**METALWORK 445/1 BUNAMFAN MOCK DEC. 2021 SCHEME**

1(a) methods of applying paint

* ***By use of painting brushes***
* ***By dip painting***

***b)Reasons for painting***

* ***To prevent rust***
* ***To decorate***  1×2=2marks

2 (a) uses of drift in forging

* ***Opening up a punched hole***
* ***Enlarging holes in forging*** 1×2=2marks

( c) precautions to be observed when twisting

* ***Ensure you use a two handle wrench when twisting.***
* ***Ensure once complete twist is done in uniform heat.***
* ***Ensure the work-piece is always straight.***  1×2=2marks

3 (a) reasons for using hollow metals when making furniture.

* ***To ensure items made are light in weight***
* ***For strength and durability***  1×2=2marks

(b) safety when grinding

* ***Use the face for grinding and not the sides***
* ***Always wear safety goggles***
* ***Ensure the gap between tool rest and grinding wheel is as small as possible***
* ***Ensure the wheel is even and balance***
* ***Avoid loose clothing 1×2=2marks***
* ***Switch off the machine and the power supply after use***

4( a) specifications of twist drill

* ***Shank diameter***
* ***Length of the shank***
* ***Material of the rivet***
* ***Shape of the head***  1×4=4mrks

(b) factors to consider when selecting a spelter

* ***The material to be joined***
* ***The thickness of the material to be joined***
* ***The position of the joint***  1×3=3mrks

5 (a) methods of holding a work piece in a lathe

* ***By use of a 3 jaw chuck***
* ***By use of 4 jaw chuck***
* ***By use of face plate***
* ***By use of face plate and dog***  1×4=4mrks

(b) reasons for knurling

* ***To enhance grip***
* ***to decorate the article***  1×2=2marks

6 (a) sources information related to career

* ***News letters***
* ***Career booklets***
* ***Career subjects***  1/2×4=2mrks

(b) types of inventories

* ***Permanent inventories -used for recording equipment tools and machines that are permanent***
* ***Expendable inventories- used for recording items that wear out with time***
* ***Consumable inventories- used for recordin***g materials that are to be used 1×3=3mrks

( c ) reasons for carrying out annealing

* ***To relief stress and strain caused by work hardening***
* ***To soften metal that has been hardened by working*** on it 1×2=2marks

(d) procedure of annealing

* ***Heat the metal to temperatures above critical temperate, then let it cool slowly in a closed furnace***  1×1=1mrk

7 (a) forging tools

* ***Leg vice- used for holding hot work piece***
* ***Anvil -provide a platform for hammering***
* ***Hot set- used for cutting and necking metals***
* ***Flatters- used for finishing work piece to flatness***
* ***Fullers -used for finishing round work piece***
* ***Swage block -used for forming various shaped***  1×3=3mrks

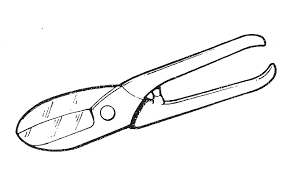
(b) state two disadvantages of cooling a brazed joint rapidly

* ***The joint may develop cracks***
* ***It makes the joint brittle***
* ***Makes the joint weak***
* ***Causes scaling of the joint***  1×2=2marks

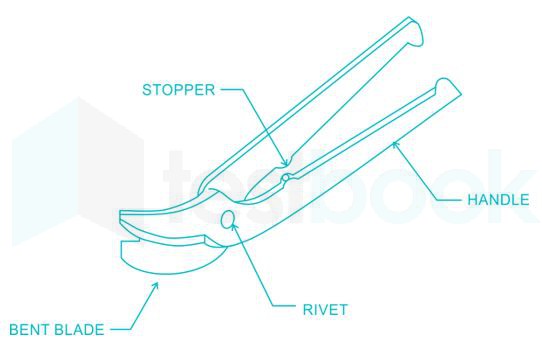
8 (a) state two advantages of forging over machining

* ***Forms strong items***
* ***Grain structures are not cut or removed***  1×2=2marks

