METAL WORKS PAPER 1

ANSWERS

KCSE 2010

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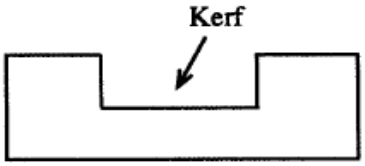
30.17.1 Metal Work Paper 1 (445/1)

1. (a) SAFETY PROCEDURES
Wipe the blade clean before use
Oil the blades fold into case after use
Don't force blades into gaps
Avoid overtightening locking screw.
Don't expose to heat or corrosive substances
Do not detach blade from set. Any 4 x ½

(b) (i) Gross pay is all payment due before any deductions while net pay is payment due after all deductions.
(ii) Change is transaction involving exchange of different denominations of equal amount while balance is the amount due after purchase of good or payment of services.
2 x 1

2. (a) REASON
To minimize clogging the teeth of the file 1 x 1

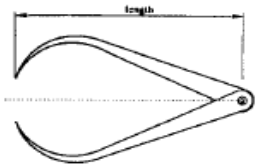
(b) KERF

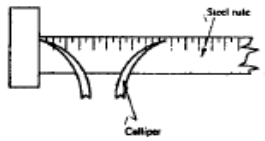


Is the width of a cut produced by the setting of the teeth of a saw blade.
(1½ marks)

3. (a) MARKING OUT TOOLS
Surface plate or scribing block
Steel rule
Angle plate. 3 x ½

4. OUTSIDE CALIPERS





5. (a) CHIPPING ANGLE
Too large clearance angle makes tool point to 'dig' into the work while too small clearance angle tend to cut thin material or slapping. 2 x 1

(b) TWIST DRILL WITH UNEQUAL LIPS
Excessive wear
Rough hole and out of round
Overheating
Breakage of drill
Oversize hole Any 4 x 1

6. (a) TINPLATING AND GALVANISING

Tinplating is coating mild steel sheets with tin while galvanizing is coating mildsteel sheets with Zinc. 2 x 1

(b) METHODS OF GALVANIZING

Hot dipping where cleaned and flux coated sheets are dipped in bath of molten tin/zinc.
Spraying with metallic coating of tin or zinc. 2 x 1

7. (a) SOFT HAMMER HEADS

Copper
Lead
Raw hide
Plastic
Wood Any 4 x 1

(b) TYPES OF HAMMERS

Stretching hammer
Raising hammer
Planishing hammer 3 x ½

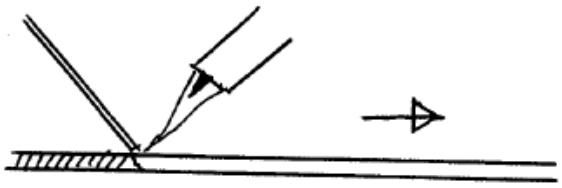
8. (a) DEFINITIONS

Spelter: the copper and zinc alloy used in joining.
Capillary Action; the attraction of molten metal into the joint.

(b) FORGE

(i) Bricks for good heat retention
(ii) Sparks and smoke would not be arrested causing discomfort in working areas.
(iii) Water bosh containing water for cooling the tuyeres. 3 x 1

9. (a) RIGHTWARD WELDING TECHNIQUE

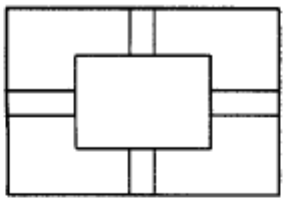


2 Marks

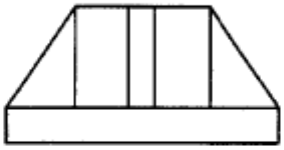
(b) ADVANTAGES

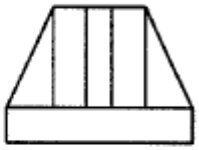
Provides better view while welding hence better joint
Produces less brittle joint as flame anneals joint
Provides better penetration as parent metal is pre-heated
Faster than lefward hence less gas used. Any 3 x 1

10.

