higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

PLATERS' THEORY N2

(8090001)

1 December 2023 (X-paper)
09:00–12:00

Drawing instruments and nonprogrammable calculators may be used.

This question paper consists of 6 pages.

223Q1G2301

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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. Start each section on a new page.
5. Use only a blue or black pen.
6. Write neatly and legibly.

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QUESTION 1: MACHINES

1.1 State TWO safety precautions to be observed when working with a radial power saw. (2)

1.2 Briefly describe the working principle of a cropping machine. (3)

1.3 FIGURE 1, below, shows a reciprocating machine.

List the FIVE parts that correspond with the letters as indicated on the diagram (A-E). (5)

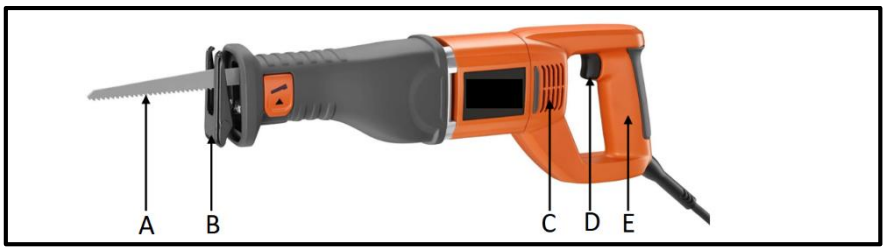


FIGURE 1

[10]

QUESTION 2: ROLLING AND BENDING

2.1 The heel diameter of a 60 × 60 × 6 mm external angle-iron ring is 247 cm. Calculate the length in millimetres of the angle-iron to form the ring by using the formula given bellow:

$L = [D + T + (T \div 3)] 3.142$

Where: L = length of the angle-iron
D = heel diameter of the angle-iron
T = thickness of an angle-iron (5)

2.2 Briefly describe what is the difference between the rolling process and the bending process. (5)

[10]

QUESTION 3: JOINING OF STEEL SECTION

3.1 Well-designed assembly jigs are very important in a welding shop. Name FOUR requirements of a well-designed welding jig. (4)

3.2 Briefly explain what a *jig* is. (3)

3.3 Illustrate, by means of a freehand drawing, the method of joining a channel iron to a rolled steel joist at 90°. (3)

[10]

QUESTION 4: GENERAL PIPE WORK

4.1 Describe with the aid of a neat, detailed drawing, how to determine the 'saddle depth' of a T-piece of unequal diameter pipes and list your findings. (6)

4.2 FIGURE 2, below, shows an outside view of a centre finder.

List FOUR parts corresponding with the letters A–D as indicated in FIGURE 2 below. (4)

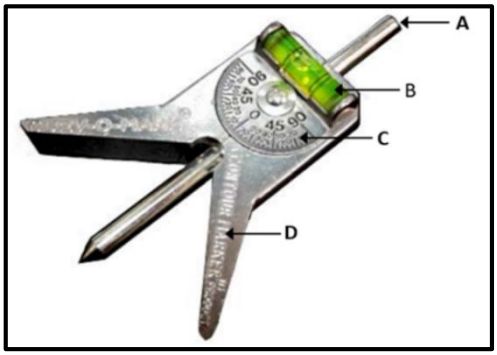


FIGURE 2

[10]

QUESTION 5: STEEL SRUCTURE

Briefly explain the following terms used with steel structures:

5.1 Purlins

5.2 Purlin cleats

5.3 Gusset plates (3 × 2) **[6]**

QUESTION 6: TEMPLATES

Briefly explain the use of the following templates:

6.1 Template paper

6.2 Light steel plate

6.3 Timber (plywood)

(3 × 2) **[6]**

QUESTION 7: METALS

7.1 Briefly explain the function of annealing as applied to a heat treatment process. (2)

7.2 Name TWO effects on the steel when separately alloyed with each of the following elements:

7.2.1 Carbon

7.2.2 Cobalt

(2 × 2) (4)

[6]

QUESTION 8: GAS WELDING AND CUTTING

8.1 Explain the effect of using flame cleaning nozzles. (2)

8.2 State FIVE causes of backfire. (5)

8.3 Briefly explain what is meant by *brazing*. (2)

8.4 Briefly describe the following gas welding terms:

8.4.1 Oxygen

8.4.2 Oxy-acetylene

8.4.3 Sustained backfire

(3 × 1) (3)

[12]

QUESTION 9: ARC WELDING

9.1 Briefly explain the following arc welding terms (without the use of drawings):

9.1.1 Penetration

9.1.2 Run

9.1.3 Welding face

9.1.4 Bevel angle

9.1.5 Undercutting

(5 × 2) (10)

9.2 Name FIVE causes of undercut. (5)

[15]

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QUESTION 10: CALCULATION AND PLANNING

10.1 Refer to TABLE 1, below and determine the mass of the following rolled steel channels.

100 × 50 Channel iron 1.8 m long. (2)

h × b	m	h	b
mm × mm	kg/m	mm	mm
100 × 50 200 × 75 240 × 85	10.6 25.3 33.2	100 200 240	50 75 85

TABLE 1

10.2 Reproduce the material list in TABLE 2 into your ANSWER BOOK and itemize all the components of the welded frame as shown in FIGURE 3, below onto the material list.

Determine the total mass of the frame.

MARK	QUANTITY	MATERIAL	LENGTH	Kg/m	TOTAL MASS
A		50 × 50 × 6 mm	3600 mm	4.47	
B		50 × 50 × 6 mm	4500 mm	4.47	
C		50 × 50 × 6 mm	4900 mm	4.47	
D		50 × 50 × 6 mm	8000 mm	4.47	
E		50 × 50 × 6 mm	7000 mm	4.47	
F		50 × 50 × 6 mm	4400 mm	4.47	
				TOTAL	

(13)

TABLE 2

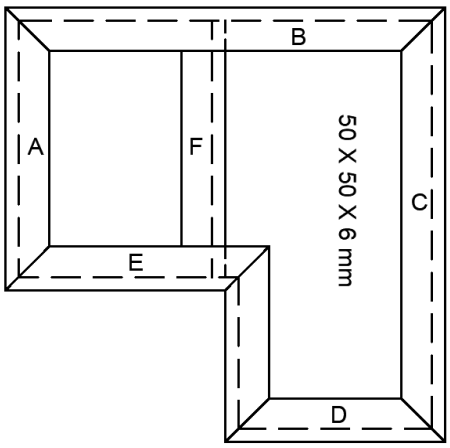


FIGURE 3

[15]

TOTAL: 100

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