



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

PLATERS' THEORY N2

(11022182)

16 April 2021 (X-paper)
09:00–12:00

This question paper consists of 5 pages and 2 diagram sheets.


213Q1A2116

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
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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 question on a new page.
 5. Use only a black or blue pen.
 6. Write neatly and legibly.
-

QUESTION 1: MACHINES

- 1.1 Briefly describe the working principle of the plate bending rolls. (3)
- 1.2 Briefly describe the working principle of the radial power saw.  (2)
- 1.3 FIGURE 1, DIAGRAM SHEET A (attached), shows a pedestal drilling machine. Label the components indicated with the letters (A–E) and write only the answer next to each letter (A–E) in the ANSWER BOOK. (5)
[10]

QUESTION 2: ROLLING AND BENDING

- 2.1 Calculate the length of material needed to manufacture a 45 × 45 × 8 mm external angle-iron ring with a heel diameter of 8515 mm.
- $$L = [D + T + (T \div 3)] \pi$$
- Where: L = Length of the angle-iron
T = Thickness of the angle-iron
D = Heel diameter of the ring
-  (5)
- 2.2 Briefly describe how one would go about removing a buckle from a metal plate. (Do NOT use sketches in your explanation.) (5)
[10]

QUESTION 3: JOINING OF STEEL PROFILES

- 3.1 Name SIX requirements to which a well-designed welding jig should comply. (6)
- 3.2 State FOUR disadvantages of a well-designed jig. (4)
[10]

**QUESTION 4: GENERAL PIPE WORK**


With the aid of a freehand drawing, describe how to determine the saddle depth a T-piece of pipe of unequal diameter. [8]

QUESTION 5: STEEL STRUCTURES


FIGURE 2, DIAGRAM SHEET A (attached), shows a part of a steel roof truss. Name the parts indicated by writing only the answer next to the letter (A–F) in the ANSWER BOOK. [6]





QUESTION 6: TEMPLATES

- 6.1 State FOUR disadvantages of using a template. (4)
- 6.2 Briefly discuss the use of templates made from the following materials:
- 6.2.1 Thin metal 
- 6.2.2 Sheet metal (2 × 1) (2)
- [6]**

QUESTION 7: METALS

- 7.1 Briefly explain the function of Case-hardening as applied in the heat treatment process. (2)
- 7.2 Briefly explain the effect of steel when alloyed with silicon. (2)
- 7.3 Explain FOUR effects of steel when alloyed with tungsten.  (4)
- [8]**

QUESTION 8: GAS WELDING AND CUTTING

- 8.1 Briefly describe the effect of the following on the quality of a gas-cut surface:
- 8.1.1 Pre-heating flame too low
- 8.1.2 Pre-heating flame too high
- 8.1.3 Irregular torch travel 
- 8.1.4 Nozzle too far from surface
- 8.1.5 Gas pressure too high (5 × 2) (10)
- 8.2 Briefly explain the term *brazing*. (2)
- 8.3 Explain the use of an oxy-acetylene profile cutter.  (2)
- [14]**

QUESTION 9: ARC WELDING

9.1 Briefly describe the following welding terms with the aid of sketch:

- Heat affected zone
- Reinforcement
- Parent metal
- Backing bar
- Weld zone



(5 × 2) (10)

9.2 Briefly explain the following terms with the aid of a free-hand drawing:

9.2.1 Stud

9.2.2 Plug 

9.2.3 Fillet

(3 × 1) (3)

QUESTION 10

Reproduce the material list, TABLE 1, in your ANSWER BOOK and itemise all the components of the welded frame as shown in FIGURE 3, DIAGRAM SHEET B (attached) in the material list. Determine the total mass of the frame.

COMPONENT	QUANTITY	MATERIAL	LENGTH mm	Kg/m	TOTAL MASS
A		50 × 50 × 6L	260	4.47	
B		50 × 50 × 6L	350	4.47	
C		50 × 50 × 6L	390	4.47	
D		50 × 50 × 6L	700	4.47	
E		50 × 50 × 6L	600	4.47	
F		50 × 50 × 6L	1000	4.47	
G		60 × 50 × 6L	600	4.95	
TOTAL					



TABLE 1

[15]

