



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2017

CIVIL TECHNOLOGY

MARKS: 200

TIME: 3 hours



This question paper consists of 28 pages, answer sheets and 1 formula sheet.

REQUIREMENTS:

1. ANSWER BOOK
2. Drawing instruments
3. A non-programmable pocket calculator

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR sections: SECTIONS A, B, C and D.
2. SECTION A (QUESTIONS 1, 2, 3) is COMPULSORY for all learners.
3. Choose ONE of the following SECTIONS according to the area of specialisation for which you have registered:

SECTION B (QUESTIONS 4, 5 and 6) – Construction

SECTION C (QUESTIONS 4, 5 and 6) – Civil Services

SECTION D (QUESTIONS 4, 5 and 6) – Woodworking

NOTE: If you answer questions from SECTIONS B, C and D that you have NOT registered for, they will NOT be marked.

4. Number the answers correctly according to the numbering system used in this question paper.
5. Start the answer to EACH question on a NEW page.
6. Do NOT write in the margins of the ANSWER BOOK.
7. You may use sketches to illustrate your answers.
8. Write ALL calculations and answers in the ANSWER BOOK or on the attached ANSWER SHEETS.
9. Use the mark allocation as a guide to the length of your answers.
10. Make drawings and sketches in pencil, fully-dimensioned and neatly finished off with descriptive titles and notes to conform to the *SANS/SABS Code of Practice for Building Drawings*.
11. For the purpose of this question paper, the size of a brick should be taken as 220 mm x 110 mm x 75 mm.
12. Use your own discretion where dimensions and/or details have been omitted.
13. Where applicable, answer questions on the attached ANSWER SHEETS, as prescribed in each question.

SECTION A: GENERIC (COMPULSORY)**QUESTION 1: SAFETY AND MATERIAL**

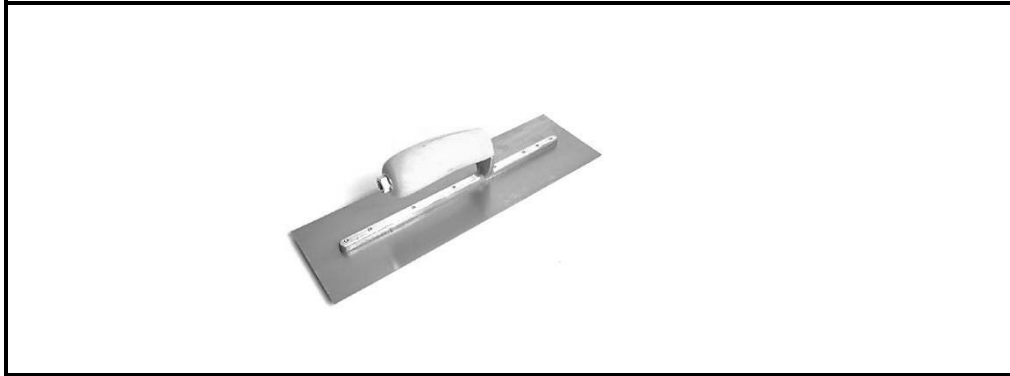
- 1.1 Which type of protective footwear must be worn when working with concrete? (1)
- 1.2 Name THREE requirements for footwear which is worn on a building site. (3 x 1) (3)
- 1.3 General safety for hand and power tools is important. Briefly motivate why each of the following safety measures must be applied:
- 1.3.1 Do not put tools on the edge of a working surface. (1)
- 1.3.2 Only one person at a time should work on a machine. (1)
- 1.3.3 Remove any loose clothing. (1)
- 1.3.4 Petrol engines should only be used in the open air. (1)
- 1.4 Name any TWO types of protective clothing which should be used when working with an angle grinder. (2 x 1) (2)
- 1.5 Describe the safe storing and stacking methods of material according to the following requirements:
- 1.5.1 Base underneath the material (2)
- 1.5.2 Maximum height of a stack (2)
- 1.5.3 Fire-fighting equipment (2)
- 1.6 Briefly describe the difference between *unreinforced concrete* and *reinforced concrete*. (2)
- 1.7 Name the ingredients for a dagha mix. (Water excluded) (3)
- 1.8 Describe the purpose of water in a dagha mix. (2)
- 1.9 Name TWO uses of each of the following board products:
- 1.9.1 Plywood (2 x 1) (2)
- 1.9.2 Hardboard (Masonite) (2 x 1) (2)
- 1.10 Which ingredient in ferrous metals makes it susceptible to rust? (1)
- 1.11 Describe ONE property of safety glass. (1 x 2) (2)

[30]

QUESTION 2: EQUIPMENT, TOOLS AND GRAPHICS

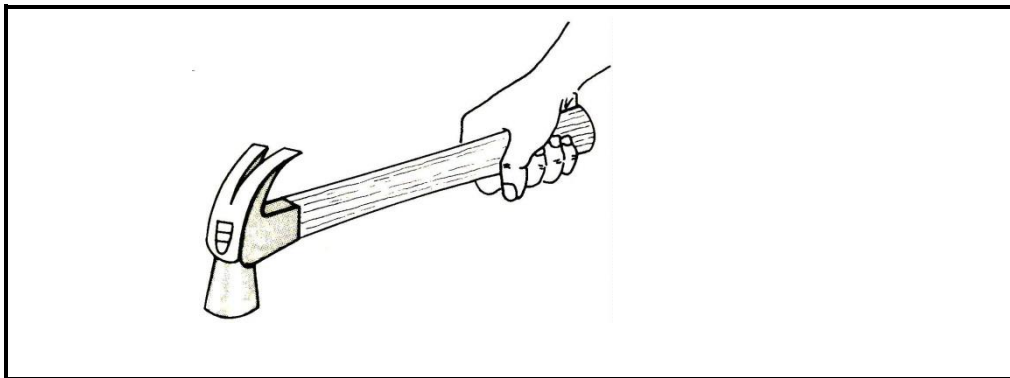
2.1 Identify the following tools and name ONE use of each.

