higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

NOVEMBER EXAMINATION

PLATERS' THEORY N2

22 NOVEMBER 2016

This marking guideline consists of 7 pages.

QUESTION 1: MACHINES

1.1 A – Drill chuck
B – Motor pulleys
C –Electric motor
D –Column
E –Table locking clamp

(5 × 1) (5)

1.2
- Do not make any adjustments while the machine is in operation.
- Wear safety gloves to protect your hands against sharp plate edges.
- Keep fingers away from the stripper.
- Only one person may operate the machine at a time.
- Make sure that the workpiece is held secure during punching. (Any 2 × 1) (2)

1.3 If a plate is inserted between a set of rolls and one of the rolls is moved towards the others, the plate between the rolls will bend.√ When the rolls are rotated and the plate is passed between them, progressive bending takes place√ and a cylinder is formed.√ (3)

[10]

QUESTION 2: ROLLING AND BENDING

2.1 $L = [D + T + (T \div 3)] \times 3{,}142$

$= [1\,500 + 6 + (6 \div 3)] \times 3{,}142$

$= [1\,500 + 6 + 2] \times 3{,}142$

$= 1\,508 \times 3{,}142$
√ √
$= 4\,738{,}136$ mm (5)

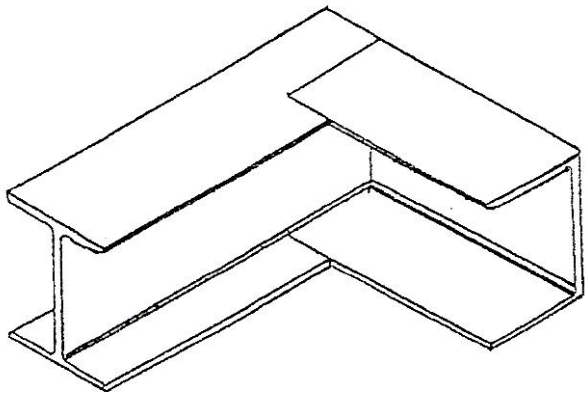
2.2 Place the buckled plate on a levelling block.√ Before commencing to hammer the plate the position of the buckle should be carefully noted.√ To bring the plate level all the strain must be removed, so that no part of the surface shall be pulling against another.√

The hammer blows will need to be thickest at the outside of the plate, running away to nothing at the centre.√ When the hammer alone is used, greater care must be taken so that its face edges do not cut into the plate.√ (5)

[10]

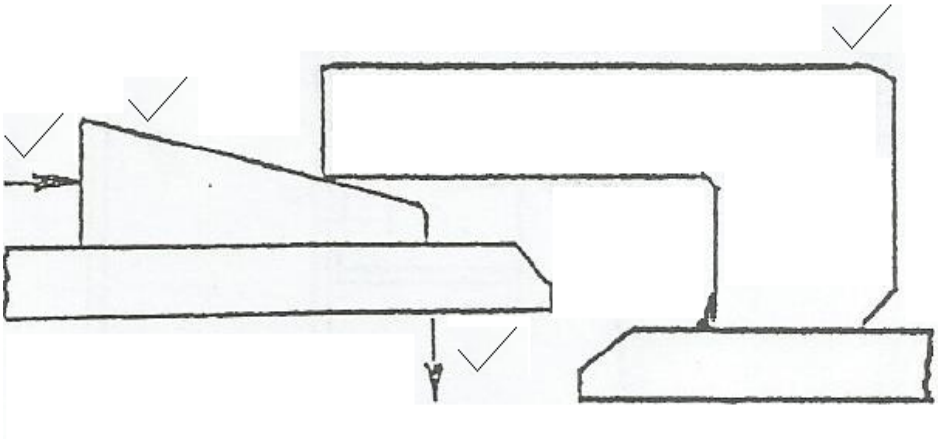
QUESTION 3: JOINING OF ROLLED-STEEL SECTIONS

3.1



√√ √ (3)

3.2



(4)