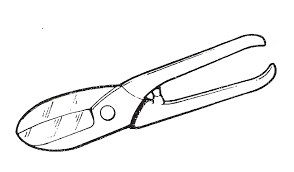
1. types of tin snips



***Straight tin snips***



***Curved tin snips***

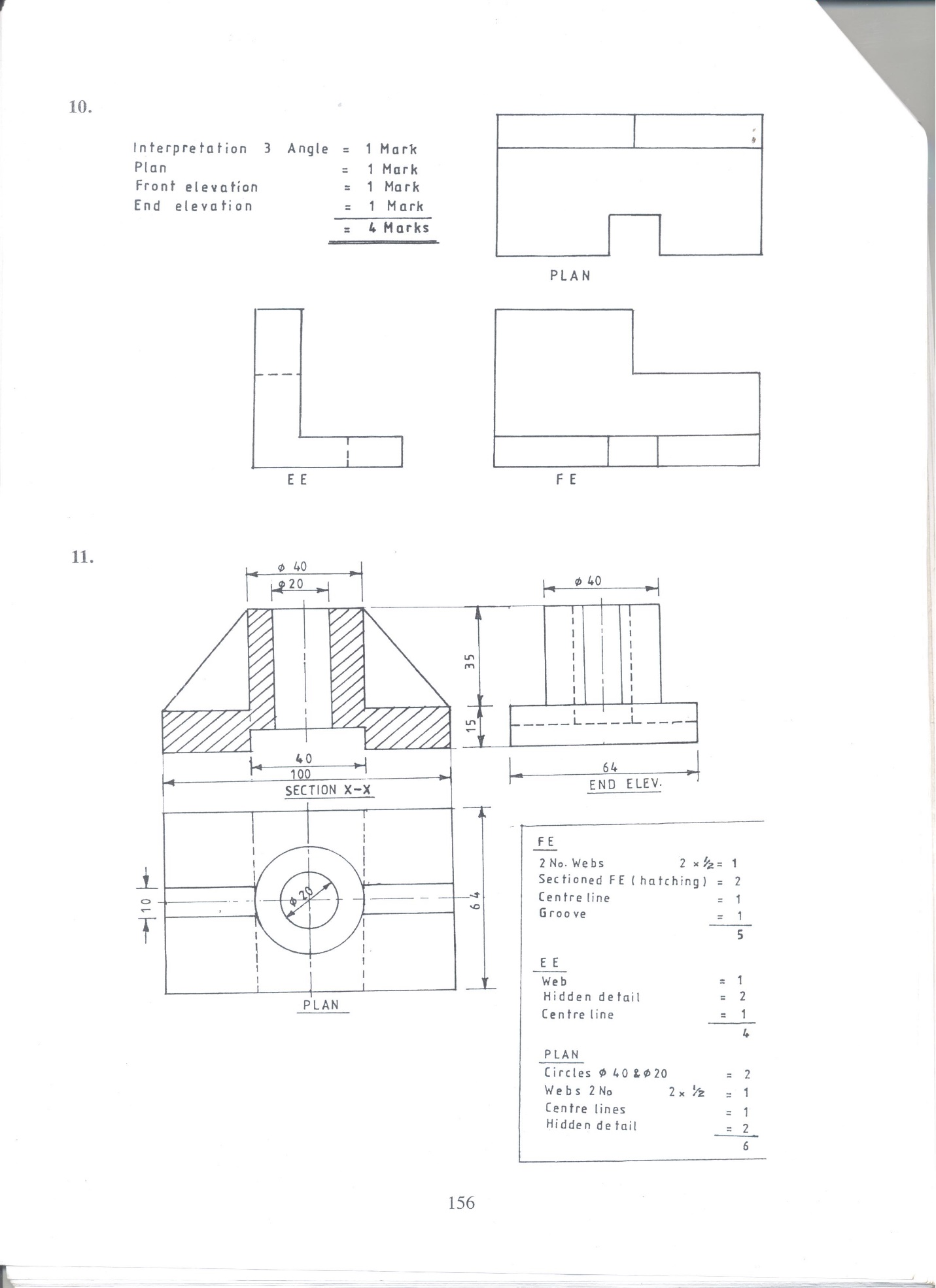


***Universal tin snips***

1×3= 3mrks

1. disgusting gross-pay and net-pay

* ***Gross pay -this is the amount of money paid before deductions are made 1×2=2marks***
* ***Net pay -payment received after deductions 1×2=2marks***