2.1.1



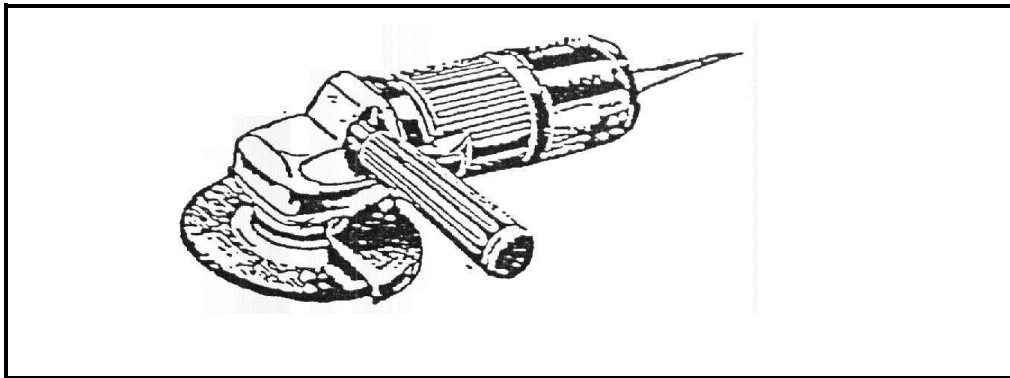
(2)

2.1.2



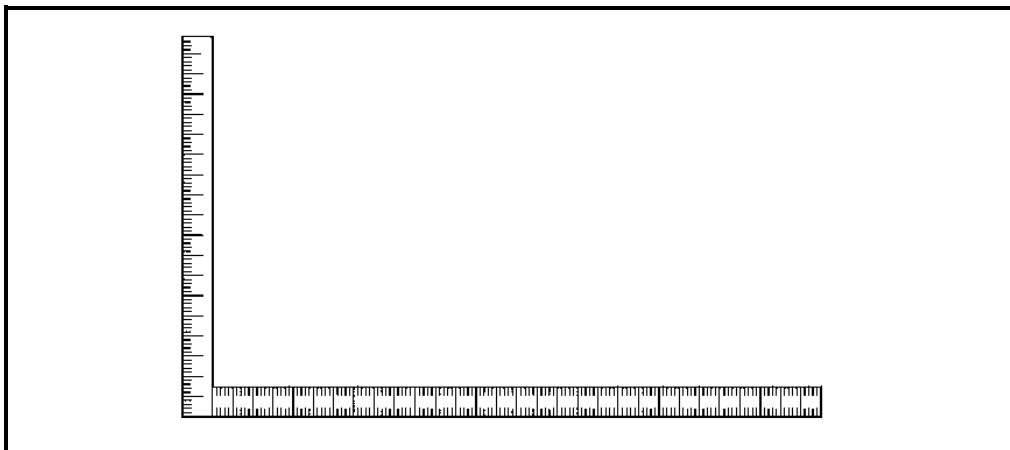
(2)

2.1.3



(2)

2.1.4



(2)

2.2 Answer the following questions with regard to the floor plan of a bathroom in FIGURE 2.2 on ANSWER SHEET A.

Complete the floor plan by drawing in the following symbols on scale 1 : 50:

- 2.2.1 Door at 2.2.A (2)
 - 2.2.2 Window at 2.2.B (2)
 - 2.2.3 Shower at 2.2.C (2)
 - 2.2.4 Water closet at 2.2.D (2)
 - 2.2.5 Gully and abbreviation at 2.2.E (2)
 - 2.2.6 Rodding eye and abbreviation at 2.2.F (2)
 - 2.2.7 Vent pipe and abbreviation at 2.2.G (2)
 - 2.2.8 Use the information on ANSWER SHEET A and do the measurements of the west view according to standard building drawing practice. (8)
- 2.3 Identify FOUR of the following requirements that are applicable to section views: (4)
- 2.3.1 The width and thickness of the foundations
 - 2.3.2 The roof construction
 - 2.3.3 Access to the site
 - 2.3.4 Number of the site
 - 2.3.5 Location of damp-proofing
 - 2.3.6 Ceilings and bandering
 - 2.2.7 Building lines
 - 2.3.8 North arrow
- 2.4 Make neat sketches to illustrate each of the following symbols:
- 2.4.1 Concrete (2)
 - 2.4.2 Hardcore (2)
 - 2.4.3 Distribution board (2)

[40]

QUESTION 3: QUANTITIES AND JOINING

3.1 FIGURE 3.1 shows the foundation strips for a building. The foundations are 600 mm wide and 200 mm thick.

Use the quantity list on ANSWER SHEET B and determine the following:

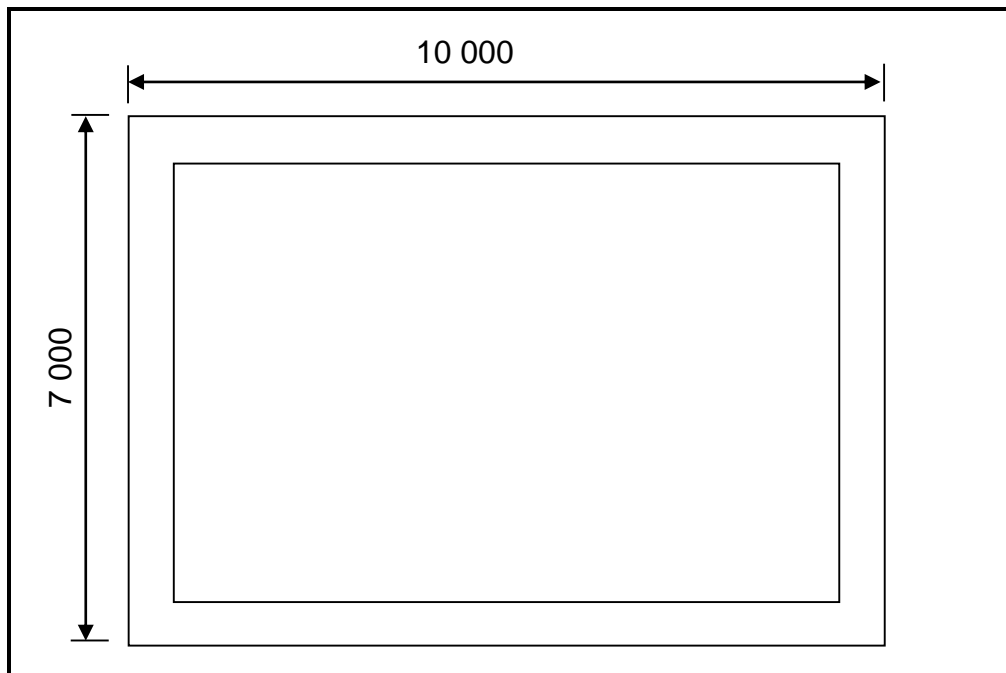


FIGURE 3.1

3.1.1 Calculate the centre line of the foundation. (5)

3.1.2 Calculate the volume concrete needed for the foundation. (3)

3.2 FIGURE 3.2 shows the front elevation of a boundary wall with two openings.

The following measurements are applicable to the wall:

Length = 20 m

Height from the foundation = 1,8 m

Opening A = 3 m x 1,6 m

Opening B = 1 m x 1,6 m

Wall thickness = 220 mm

Use the quantity list on ANSWER SHEET B and calculate the number of bricks needed to build the wall.

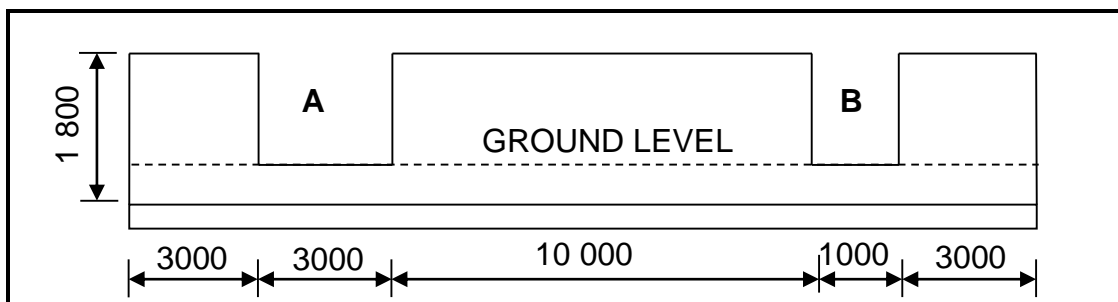


FIGURE 3.2

(14)

- 3.3 Which adhesive is used to join PVC pipes? (1)
- 3.4 Briefly describe the instructions for the use of contact glue. (2)
- 3.5 Name THREE properties of PVA wood glue. (3 x 1) (3)
- 3.6 Name TWO precaution measures which must be applied when epoxy is used. (2 x 1) (2)
- [30]**

TOTAL SECTION A: 100

SECTION B: CONSTRUCTION**QUESTION 4: MATERIAL, EQUIPMENT AND JOINING**

Start this question on a NEW page.

- 4.1 Name THREE properties of face bricks. (3 x 1) (3)
- 4.2 Briefly motivate why clay stock brick must be plastered. (1)
- 4.3 Name THREE advantages of concrete paving bricks for parking areas. (3 x 1) (3)
- 4.4 Answer the following questions with regard to the brick structure in FIGURE 4.4:



FIGURE 4.4

- 4.4.1 What is the structure called? (1)
- 4.4.2 Name TWO advantages of the cavities in the structure. (2 x 1) (2)
- 4.4.3 Name TWO disadvantages of the structure. (2 x 1) (2)
- 4.5 What is the purpose of the firing process of clay bricks? (1)
- 4.6 Name the TWO main ingredients for the manufacturing of cement. (2 x 1) (2)
- 4.7 Answer the following questions with regard to the surveying instrument in FIGURE 4.7:

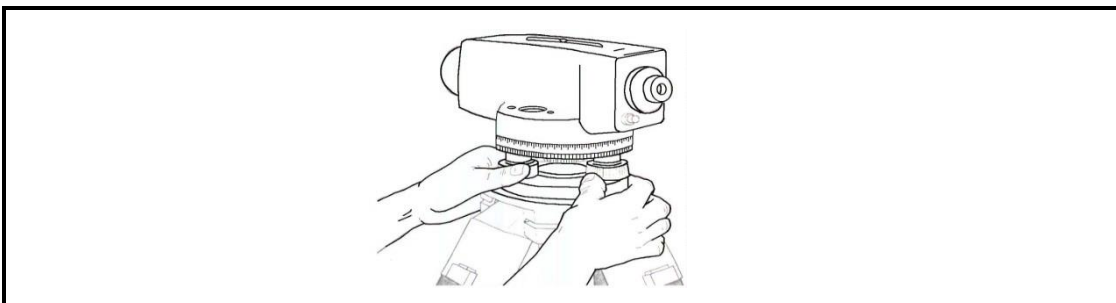


FIGURE 4.7

- 4.7.1 What is this instrument called? (1)
- 4.7.2 Name THREE uses of this instrument. (3 x 1) (3)

4.8 Answer the following questions with regard to the scaffold in FIGURE 4.8.

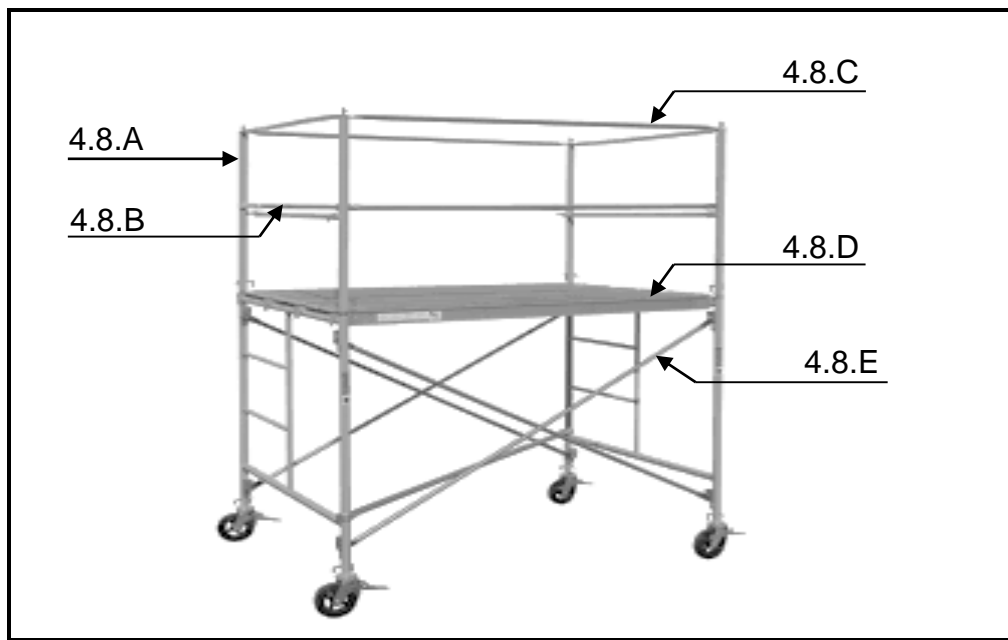


FIGURE 4.8

- 4.8.1 Name the parts 4.8.A to 4.8.E. (5)
- 4.8.2 Briefly motivate why scaffolding must be braced. (2)
- 4.8.3 What is the purpose of the brick guard on scaffolding? (1)

4.9 FIGURE 4.9 shows the joining of a door frame to a brick wall. Name the parts 4.9.A to 4.9.C.

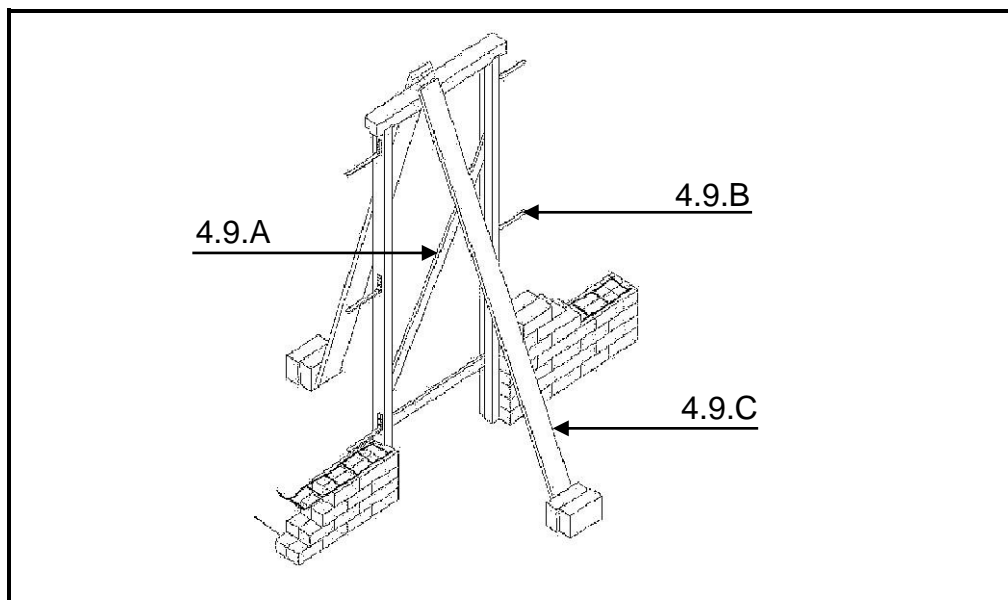
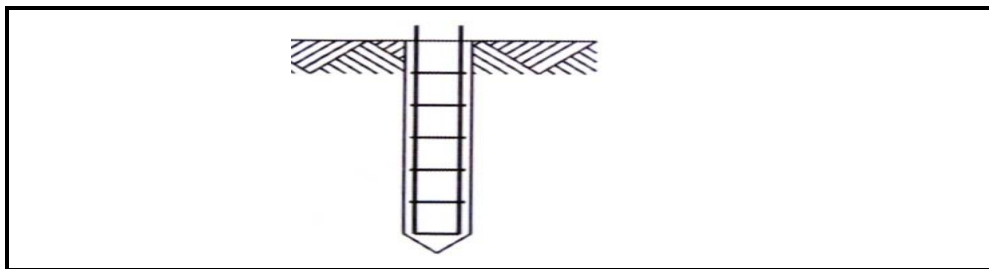