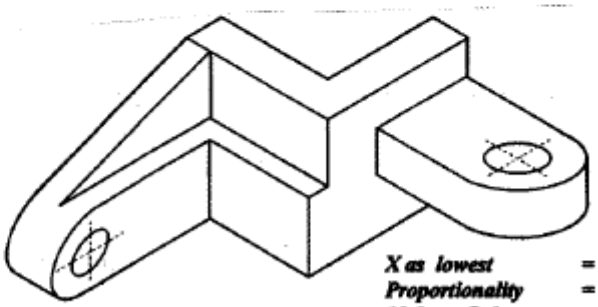


Correct F. E., E. E. & Plan (3 x1 ½)	*= 4 ½*
Correct angle of projection	*= ½*
TOTAL	*= 5 marks*



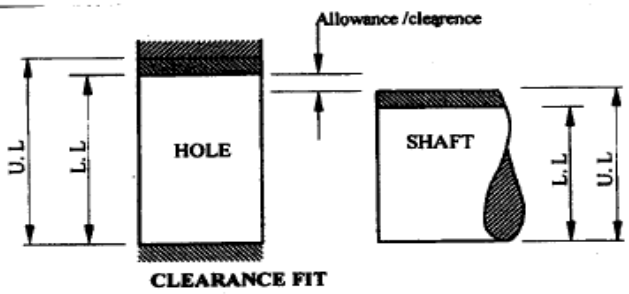


11.



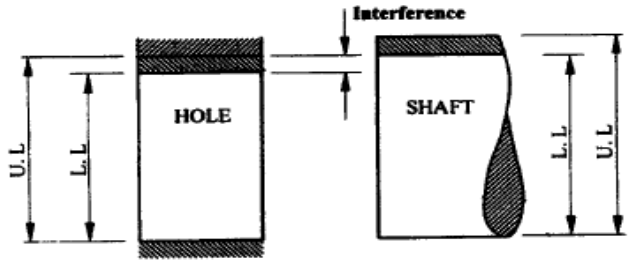
X as lowest	*= 1*
Proportionality	*= 1*
10 faces @ 1	*= 10*
2 holes @ 1	*= 2*
2 centrelines @ ½	*= 1*
TOTAL	*= 15*

12. (a) TYPES OF FITS



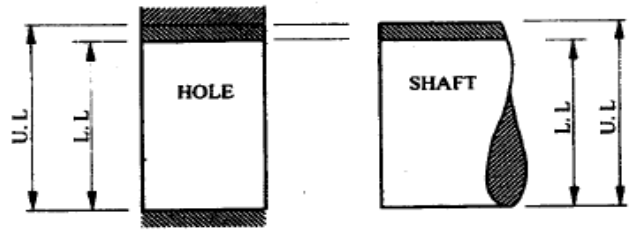
CLEARANCE FIT

CLEARANCE FIT (3 marks)



INTERFERENCE FIT

INTERFERENCE FIT (3 marks)

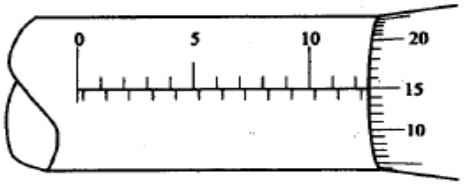


TRANSITION FIT

TRANSITION FIT (3 marks)

(b)

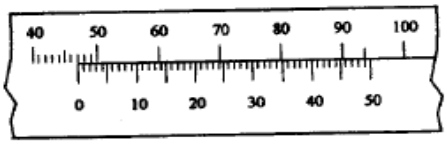
(i)



Main scale 1 mark
Thimble 1 mark
Correct reading 1 mark

(ii)