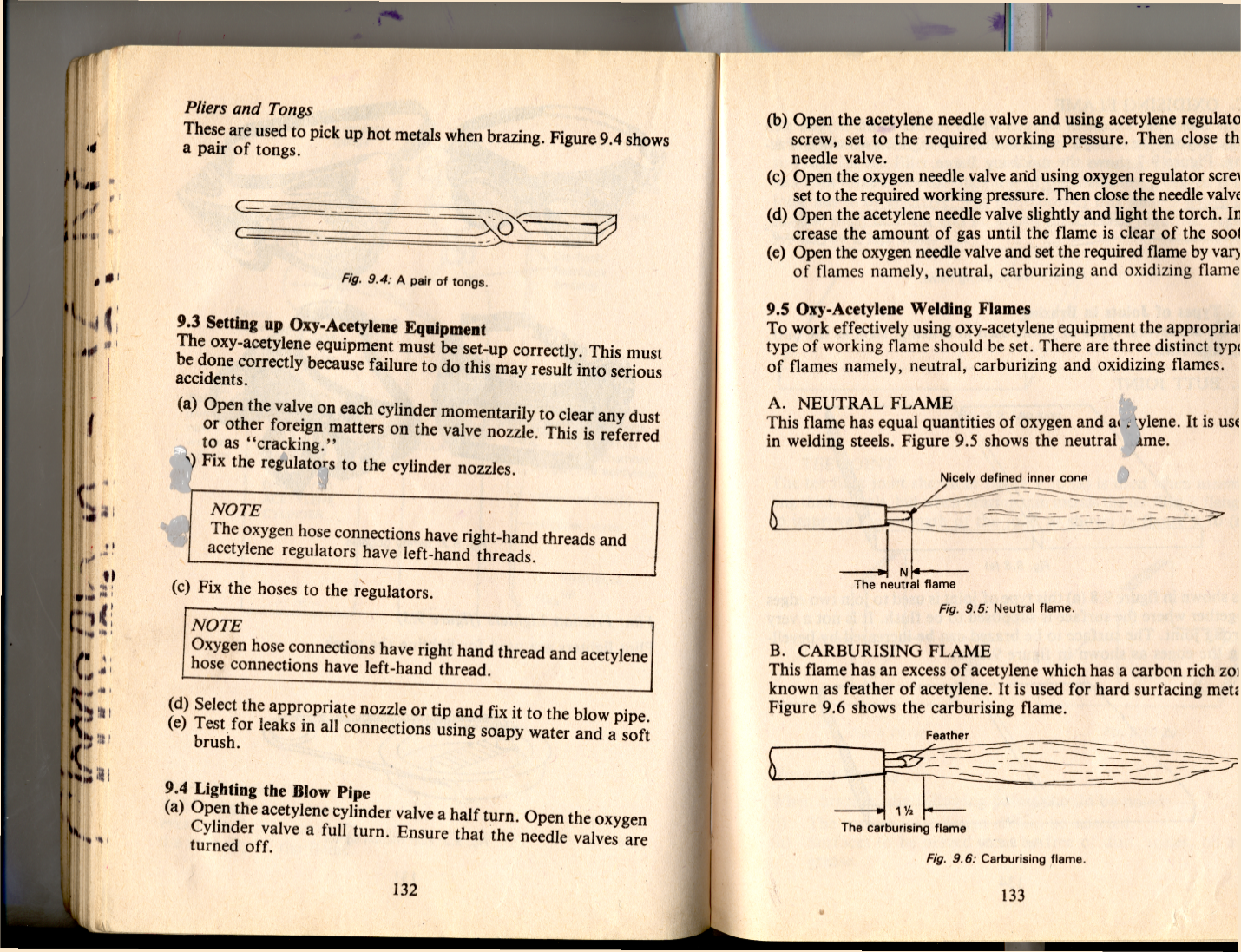
12a) Name three methods of testing the quality of gas welded joints. [1 ½ marks]

Visual inspection -Bending

Penetrate fluid -Tensile

Application of load. -Impact

b)Sketch the correct flame for welding brass and outline the procedure of setting the flame. [5 ½ marks]



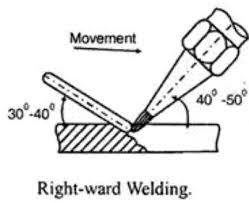
-Open the acetylene cylinder valve half turn and oxygen valve a full turn.