FIGURE 4.9

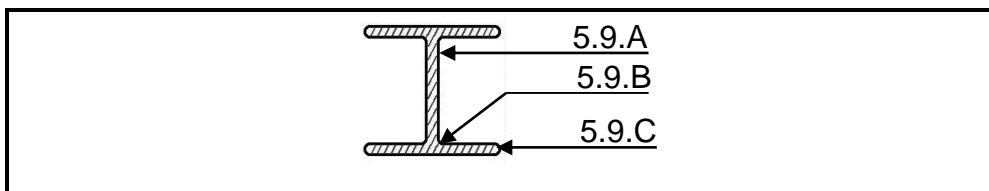
(3)
[30]

CONSTRUCTION**QUESTION 5: EXCAVATIONS, FOUNDATIONS AND STEEL**

- 5.1 Name TWO methods to determine the depth of foundation excavations. (2 x 1) (2)
- 5.2 Briefly motivate why foundation excavations must be accurate and level. (2)
- 5.3 Briefly describe the purpose of the datum peg on a building site. (2)
- 5.4 Name THREE causes of excavation accidents. (3 x 1) (3)
- 5.5 FIGURE 5.5 on ANSWER SHEET C shows an excavation of 1 metre deep and 0,7 metre wide in firm soil. Draw in good ratio, the formwork for the excavation. Also show the labels of the THREE parts of the formwork. (7)
- 5.6 Make a neat isometric view of a block foundation with a pier. (3)
- 5.7 Briefly describe the purpose of steel reinforcement in wide strip foundations. (2)
- 5.8 Answer the following questions with regard to the foundation in FIGURE 5.8:

**FIGURE 5.8**

- 5.8.1 Name this type of foundation. (1)
- 5.8.2 Name THREE circumstances wherein this type of foundation should be used. (3 x 1) (3)
- 5.9 Answer the following questions with regard to the steel profile in FIGURE 5.9.

**FIGURE 5.9**

- 5.9.1 Name the parts 5.9.A to 5.9.C. (3)
- 5.9.2 Name TWO uses of this type of beam. (2 x 1) (2)

[30]

CONSTRUCTION

QUESTION 6: TOOLS, CONCRETE, FORMWORK AND ROOF COVERING

6.1 Identify the type of saw in FIGURE 6.1.

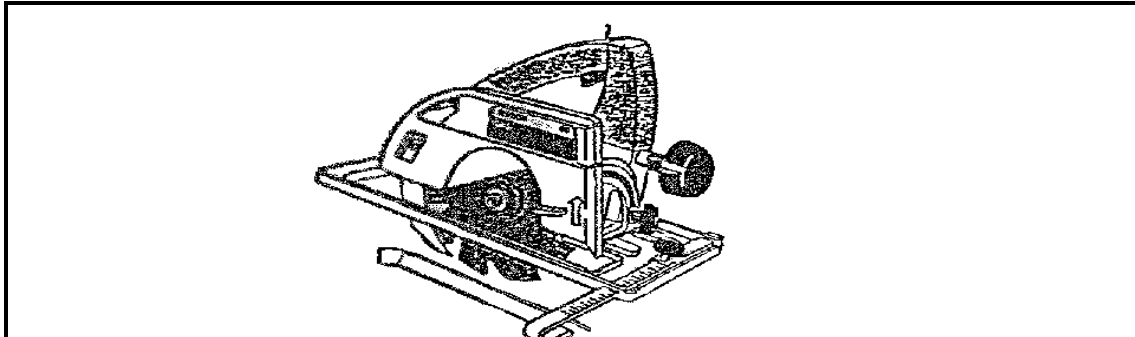


FIGURE 6.1

(1)

