

Do Not Draw In These Booklets

AUCHINLECK ACADEMY



METALWORK HOMEWORK BOOKLET

Homework 1

Practical Metalwork

1. (i) Explain what is meant by the term '*density*'.
(ii) Give **two** examples of a dense material.

2. (i) Explain what is meant by the term '*fusibility*'.
(ii) Give **two** examples of easily fused materials.

3. Give **two** examples of materials that are good *heat insulators*.

4. If a person wished to make a switch contact that will conduct electricity well, which materials might be appropriate? Give **two** examples.

5. Explain what is meant by an '*elastic*' material.

6. Explain the difference between *elasticity* and *plasticity*.

7. *With the aid of a diagram*, explain the following terms:
 - a.) Tensile strength

 - b.) Shear strength

 - c.) Torsional strength

7. Which mechanical property allows a material to be stretched until it becomes a long thin wire or fibre?

8. Explain what it meant by a '*tough*' material.

9. Which type of materials are the opposite of tough?

Homework 2

Practical Metalwork

1. Explain what is meant by the term *alloy*.
2. Explain **one** benefit of creating an alloy.
3. Explain the difference between ferrous and non-ferrous metals.
4. Explain what is meant by the term *ductile*.
5. State the name of the tool which could be used to secure a piece of **sheet metal** whilst drilling.
6. List **three** safety checks which should be carried out *on the pillar drill* prior to switching it on.
7. (i) State the names of the tools shown below:
(ii) Describe what they are used for.

(i)



(ii)



(iii)

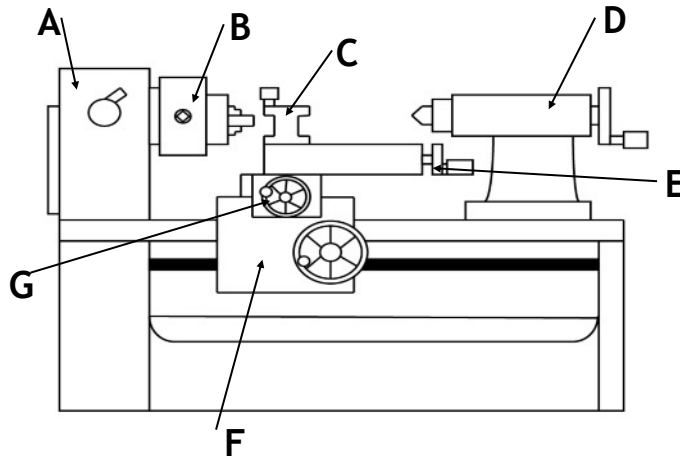


(iv)

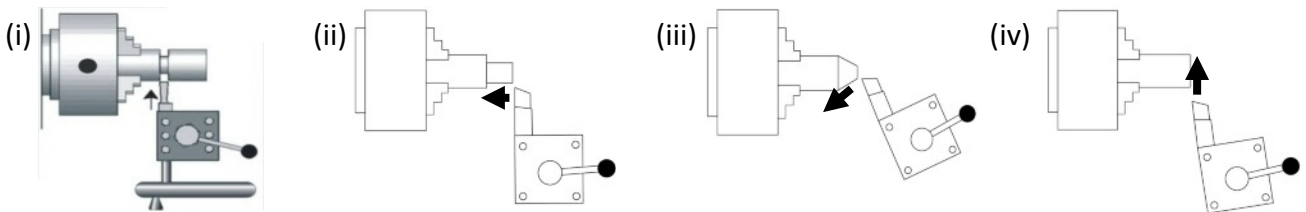


8. Explain with the use of a diagram, what the term *bending strength* means.
9. Describe the four main stages in *plastic dip coating*.

1. State the **name of the machine** shown below.



2. State the names of the parts of the lathe labelled A-G.
3. State the name of the **chuck** used to secure the drill bit in part D.
4. State **three** checks that should be made to the machine shown above **before switching it on**.
5. State **two** factors which affect the speed of the machine above.
6. State the name of the processes shown:



7. State what adjustment should be made to the machine prior to *knurling*.
8. A hole has to be drilled in the end of a piece of round bar. Explain the reason for using a *centre drill* before using the twist drill bit.
9. State the names of **two** tools which can be used to check the diameter of a piece of round bar.

Homework 4

Practical Metalwork

- (i) State the names of the tools shown below.
(ii) Explain what type of threading they are used for.