-Open acetylene needle valve,set to the working pressure and close the needle valve.Open oxygen needle valve,set to the working pressure and close the needle valve.

-Open acetylene needle valve slightly and light the torch.Increase the volume of gas until the flame is clear of soot.

-Open the oxygen needle valve and set a neutral flame.

c) Use a labeled sketch to show an appropriate technique for gas welding thick plates and give three reasons for using the technique. [8marks]



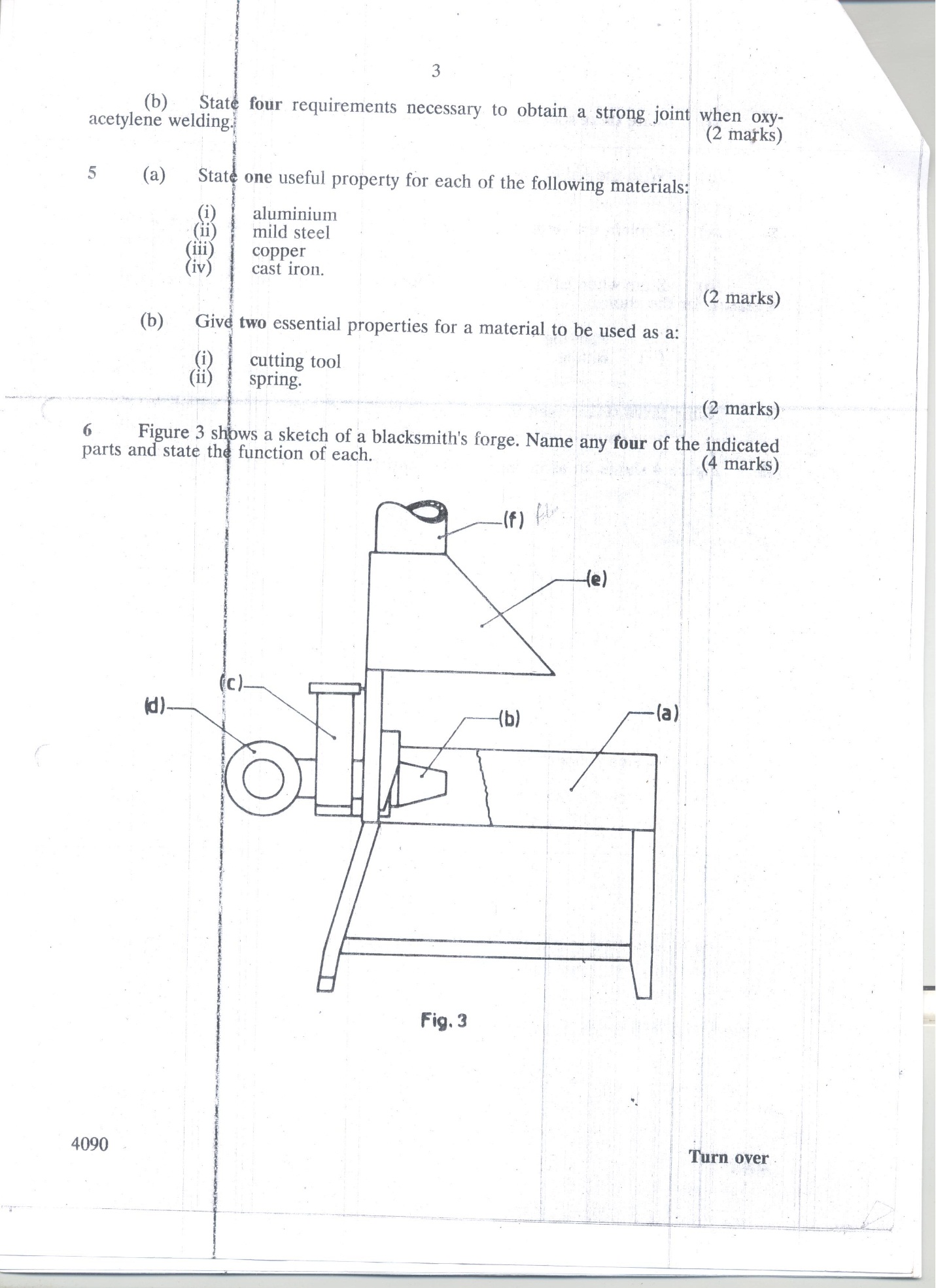
-It is faster than the leftward

-Less gas is used

-The cooling rate is lower so the weld is more ductile

-No bevel is required for steels upto8.0mm.