6.2 Name THREE properties of steel reinforcement for concrete structures. (3 x 1) (3)

6.3 Answer the following questions with regard to the steel reinforcement in FIGURE 6.3.

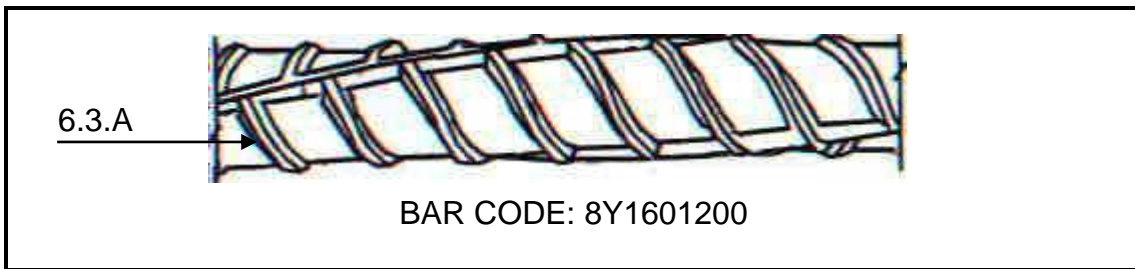


FIGURE 6.3

6.3.1 What is this type of steel bar called? (1)

6.3.2 What is the purpose of part 6.3.A? (1)

6.3.3 Which type of steel is used for this bar? (1)

6.3.4 What is the thickness of the bar according to the bar code? (1)

6.4 Name the THREE types of forces exerted onto concrete columns. (3 x 1) (3)

6.5 Name TWO disadvantages of steel reinforcement in concrete construction. (2 x 1) (2)

6.6 Name TWO purposes of stirrups in a concrete beam. (2 x 1) (2)

- 6.7 Indicate whether the following statements are TRUE or FALSE.
Write only the word 'true' or 'false' next to the number in the ANSWER BOOK.
- 6.7.1 Concrete for concrete suspended floors must be compacted. (1)
- 6.7.2 Formwork for concrete suspended floors can be struck after 4 days. (1)
- 6.7.3 Prefabricated concrete parts must be reinforced with formwork after they have been installed. (1)
- 6.7.4 The thickness of the concrete is a determining factor when formwork is struck. (1)
- 6.8 Briefly describe the purpose of adequate concrete covering. (2)
- 6.9 Name TWO requirements of emulsions for steel formwork. (2 x 1) (2)
- 6.10 Describe THREE requirements for good formwork. (3 x 2) (6)
- 6.11 Name the parts 6.11.A to 6.11.D of the formwork in FIGURE 6.11.

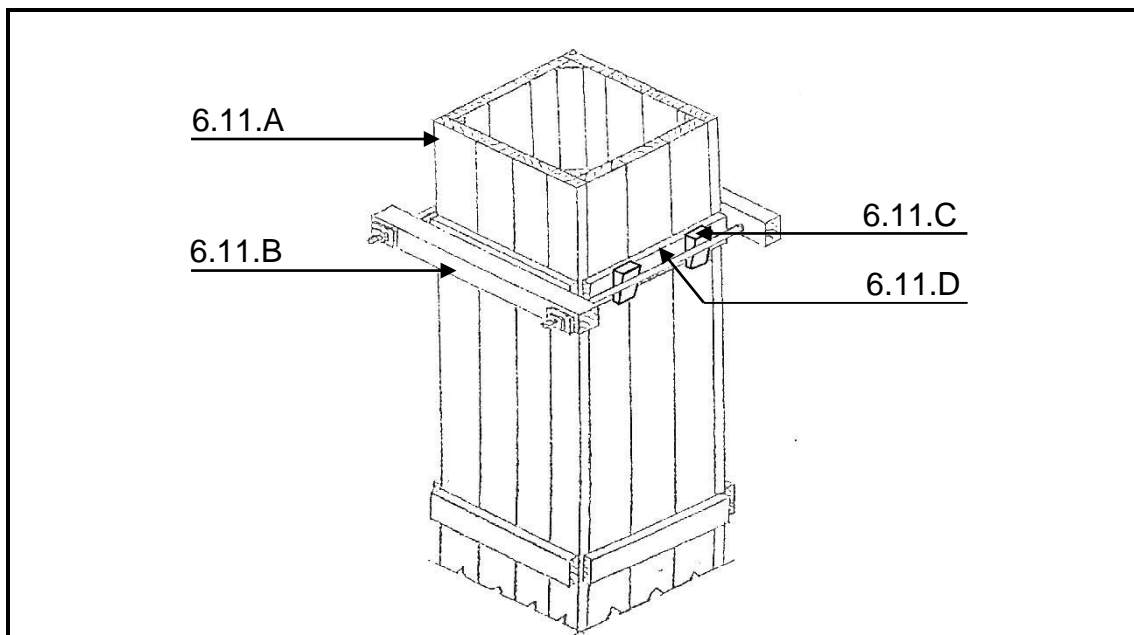


FIGURE 6.11

(4)

- 6.12 Briefly describe what a *gauged arch* is. (3)
- 6.13 Briefly motivate why the shaped side of the lintel must be placed upwards during the building process. (2)
- 6.14 Name TWO disadvantages of corrugated iron sheeting. (2 x 1) (2)

[40]**TOTAL SECTION B: 100**

SECTION C: CIVIL SERVICES

QUESTION 4: SAFETY, MATERIAL, EQUIPMENT AND JOINING

Start this question on a NEW page.

- 4.1 Briefly motivate why protective clothing must be worn when working with raw sewage. (2)
- 4.2 Briefly describe the requirements applicable to lead waste of soldering work. (2)
- 4.3 Explain how you would prevent inhalation of soldering fumes. (1)
- 4.4 Name THREE uses of ceramic. (3 x 1) (3)
- 4.5 Why must the water pump pliers be regularly oiled? (1)
- 4.6 Identify the type of tool which will be used for the following work:
 - 4.6.1 Cutting sheet metal (1)
 - 4.6.2 Cutting threads in pipes (1)
 - 4.6.3 Forming the head of rivets (1)
 - 4.6.3 Rolling a seam joint (1)
- 4.7 Answer the following questions with regard to the sheet metal machine in FIGURE 4.7.



