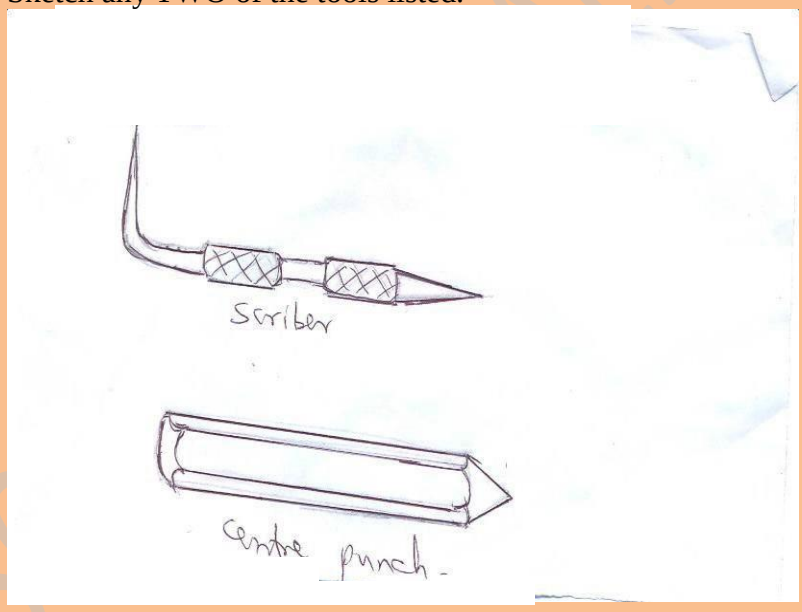
NATIONAL BUSINESS AND TECHNICAL EXAMINATIONS BOARD (NABTEB).
NATIONAL TECHNICAL CERTIFICATE EXAMINATION

FABRICATION/WELDING (051-1) MARKING SCHEME.

1(a) Outline SIX marking out tools used in sheet metal work.
(i) Scriber (ii) Spring divider
(iii) Centre punch (iv) Trammel
(v) Dot punch (vi) Odd – leg caliper

(b) Explain the use of each of the tools listed above.
i. Scriber: It is used to mark on draw lines or metals before cutting or drilling
ii Spring divider: It is used to draw arcs, circles or lines on metals
iii. Centre punch: It is used to mark or locate a point with the aid of a hammer before drilling or cutting.
iv. Trammel: It is used to mark large arcs or circles on metals
v. Dot punch : Used to locate points on metals in form of dots.
vi. Odd – leg calipers: Used to find out the centre of a round bar.

(c) Sketch any TWO of the tools listed.



2(a) i Malleability: It is the ability of a metal to be bert, rolled or formed without fracture. E.g. steel, aluminum.

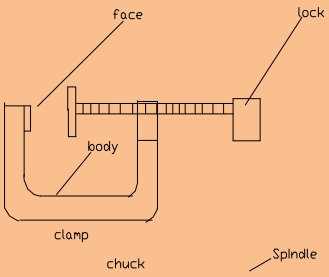
ii Ductility: It is the ability of a metal to be drawn into thin wire e.g. copper.

iii. Toughness: Ability of a metal to resist sudden heavy load without fracture. E.g wrought iron.

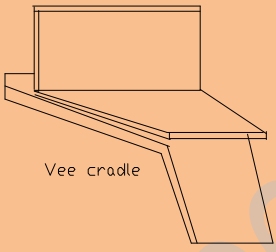
iv. Fusibility: Ability of metal to turn into liquid when heated to sufficient temperature e.g. cast iron
v. Brittleness: Ability of metal to break when sufficient load is applied e.g. cast iron.

vi. Conductivity: Ability of metal to allow easy passage of heat or electricity.

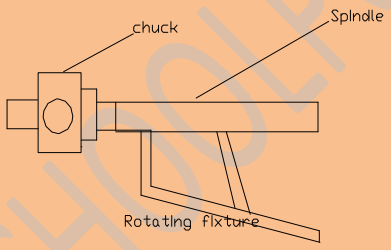
(b) State Hookes law of elasticity.
Hookes law of elasticity states that for an elastic material, strain is proportional to stress.



