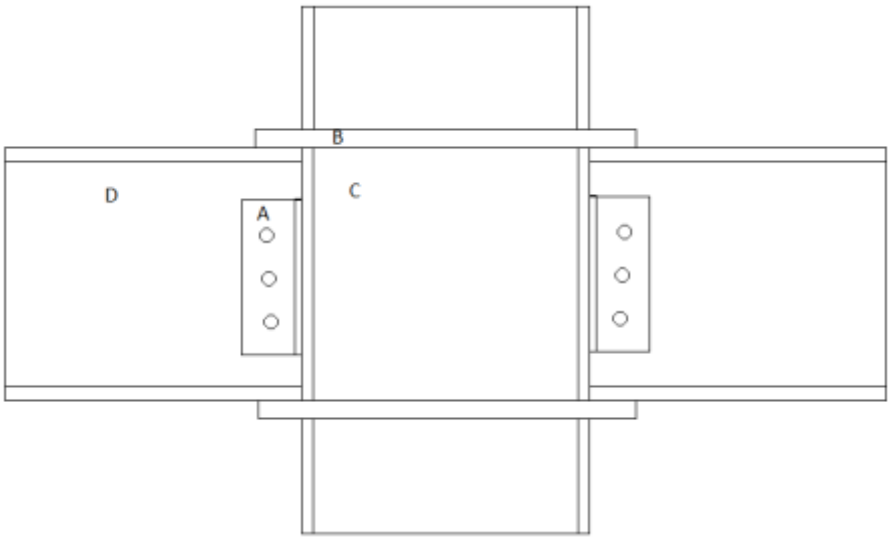
Lesson 40- Beam Connections

1. Identify the connection and indicate the material profile and size for A - D?

   1.1



   1.2



Lesson 41- Uses of profiles

1. Identify metal structures at school.
2. Take worksheet and identify all the metal profiles used.
3. Discuss why the profiles were used in the structure.
4. Identify where a profile was used incorrectly
5. Where could another profile have been used to minimize the weight of the structure without compromising on the strength of the structure?

Lesson 42- Joining of Sections

1. Identify 5 types of joints obtained in any profile?
2. Name one permanent joining method?