higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1320**(E)**(A6)T

NATIONAL CERTIFICATE

PLATERS' THEORY N2

(11022182)

6 August 2019 (X-Paper)
09:00–12:00

This question paper consists of 6 pages.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
PLATERS' THEORY N2
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Sketches must be large, neat and fully labelled.
5. Freehand drawings must be done in pencil.
6. Write neatly and legibly.

QUESTION 1: MACHINES

1.1 Describe the working principle of the following machines:

1.1.1 Plate bending roll

1.1.2 Punching machine

(2 × 4) (8)

1.2 Write down TWO safety precautions to consider when working with the bending roll. (2)

[10]

QUESTION 2: ROLLING AND BENDING

2.1 The heel diameter of a 100 × 100 × 6 mm external angle-iron ring is 2,5 m.

Use the formula below to calculate the length of the angle-iron to form the ring in millimeters:

$$L = [D + T + (T \div 3)]\ \pi$$

Where: L = Length of the angle-iron
D = Heel diameter of the angle-iron
T = thickness of the angle-iron (5)

2.2 A piece of sheet metal, 1 250 mm in diameter, is buckled in the center.

Describe how the buckle can be removed without using heat and what tools you would use. (Do NOT use a diagram for your explanation.) (5)

[10]

QUESTION 3: JOINING OF ROLLED STEEL SECTION

3.1 Write down FIVE advantages of using a well-designed assembly jig in a welding shop. (5)

3.2 Describe the purpose of the following:

3.2.1 A gusset plate (2)

3.2.2 An assembly jig (3)

[10]

QUESTION 4: GENERAL PIPE WORK

4.1 FIGURE 1 below shows an outside view of a pipe contour marker.

Name the FOUR labeled parts of the pipe contour marker below. Write only the answer next to the letter (A-D) in the ANSWER BOOK. (4)