13a)The figure below shows a very important equipment used in forgework.



(i)Give the name of the equipment. [ 1 mark]

**Forge**

(ii)Name parts labeled ***c, e*** and ***f.*** [1 ½ marks]

**c-Water bosh**

**e-Hood**

**f--Flue**

(iii)State the uses of parts ***a,b*** and ***d.*** [1 ½ marks]

a-**Hearth-For heating the workpiece**

b-**Tuyere-Protecting the blast fan**

f-**Blast fan-Blowing air for the fuel to burn.**

b)List four factors that would contribute to a poorly brazed joint. [4marks]

**-Wrong size of filler rod**

**-Not cleaning the area of the seam.**

**-Wrong type of flux**

**-Not arranging the parent metals well.**

c)State three differences between gas welding and brazing. [3marks]

**Gas welding** **Brazing**

-Filler metal same material as parent metal -Filler metal is brass

-Parent metals meld or fuse -Parent metals do not melt.

-Joint colour same as parent metal -Joint colour different from

Parent metals.

-High temperatures -Low temperatures

-Neutral flame -Oxidising flame

d)Give four safety precautions to be observed when tapping a through hole. [4marks]

**-The taps should not be given undue pressure.**

**-Lubricate the taps when in use.**

**-Use the correct size of tap wrench.**

**-Do not subject the taps to high temperatures.**

14a)Using sketches explain the following terms as applied in limits and fits. [4marks]

