higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

PLATERS' THEORY N2

6 AUGUST 2018

This marking guideline consists of 6 pages.

QUESTION 1: MACHINES

1.1 1.1.1 If 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.✓

1.1.2 The main function of this machine is to rapidly remove metal✓ to form round, square or other shaped holes✓ by using a top punch✓ and a bottom die.✓

(2 × 4) (8)

1.2 Keep your hands clear of the moving rolls. . ✓
Beware of catching your fingers between the rollers and the work. . ✓
Avoid wearing gloves. ✓
Ensure that the work is held firmly when rolling the edge of the plate. . ✓

(Any 2 × 1) (2)
[10]

QUESTION 2: ROLLING AND BENDING

2.1 $L = (D + T + T \div 3) \times 3{,}142$ ✓ ✓
$= (2\,500 + 6 + 6 \div 3) \times 3{,}142$ ✓
$= (2\,508) \times 3{,}142$ ✓ ✓
$= 7880{,}136$ 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 one 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 shall not cut into the plate.✓ (5)
[10]

QUESTION 3: JOINING OF ROLLED STEEL SECTION

3.1 Assembled items are identical. ✓
Assembly time is reduced. ✓
Workers can do the work on their own.
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 5 × 1) (5)

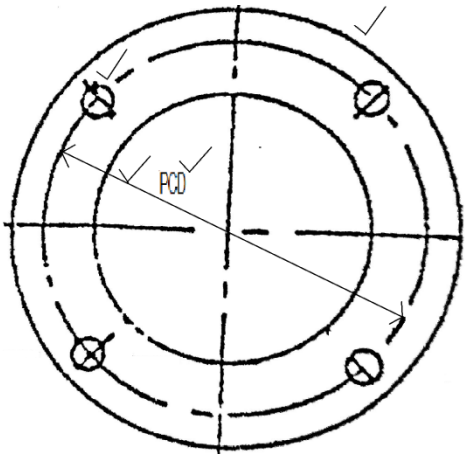
3.2 3.2.1 Used to connect beams✓ and columns together or to connect truss members✓ (2)

3.2.2 Used to hold parts in position✓ so that a number of identical items can be tack welded✓ and easily removed before final welding is done.✓ (3)
[10]

QUESTION 4: GENERAL PIPE WORK

4.1 A – Channel frame
B –Protractor locking screw
C –Chalk
D –Tree joint making arm (4)

4.2



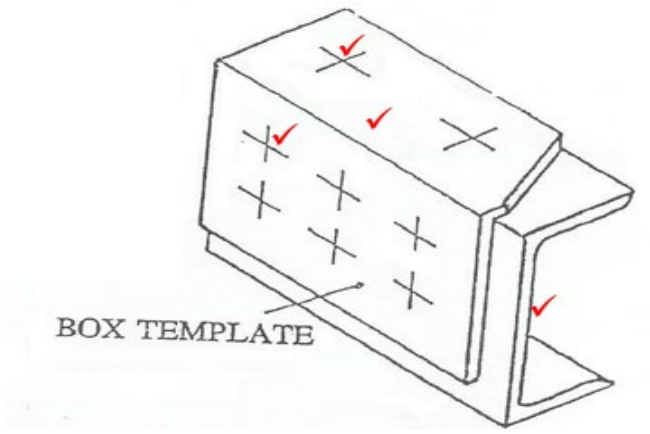
(4)
[8]

QUESTION 5: STEEL STRUCTURES

A – Purlin
B – Rafter
C – Tie beam
D – Shoe plate
E – Incline tie
F – Shoe of truss **[6]**

QUESTION 6: TEMPLATES

6.1



(4)

6.2 6.2.1 Up to 3 mm plate can be used for profile cutting machines.
6.2.2 Sizing and checking purposes.

(2 × 1) (2)
[6]

QUESTION 7: METALS

7.1 7.1.1 Relieving the hardening stress✓ and reducing the brittleness of the metal✓

7.1.2 Only the outside surface (1,5 mm) of the metal is hardened✓ and not the core.✓

(2 × 2) (4)

7.2 7.2.1
- Higher resistance to fatigue
- Improved heat-treating characteristics
- Refined structure of the steel
- Endurance under heavy loads

7.2.2
- Increased hardness depth
- Increased resistance to high temperature
- Increased resistance to wear and corrosion
- Increased magnetic properties

(Any 2 × 2) (4)
[8]

QUESTION 8: GAS WELDING AND CUTTING

8.1 Flame-cleaning nozzles spread the heating flame✓ so that mill scale, oxide, paint and grease can be removed✓ from the surface of the work piece.✓ (3)

8.2 The machine is used to gas cut one or more identical items✓ and it is mechanically driven.✓ (2)

8.3
- Gas pressure
- Flame setting
- Nozzle type
- Nozzle cleanness (Any 3 × 1) (3)

8.4
- Mild steel
- Alloy steel
- Stainless steel
- Non-ferrous metals (Any 4 × 1) (4)

[12]

QUESTION 9: ARC WELDING

9.1 9.1.1 The metal melted or deposited during one passage of the electrode

9.1.2 The section or part to be welded

9.1.3 The surface of a weld seen from the side from which the weld was made

9.1.4 A piece of material placed behind a butt or corner joint to help the welding operation but not intended to become part of the weld (4 × 2) (8)

9.2
- Insufficient heat input
- Welding speed too fast
- Incorrect polarity when using DC current
- Incorrect joint design (Any 4 × 1) (4)

[12]

QUESTION 10: CALCULATION AND PLANNING

10.1 Mean diameter = 1620 - 20

= 1600mm ✓

Circumference = $\pi \times$ mean diameter

= $\pi \times 1600mm$ ✓

= 5026,55mm ✓

$\therefore$ Area of plate= length $\times$ breath

= $5,026m \times 1,650m$

= $8,29m^2$

Area of base plate = $\pi \times$ (mean radius)^2

= $\pi \times 0,8^2$ ✓

= $2m^2$ ✓

Total area = Area of side plate+ Area of base plate ✓

= 8,29+2 ✓

= $10,29m^2$ ✓

Mass of plate= Total area $\times$ mass (kg/m^2)

= $10,29 \times 7,85 \times 20$ ✓

= 1615,53kg ✓ (10)

10.2.1 203 × 203 × 53,4 H-section × 4500 mm long

$53,5 \times 4,5 = 240,75kg$ ✓ ✓ (2)

10.2.2 305 × 305 × 110,0 H-section × 3000 mm long.

$110 \times 3 = 330kg$ ✓ ✓ (2)

10.2.3 254 × 254 × 84,7 H-section × 4000 mm long.

$84,7 \times 4 = 338,8$ ✓ ✓ (2)

10.2.4 254 × 254 × 62,5 H-section × 3500 mm long.

$62,5 \times 3,5 = 218,75kg$ ✓ ✓ (2)

[18]

TOTAL: 100