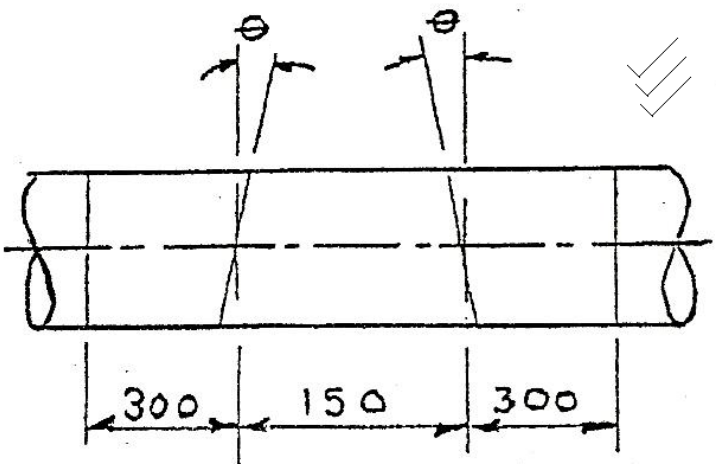
3.3
- Assembled items are identical.
- Assembly time is reduced.
- Workers can do the work alone.
- Saves unnecessary measuring.
- Enables untrained workers to do the work.
- Jig can be stored for long periods of time and used again.
- Reduces distortion.
- Reduces the cost of production.

(Any 3 × 1) (3)

[10]

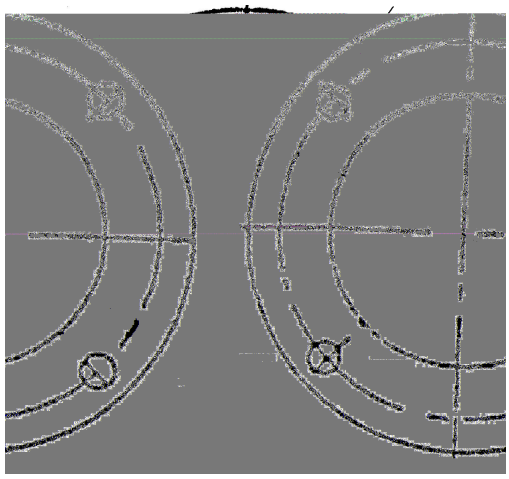
QUESTION 4: GENERAL PIPEWORK

4.1



Angle of cut 0 = 45 ÷ 2√
= 22.5 ÷ 2√
= 11.25°√ (6)

4.2

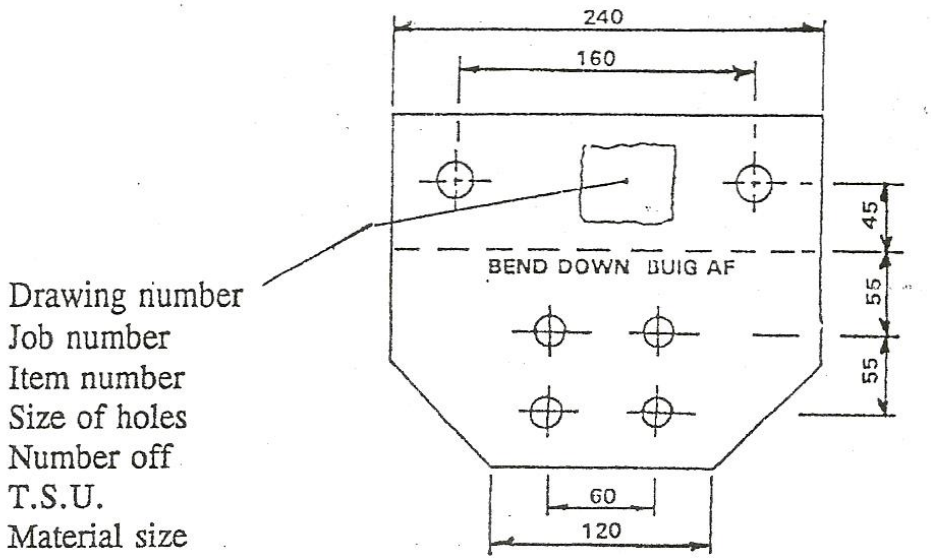


(2)
[8]

QUESTION 5: STEEL STRUCTURES

A – Purlin
B – Rafter
C –Tie beam
D –Shoe plate
E –Inclined tie
F –Shoe of truss (6 x 1) **[6]**