TOTAL: 100

DIAGRAM SHEET A

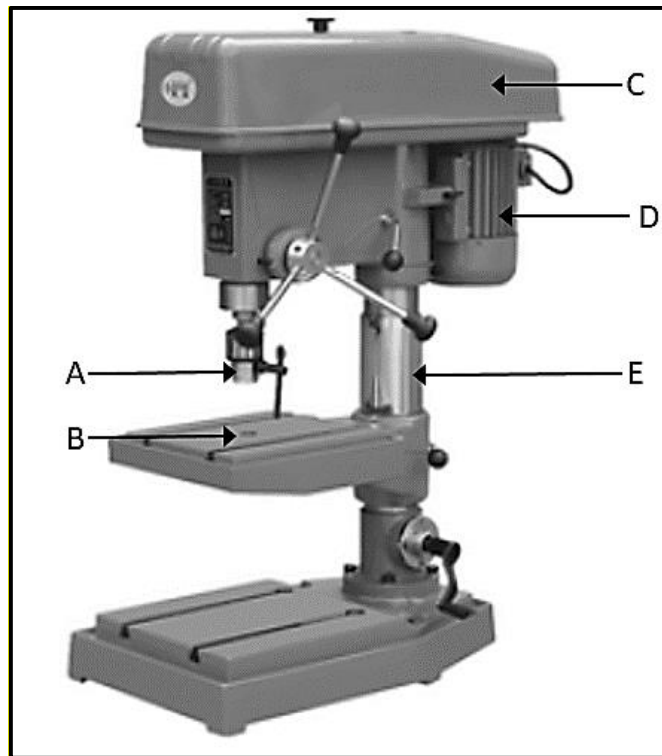


FIGURE 1

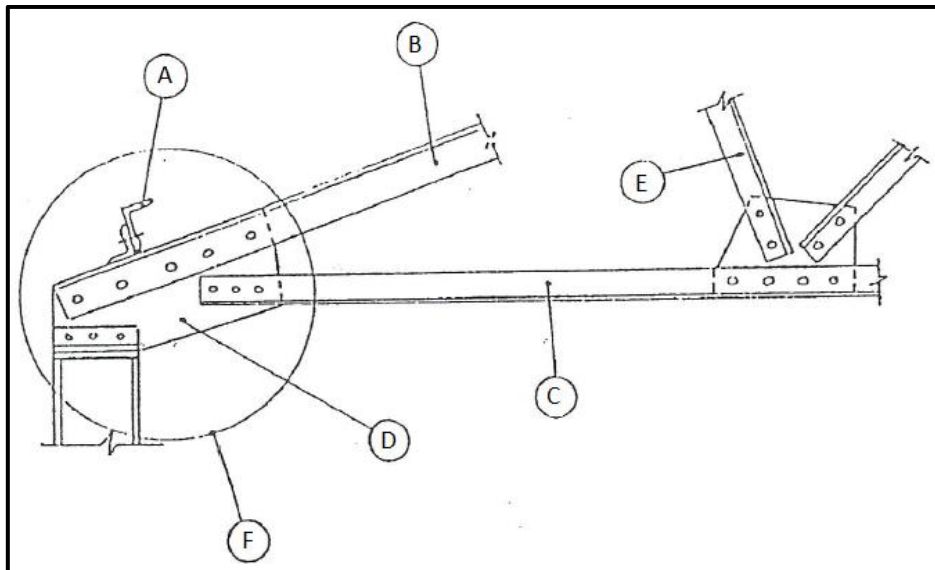


FIGURE 2

DIAGRAM SHEET B

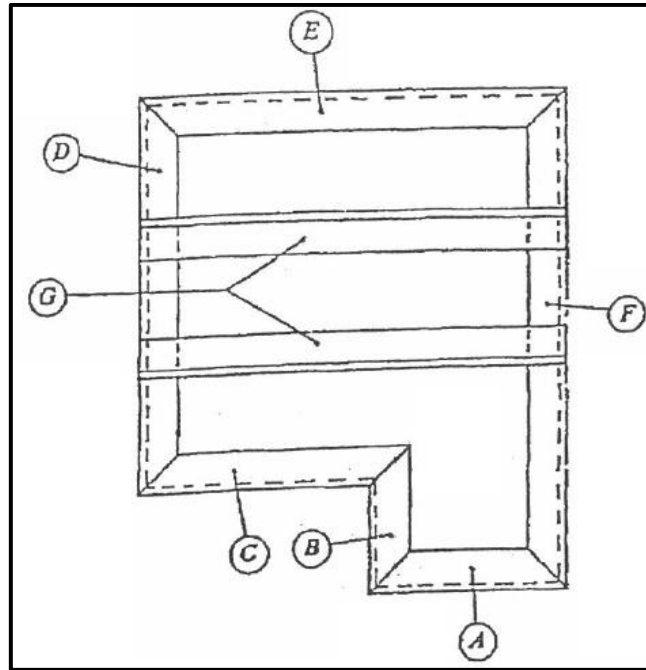


FIGURE 3