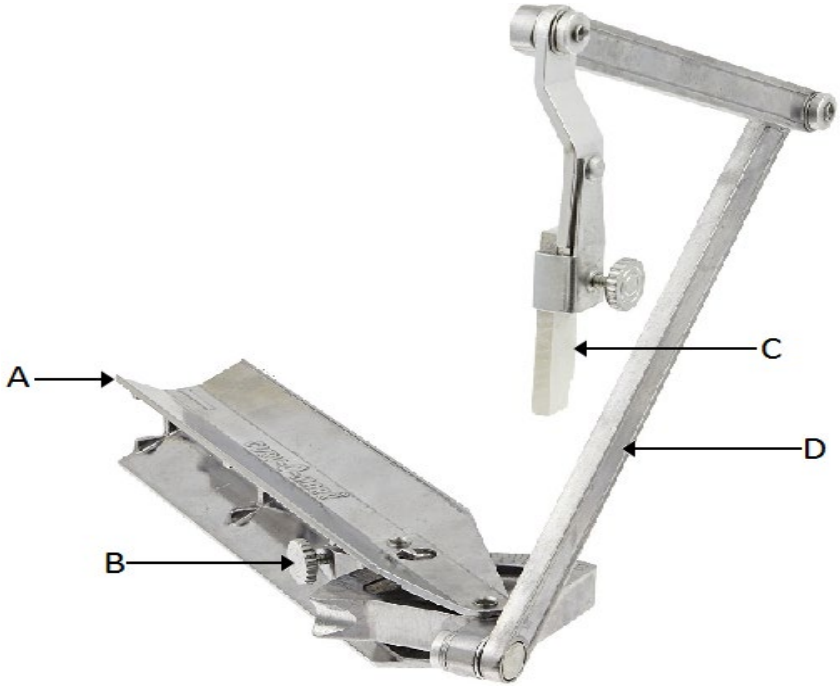


FIGURE 1

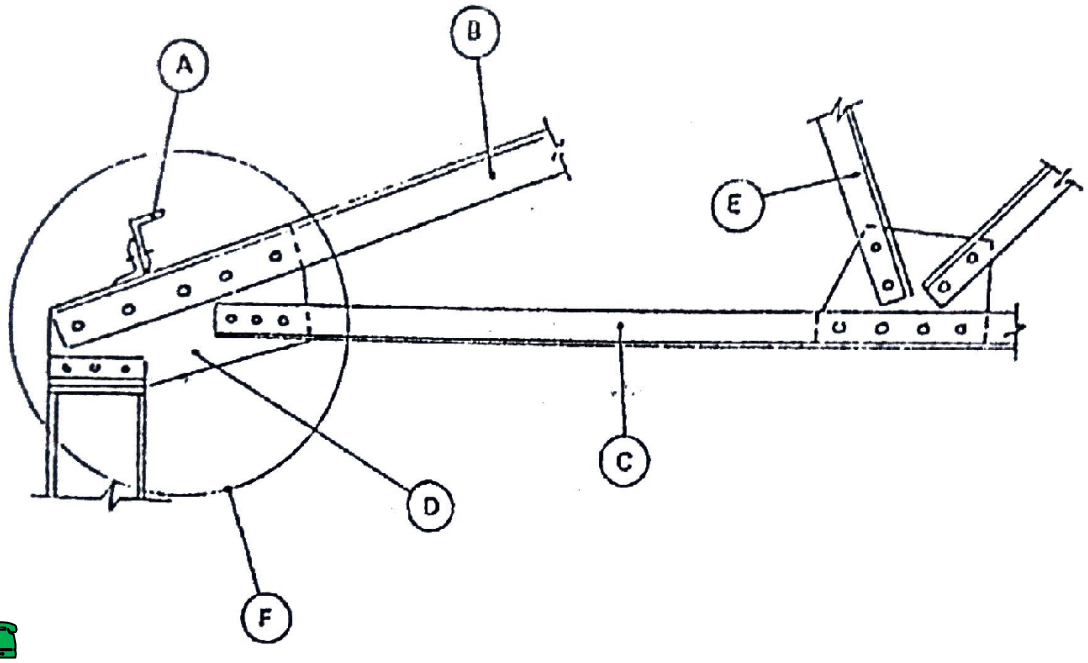
4.2 Explain with the aid of a drawing what is meant by the term *two hole on top* when referring to pipe flanges. Also indicate the pitch circle diameter (PCD) on the flange. (4)

[8]

QUESTION 5: STEEL STRUCTURES

FIGURE 2 below shows a part of a steel roof truss.

Name the SIX labeled parts of the steel roof truss below. Write only the answer next to the letter (A–F) in the ANSWER BOOK.



[6]

FIGURE 2

QUESTION 6: TEMPLATES

6.1 Draw a freehand isometric drawing of an RSC with a box template in position. (4)

6.2 State the use of templates made from the following materials:

6.2.1 Thin sheet plate

6.2.2 Hardboard

(2 × 1) (2)

[6]

QUESTION 7: METALS

7.1 Write down TWO effects on steel when subjected to the following heat-treatment processes:

7.1.1 Tempering

7.1.2 Case-hardening

(2 × 2) (4)

7.2 7.2.1 Write down TWO effects on steel when alloyed with vanadium.

7.2.2 Write down TWO effects on steel when alloyed with chrome.

(2 × 2) (4)
[8]

QUESTION 8: GAS WELDING AND CUTTING

8.1 Explain the effect of using flame-cleaning nozzles. (3)

8.2 Explain the use of the oxy-acetylene profile cutter. (2)

8.3 Write down THREE factors that influence the plate surface quality of an oxy-acetylene gas weld. (3)

8.4 Name FOUR metals which can be cut by means of a plasma cutter. (4)
[12]

QUESTION 9: ARC WELDING

9.1 Describe the meaning of the following welding terms without the aid of a drawing:

9.1.1 Run

9.1.2 Parental metal

9.1.3 Welding face

9.1.4 Backing bar

(4 × 2) (8)

9.2 Name FOUR causes of poor penetration. (4)
[12]

QUESTION 10: CALCULATION AND PLANNING

10.1 Determine the mass of a plate in kg to form a tank open on one end. The internal diameter of the cylinder is 1580 mm, and its height is 1560 mm and the thickness of the plate used to form the cylinder is 20 mm.

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$1\text{mm plate} = 7{,}85\ \text{kg/m}^2$

$\text{Area of circle} = \pi \times r^2$ (10)

10.2 Given below is the information taken from the hot rolled structural steel sections table.

H-SECTIONS (PILES)
Parallel Flange

Serial size - mm	Kg/m	h- height	b-breadth
203 x 203	53,5	203,9	207,2
254 x 254	62,5 84,7	246,9 254,3	256,0 259,7
305 x 305	79,0 110,0	299,2 307,0	306,0 310,3

Calculate the mass of the following H-sections.

10.2.1 203 × 203 × 53,4 H-section × 4500 mm long (2)

10.2.2 305 × 305 × 110,0 H-section × 3000 mm long. (2)

10.2.3 254 × 254 × 84,7 H-section × 4000 mm long. (2)

10.2.4 254 × 254 × 62,5 H-section × 3500 mm long. (2)

[18]

TOTAL: 100