QUESTION 6: TEMPLATES



3 Marks for template and a half mark for each label. **[6]**

QUESTION 7: METALS

7.1
- Chrome
- Molybdenum
- Nickel
- Cobalt
- Manganese
- Vanadium
- Silicon
- Tungsten

(Any 2 × 1) (2)

7.2 7.2.1 Annealing is done by slowly heating the steel√ to a temperature slightly above its critical temperature. √ The steel is then left at that temperature to *soak* for a short time, before being allowed to cool down, very slowly, inside the furnace.√ (3)

7.2.2 The steel is heated in its hardened state to a suitable tempering temperature, which is lower than that for hardening.√ The steel is then quenched in water or oil.√ The temper temperature depends on the carbon content of the steel and the purpose for which the steel is going to be used.√ (3)
[8]

QUESTION 8: GAS WELDING AND CUTTING

8.1 8.1.1 The cutting speed should be uniform throughout the cut. If the speed is too fast, insufficient heat will be imparted to the plate by the heating flame,√ consequently the metal will not ignite in the oxygen stream, and the cut will fail.√

If the speed is too slow, the heating flame overheats the plate surface√ causing melting at the top edge, due to the resultant excess of oxygen in the kerf.√ (4)

8.1.2 The size of the cutting oxygen nozzle must be chosen to suit the thickness of the part to be cut.√ A larger bore and consequently a greater volume of oxygen is required for cutting thick material than for thin material.√ Too small a nozzle leads to frequent failure of the cut.√ (3)

8.1.3 A dirty nozzle will divert or distort the gas stream, thus producing a rough cut surface. √ (1)

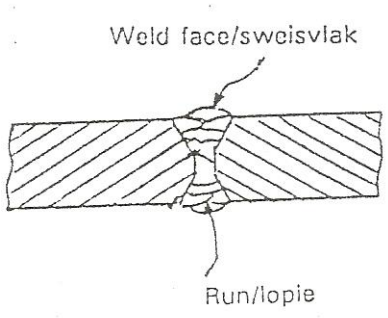
8.2
- Selecting the correct size of cutting nozzle for the thickness of the material being cut.
- Moving the cutting torch at the correct cutting speed.
- Operating the cutting torch at the correct oxygen pressure.
- Maintaining the nozzle at the correct distance from the plate surface.

(4 x 1) (4)
[12]

QUESTION 9: ARC WELDING

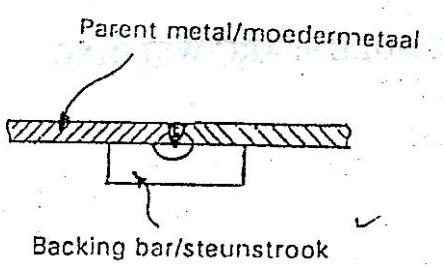
9.1 9.1.1 The weld face is the surface of a weld seen from the side which the weld was made.

9.1.2 The metal melted or deposited during one passage of the electrode, is called the run.



9.1.3 The backing bar is a piece of material placed behind a butt or joint to help the welding operation but is not intended to become part of the weld.

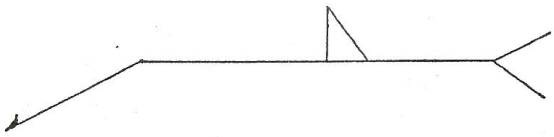
9.1.4 The section or the part to be welded is known as the parent metal.



(4 × 2) (8)

9.2
- Excessive welding current
- Electrode at incorrect angle
- Excessive wave
- Arc length too long
- Incorrect setting of the welding machine (5 x 1) (5)

9.3



√√ (2)
[15]

QUESTION 10: CALCULATION AND PLANNING

Circumference = 3,142 × mean diameter
= 3,142 × (1 600√ + 20) √
= 5 090,04 mm√√

Area = Circumference × height
= 5 090,04 × 2 000√
= 10 180 080 mm²√
= 10,180 m²√√

Area of base plate = 3,142 × radius²
= 3,142 × 0,8²√
= 2,011 m²√√

Mass of plate = (10,180 + 2.011)√ × 7.85 × 20√
= 1 913,969 kg√√ **[15]**

TOTAL: 100