Main scale 1 mark
Vernier scale 1 mark
Correct reading 1 mark



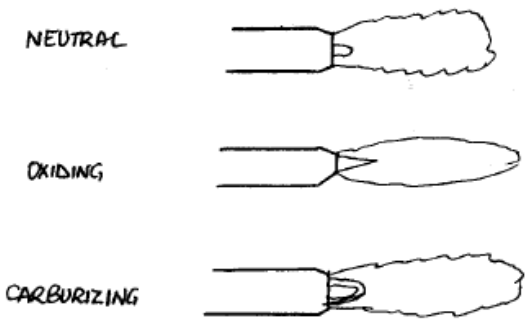
13. (a)(i) LACQUERING

Clean the surface/article ½
Warm the article ½
Apply the lacquer using brush from centre endwards ½
Apply to dry in a warm dust free room ½
Apply a second coat and allow to dry ½ 5 x ½

(ii) PREPARING FOR PLANISHING
Anneal the article ½
Pickle the article ½
Buff with polishing compound ½
Wash and dry the article. ½ 4 x ½

(iii) PLANISHING
Position the article on planishing stake
Gently hammer from centre of article outward
Rotate article while hammer continues
Ensure hammer marks overlap slightly. 4 x1

(b)



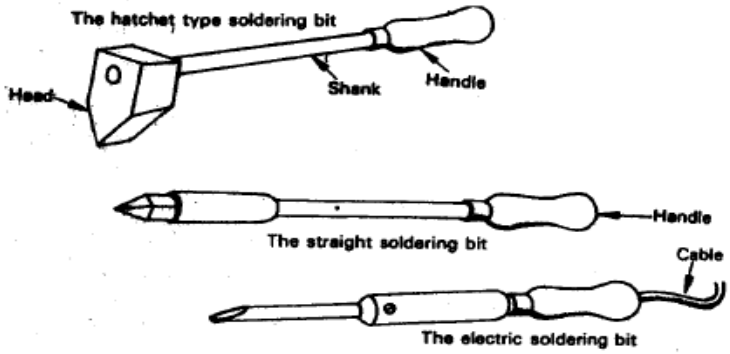
1½ x3

(ii) TESTING EQUIPMENT FOR LEAKS
Close the torch needle valve ½
Pressurise the system by opening the valves ½
Apply soapy water on all the valves and any other suspected areas ½
Look for bubbles to determine any leakage. ½ 4 x ½

14. MAKING TROWEL
Mark out the holes and other dimensions
Cut out the blade and file to shape.
Drill one hole on the blade
Form the blade to shape on the anvil beak
Heat and draw down the tang
Bend the tool position of the tang to required measurement
Head and flatten the end to be riveted to 3 mm thick
File and mark for drilling
Centre punch the two holes and drill
Align blade to tongue and rivet on hole
Drill the remaining hole and rivet
Debur the work

Steps	12 x ½
Appropriate sketches	Any 5 x 1
Corrected tools listed	8 x ½
TOTAL =	15 marks

15. (a) SOLDERING BITS



ANY 2

Sketches 2 x 1
Labelling 2 x ½

(b) (i) MARKING OUT THE OPENER

Curved end:	Establish the datum edge
	Mark the round end
	Mark R II and dot punch
Slot:	Mark the two centres and dot punch
	Mark and scribe curved ends
	Joint the tangents and dot punch
Mouth:	Mark centre and punch
	Mark the mouth strip width (5 mm)
Curvatures:	Prepare template
	Align, mark and dot punch.

4 marks

(ii) SHAPING

Curved end:	Drill ϕ 10 hole
	Cut and remove excess mobrals
	File to shape the curved end.
Slot:	Drill O 10 holes on both ends
	Chain drill
	Chise out
	File to size and shape
Mouth:	Drill ϕ12 hole
	Cut out
	File strip to width and shape
Curvatures:	Make relief cuts
	Chise/cut
	File to shape

4 marks

(iii) RESISTANT TO WEAR
Heat to cherry red and dip in carbon rich solution
Quench in water/oil

1½ marks

(iv) OIL BLACKING
Clean to obtain smooth surface
Heat to red hot
Coat with clean oil
Heat and let cool
Wipe to clean

2½ marks