FIGURE 4.7

- 4.7.1 Name the machine in FIGURE 4.7. (1)
- 4.7.2 What is the use of the machine? (1)
- 4.7.3 Name THREE maintenance measures for this machine. (3 x 1) (3)
- 4.8 Name THREE uses of polypropylene. (3 x 1) (3)

- 4.9 Name TWO advantages of stainless steel for kitchen sinks. (2 x 1) (2)
- 4.10 In which direction do the teeth of a hacksaw blade face? (1)
- 4.11 Name the parts 4.11.1 to 4.11.5 of the polythene compression fitting in FIGURE 4.11.

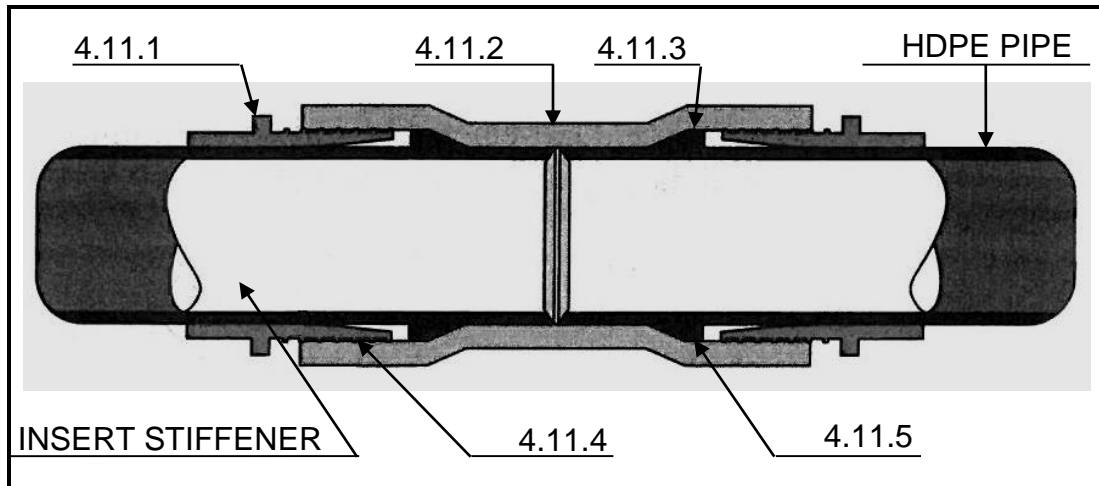


FIGURE 4.11

(5)

- 4.12 With which type of pipe joining will a ferrule be used?

(1)
[30]

CIVIL SERVICES**QUESTION 5: GRAPHICS AND CONSTRUCTION IN CIVIL SERVICES**

- 5.1 FIGURE 5.1 on ANSWER SHEET D shows a square pipe elbow. Use ANSWER SHEET D and develop and draw the development of the pipe elbow on scale 1 : 1. Show 4 mm for the seam allowance on both sides of the development. (12)
- 5.2 Make neat sketches to indicate the following symbols on a floor plan:
- 5.2.1 Stop valve (2)
 - 5.2.2 Water meter (2)
 - 5.2.3 Water closet (2)
 - 5.2.4 Rodding eye (2)
 - 5.2.5 Gully (2)
- 5.3 Make a neat sketch of a P-trap and also indicate the water level inside the trap. (3)
- 5.4 Describe the purpose of a trap. (2)
- 5.5 Briefly describe the purpose of curing concrete. (2)
- 5.6 Name ONE method for curing concrete. (1 x 1) (1)

[30]

CIVIL SERVICES

QUESTION 6: COLD AND HOT WATER SUPPLY, DRAINAGE AND SANITARY FITMENTS

- 6.1 Name THREE advantages and ONE disadvantage of each of the following water supply pipes:
- 6.1.1 Copper pipes (4)
- 6.1.2 Polyethylene pipes (4)
- 6.2 Briefly describe the purpose of the ball valve in the cistern of the water closet. (2)
- 6.3 Answer the following questions with regard to the tap in FIGURE 6.3.