3(a)



Outline



FOUR tools used in gas welding

(i) Colored goggle
(ii) Spark lighter
(iii) Wire brush
(iv) Hammer
(v) Spindle key
(vi) Plier
(vii) Screw driver
(viii) A set of Spanners.

(b) List the uses of each of the tools used in gas welding.
i. Colored goggle: It is used to protect the eyes from radiation of heat and sparks.

ii. Spark lighter: It is used to light the blow pipe when fuel gas is released.

iii. Wire brush: It is used to clean the metal surface before and after welding.

iv. Hammer: It is used to tap the welded joint or to shape the metal to the required position.

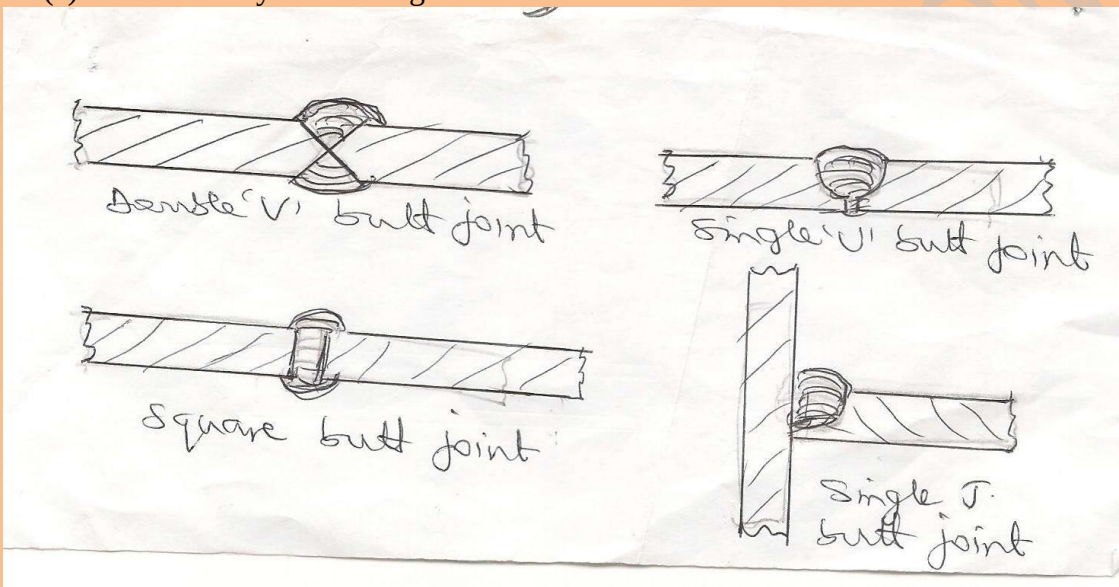
v. Spindle key: It is used to open the spindle of the cylinder in order to release gas to the blow pipe.

vi. Plier: It is used to hold metal before, during or after welding

vii. Screw driver: It is used to tight or loose hose clip.

viii. Spanner: It is used to lock or unlock nuts on the cylinder.

(c) Sketch neatly THREE figs and fixtures used in structural steel work.



4(a) Explain FOUR properties of stainless steel.

i. Corrosion resistant: Stainless steel is corrosion resistant. It is very useful where corrosion will cause damages to products. E.g. cutleries, cooking utensils.

ii. Heat treatment: Martenstic stainless steel is heat treatable. This makes it useful the construction of boilers.

iii. Cold working: Ferritic stainless steel is easy to cold worked. It can be formed t shapes through forming operations in the workshop.

iv. Magnetism: Austenetic stainless steel is magnetic. This influences its use where magnetic property is required.

(b) Describe TWO methods of how a non-ferrous metal can be heat treated.

(i) A non-ferrous metal (aluminum) can be heat treated by annealing after cold working which increases hardness. This can be done by heating with blow pipe and smeared with soap or match stick rubbed on the metal. When soap turns black, it means the annealing temperature is reached and then allowed to cool to room temperature.