- Explain why the external thread must be cut after the internal thread.
- State **two** procedures which would ensure a high quality thread is cut.
- The thread was found to be a tight fit. Explain what adjustments could be made to fix this.
- Explain what is meant by the term *toughness*.
- Explain with the use of a diagram, what the term *tensile strength* means.
- Describe **two** procedures which should be carried out prior to painting.
- Explain what is meant by the term *malleable*.
- List **three** safety checks which should be carried out *on the pillar drill* prior to switching it on.
- (i) State the names of the tools shown below.
(ii) Explain what they are used for.

a.)



b.)



c.)



d.)



e.)



f.)



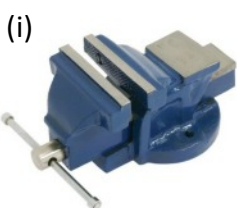
Homework 5

Practical Metalwork

1. State the name of the tool which could be used to secure a piece of **round bar** whilst drilling.
2. Explain what is meant by the term *fusibility*.
3. Explain what is meant by the term *hardness*.
4. Explain with the use of a diagram, what the term *compressive strength* means.
5. Explain two reasons why paint may be selected as a finish.
6. Explain two reasons why *lacquer* may be chosen as a finish.
7. Explain what is meant by the term *alloy*.
8. Describe the process of *anodising*.
9. Describe **three** safety checks that should be made *to the centre lathe* before switching it on.
10. a.) State the name of the tool shown below.
b.) State which part of the centre lathe this tool would be held in.
c.) Explain what this tool is used for.



11. State the names of the tools shown below and state what they are used for.



Homework 6

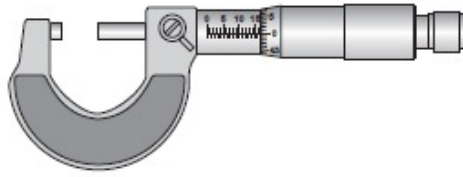
Practical Metalwork

1. Describe the process of *oil blacking*.
2. Describe the process of *electroplating*.
3. Describe the four main stages in *plastic dip coating*.
4. Explain with the use of a diagram, what the term *shear strength* means.
5. Explain with the use of a diagram, what the term *compressive strength* means.
6. Explain what is meant by the term *hardness*.
7. Explain what is meant by the term *brittleness*.
8.
 - (i) Explain what annealing means..
 - (ii) Describe the process of annealing aluminium.
9. Explain why copper is a suitable choice for pots and pans. (Reference the properties of copper in your answer.)
10. State the name of two tools which could be used to secure a piece of **sheet metal** whilst drilling.
11.
 - (i) Explain what is meant by the term *durability*.
 - (ii) Give **one** example of a durable metal.
12. Explain with the use of a diagram, what the term *torsional strength* means.
13. Explain what is meant by the term 'ferrous' when referring to metal.
14.
 - (i) Describe **two advantages** of CNC machining to a company.
 - (ii) Describe **two disadvantages** of CNC machining to a company.

Homework 7

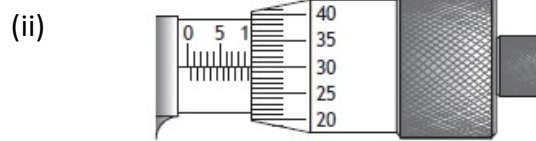
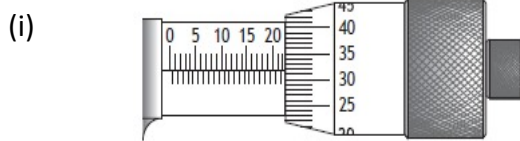
Practical Metalwork

1. (a.) (i) State the name of the tool shown below:

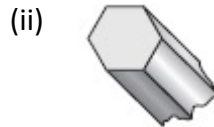
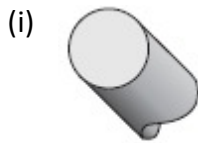


- (ii) State **one advantage** of this tool *over outside calipers*.

- (b.) State the readings.



2. Name each of the two common sections shown below.



3. State **three personal safety** precautions that should be observed when welding.
4. Describe the process of spot welding. (You may use sketches to illustrate your answer).
5. State **two** properties of aluminium which make it suitable for the manufacture of drinks cans.
6. Explain the purpose of a 'safe edge' on a flat file. Explain when this would be useful.
7. (a) State the name of the tool shown below:
(b) Describe the *four stages* to use this tool in the riveting process.

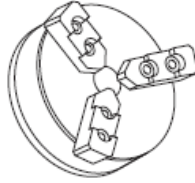


8. Explain why a hide mallet is used instead of a ball pein hammer when forming sheet metal.
9. Give **two advantages** of laser cutting when mass producing a metal part.

Homework 8

Practical Metalwork

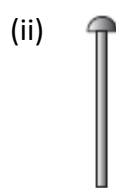
1. A piece of hexagonal bar is used for the handle of a screwdriver.
- (i) State the name of the type of chuck (shown below) used to hold the hexagonal bar on the centre lathe.