i)Nominal size

**Is the actual or exact size.Size before tolerance is included**.

ii) Tolerance

**Is the difference between the upper limit and the lower limit**.

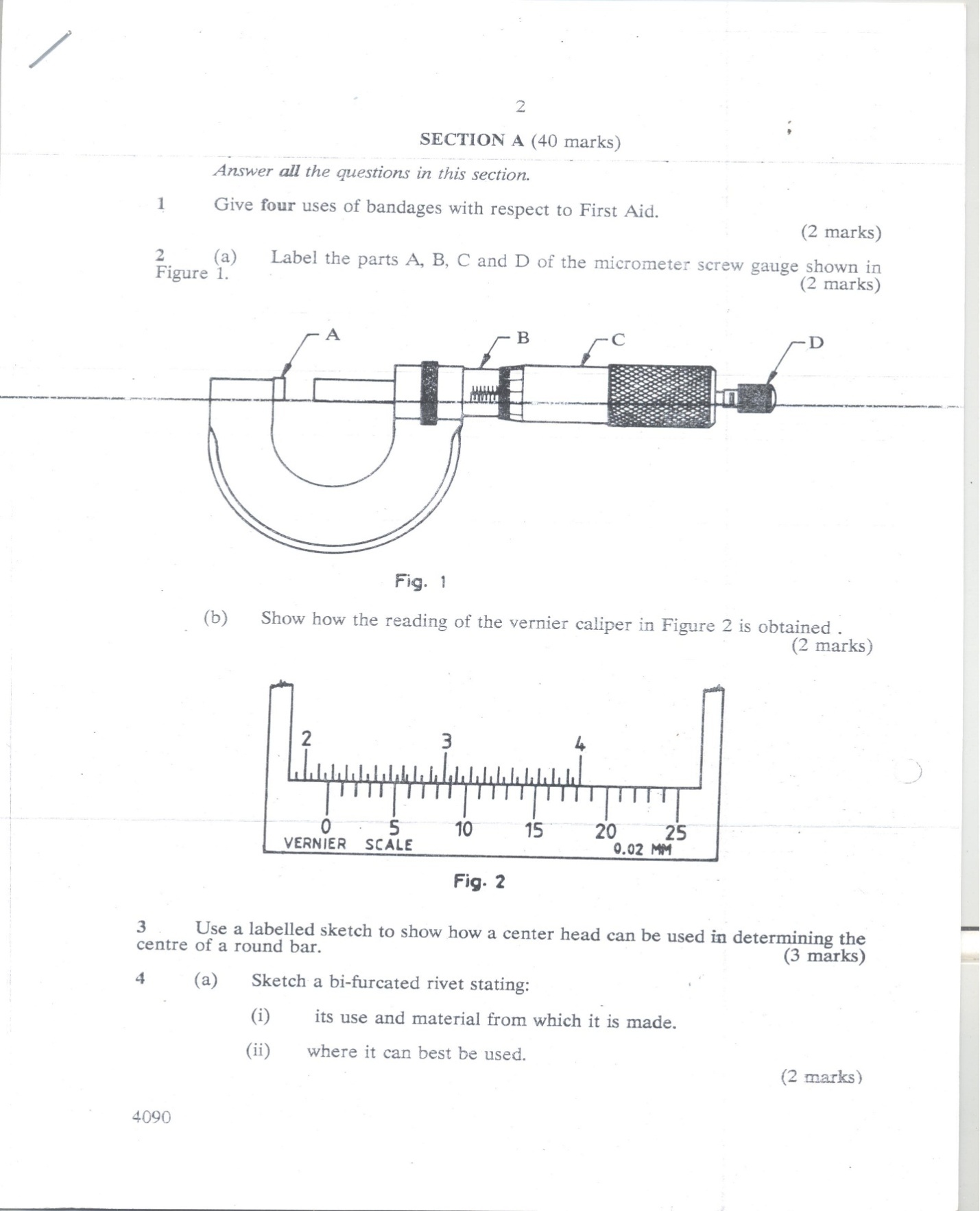
iii) Allowance

Is the difference between the low limit of hole and the upper limit of hole.

iv)Lower limit.

Is the smallest permissible size.

b) The figure shows a precision tool used in metalwork.



i)Show how to find its accuracy. [1mark)

**0.5/50=0.01mm.**

ii)Name the parts labeled ***A,B,C*** and ***D*** and give the function of each. [4marks]

A-Anvil-Measuring face

B-Sleeve-Has measuring graduations for the main scale

C-Thimble-Carries the thimble scale

D-Ratchet-Ensures correct feel when adjusting.

c)Give two applications of each of the three types of fits. [3marks]

**Clearance-Latches,pivots,piston machines,machine tool spindles,sliding rods.**

**Interference-Wheel belts,tyres,coupling under certain conditions.**

**Transition-Electric motors in shafts,gear rims,fixed plugs,driven bushings,flushed bolts**

d)State three safety precautions to be observed when using the vernier calipers.

[3marks]

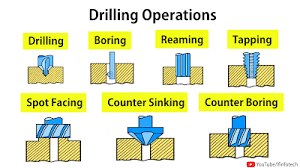
**-They should not be dropped.**

**-Always clean and close the jaws into their position and place the calipers in its case after use.**

**-They should be oiled to prevent rusting.**

**-Ensure that all the screws are in position at all times.**

15a)Illustrate five operations that can be performed on a drilling machine. [5marks]



b)State three reasons for twisting metal bars. [3marks]

**-For strength,decoration,rigidity**

c)With reference to cutting external threads:

(i)Name two types of dies used. [2marks]

**Round adjustable split die**

**-Adjustable two piece die**

**-Solid rethreading die.**

(ii)State two reasons for using cutting oil. [2marks]

**-Cooling the workpiece and the tool.**

**-Lubricating the work.**

d)An M10 internal thread is to be cut in a mild steel.Given that the thread pitch is 1.5mm,determine the size of the drill to be used. [1mark]

**10-1.5=8.5mm**

e)Give five reasons why we finish metal articles. [5marks]

**-To improve the physical appearance.**

**-To prevent rusting or tarnishing.**

**-To cover surface of a less expensive metal with a thin coat of a more expensive one.**

**-To improve the surface of an article in order to reduce or minimise wear.**

**-To improve safety by removing sharp burrs.**