(ii) Cropper can be heat treated after welding. The joint is heated to about 600^{0c} and then quenched with water or allowed to cool at room temperature\

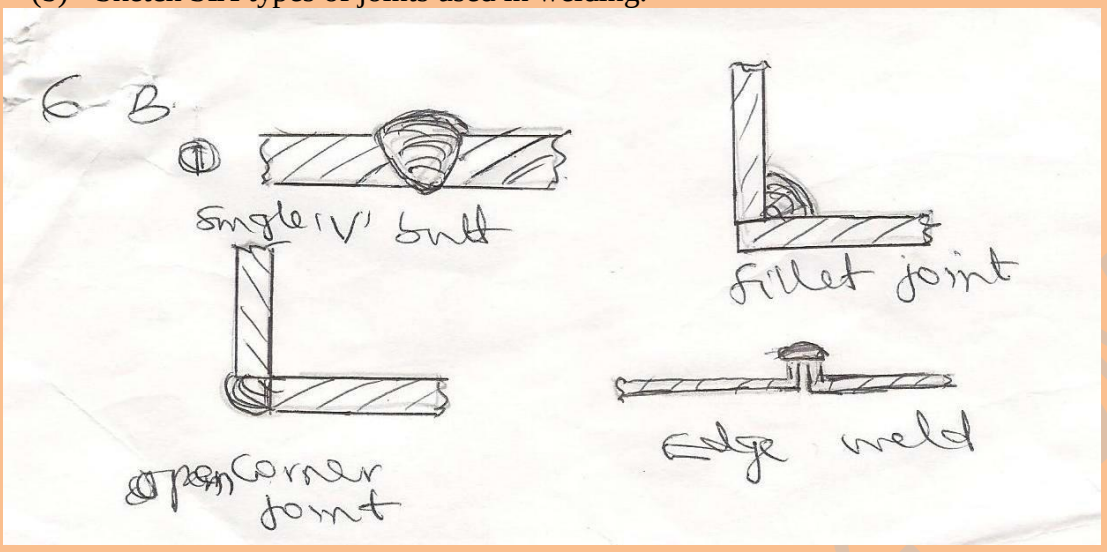
5(a) State THREE major causes of excessive spatter.
Excessive spatter may occur in arc welding as a result of:
(i) Too high welding current used
(ii) Wet electrode being used
(iii) Dirty metal surface e.g. Oil, grease.

(b) Name TWO ways in which excessive spatter can be controlled.
(i) The current should be reduced to normal.
(ii) A wet electrode should be dried especially in the oven.
(iii) Metal surface must be properly cleared free from rust, dirt, oil or grease.

(c) Destructive tests are those tests carried out with the joint destroyed by bending, cutting or application of chemical e.g. microscopic, macroscopic, chemical, tensile e.t.c.
Non – destructive tests are carried out without causing any damage to the metal e.g. visual inspection, ultrasonic test, application of penetrant fluid e.t.c.

6(a) State and explain THREE advantages of a D.C. machine over an A.C. machine.
(i) D.C. machines can be used to weld non-ferrous metals.
(ii) Bare wire electrodes can be carefully used.
(iii) It can be used where there is no electricity supply.

(b) Sketch SIX types of joints used in welding.



List EIGHT specifications for a built up or worn metal parts.
(i) There must be good fusion between base metal and overlayed materials.
(ii) There must be minimum dilution in order to retain the desired properties.
ii) There must be precision in the process especially objects that cannot be finished up.
v) The surface can be finished by grinding, turning, milling or filing.
) If series of pads are to be laid, half overlap is required for a good work.
i) Before another pad is laid on the first one, thorough cleaning of the surface must be done to avoid slag inclusion.

utline FIVE factors to be considered in the selection of joints for a project.
(i) The type of metal to be joined must be considered.
(ii) The cost of making the joint should be considered.
(iii) The strength required of the joint must be considered.