- (ii) State the feature of this chuck which makes it a suitable choice for holding the handle.
2. (a.) State the name of the lathe tool shown below.



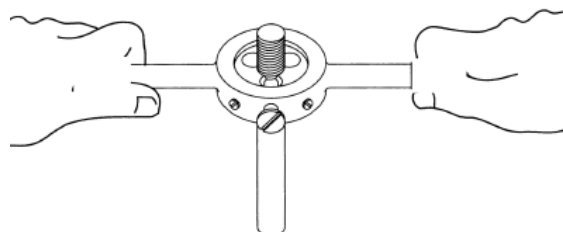
- (b.) Explain why this may be used when turning a long bar on the centre lathe.
3. State the names of the types of rivet shown below.



4. To enable carbon steel to be used for the wide variety of tools, it must first be hardened, then tempered. Explain how carbon steel is:
- (i) Hardened
- (ii) Tempered

5. (a.) Explain what is meant by the term 'alloy'.
- (b.) Explain why metals are often 'alloyed'.

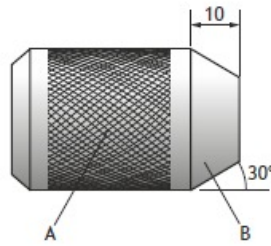
6. Describe **two procedures** to ensure a high quality thread is produced on the end of the bar.



Homework 9

Practical Metalwork

1.

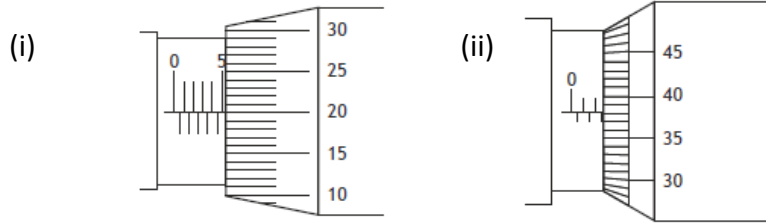


- (a) Name the *turning process* shown at A.
 - (b) State an adjustment that should be made to the centre lathe before carrying out process A.
 - (c) Name the turning process shown at B.
 - (d) State the name of the *slide* on the centre lathe that would be used to carry out process B.
 - (e) State the name of a tool that could be used to check the diameter of the bar.
 - (f) A hole is to be drilled in the end of the bar. State the name of the drill bit that should be used prior to the twist drill bit.
 - (g) The hole is to be drilled to a depth of 15mm. Explain, with reference to the parts of the lathe, how this would be achieved accurately.
- 2.
- (a) Explain the purpose of *annealing* metal.
 - (b) Describe the process of annealing *aluminium*.
3. A spacer for a shelving unit is to be made from brass, which is an alloy.
- (a) Explain what is meant by the term '*alloy*'.
 - (b) State **one** reason for alloying metal.
 - (c) State the name of a type of finish that would allow the colour of the brass to show through.
 - (d) State **two** reasons for applying a finish to metal.
- 4.
- (a) Explain why it is important to create a '*safety edge*' when manufacturing items in sheet metal.
 - (b) Briefly explain how a safety edge is created.
 - (c) Explain why a hide mallet is used to form sheet metal instead of a ball peen hammer.
- 5.
- (a)
 - (i) Describe **three advantages** of CNC machining to a manufacturing company.
 - (ii) Describe **two disadvantages** of CNC machine to a manufacturing company.
 - (b) Describe **one disadvantage** of CNC machine to the manufacturing *industry as a whole*.
6. State **two properties** of high speed steel which make it an appropriate choice for manufacturing lathe tools, drill bits and chisels.

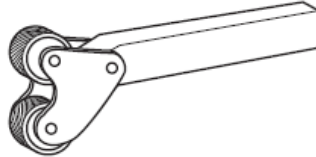
Homework 10

Practical Metalwork

1. State the micrometer readings shown below:



2. (a) State the name of the tool shown below.



- (b) State the name of the process this tool is used for.
(c) State a **functional** reason for carrying out this process on metal.

3. Explain what is meant by the term *hardness*.

4. Explain what is meant by the term *brittleness*.

5. Explain with the use of a diagram, what the term *shear strength* means.

6. (a) Describe the process of *oil blacking*.
(b) State **two** reasons for adding a finish to metal.

7. (a) State the name of the saw shown below.
(b) Describe how the blade can be changed on this saw. (You may use sketches to illustrate your answer).



8. (a) Explain the term '*blind hole*'.
(b) A tap can easily be broken when threading a blind hole. Describe a method of preventing this from happening.

9. State the name of the tool shown below and explain what it is used for.