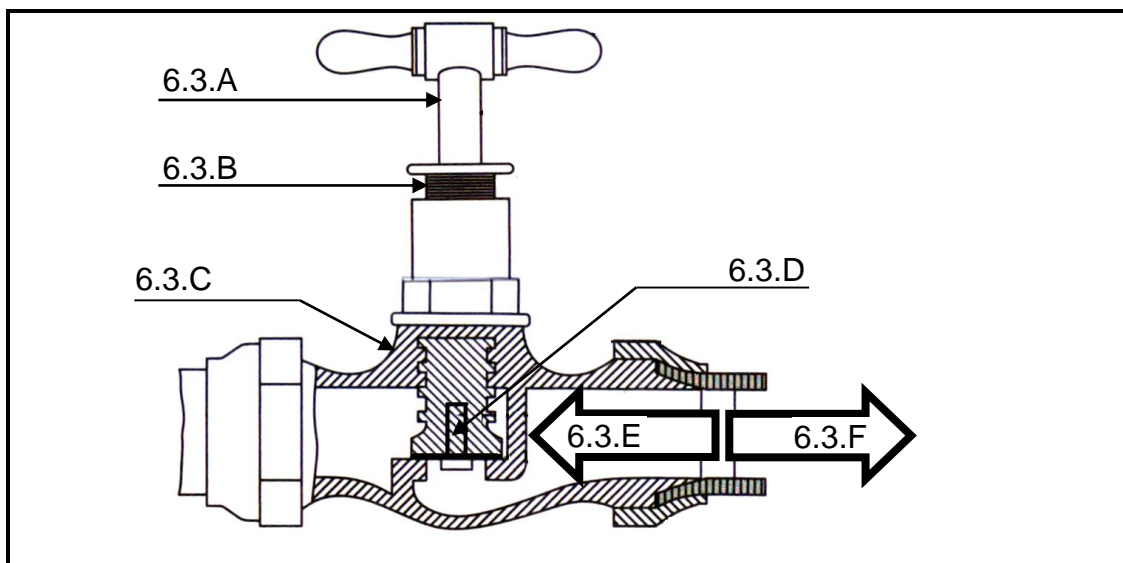


FIGURE 6.3

- 6.3.1 What is this type of tap called? (1)
- 6.3.2 Name the parts 6.3.A to 6.3.D. (4)
- 6.3.3 Which arrow point indicates the correct flow direction, arrow point 6.3.E or 6.3.F? (1)
- 6.4 Indicate whether the following statements with regard to underground pipes are TRUE or FALSE.
Write only the word 'true' or 'false' next to the number in the ANSWER BOOK.
- 6.4.1 The outside of the pipes must be covered with a soil layer of not more than 1 m. (1)
- 6.4.2 When a sanitary pipe and a water supply pipe are laid horizontally next to each other, the pipes must be 50 mm from each other. (1)
- 6.4.3 Pipes laid in trenches, must not rest on supports. (1)

6.5 Name TWO reasons why underground pipes must be protected. (2 x 1) (2)

6.6 Answer the following questions with regard to the geyser in FIGURE 6.6.

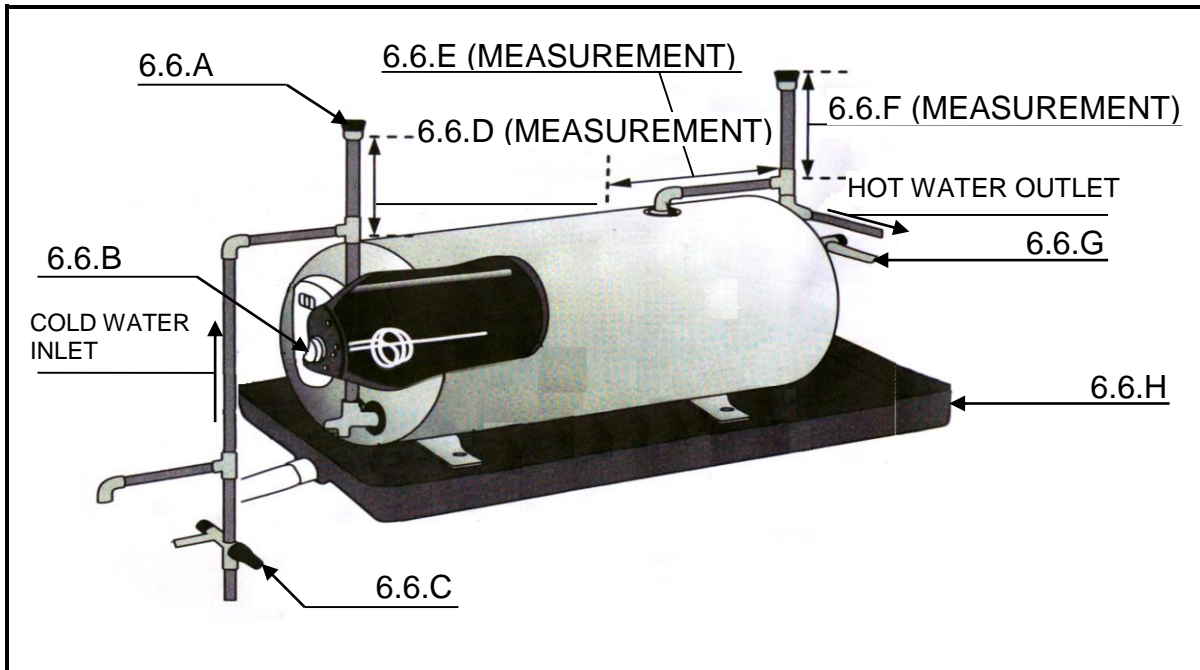


FIGURE 6.6

6.6.1 Name the parts and measurements 6.6.A to 6.6.H. (8)

6.6.2 Describe the purpose of part 6.6.C. (2)

6.7 Briefly describe why the tank of a low-pressure solar geyser must be installed higher than the panel. (2)

6.8 Name THREE factors which influence the optimal function of the solar hot water geyser. (3 x 1) (3)

6.9 Briefly describe the difference between *wastewater* and *soil water*. (2)

6.10 Name TWO advantages of a single stack drainage system. (2 x 1) (2)

[40]

TOTAL SECTION C: 100

SECTION D: WOODWORKING**QUESTION 4: MATERIAL, TOOLS, GRAPHICS AND WINDOWS**

Start this question on a NEW page.

- 4.1 Briefly motivate why wood must be seasoned before it is used in constructions. (2)
- 4.2 Describe in point form the artificial seasoning method for wood. (3)
- 4.3 Answer the following questions with regard to the conversion method in FIGURE 4.3.

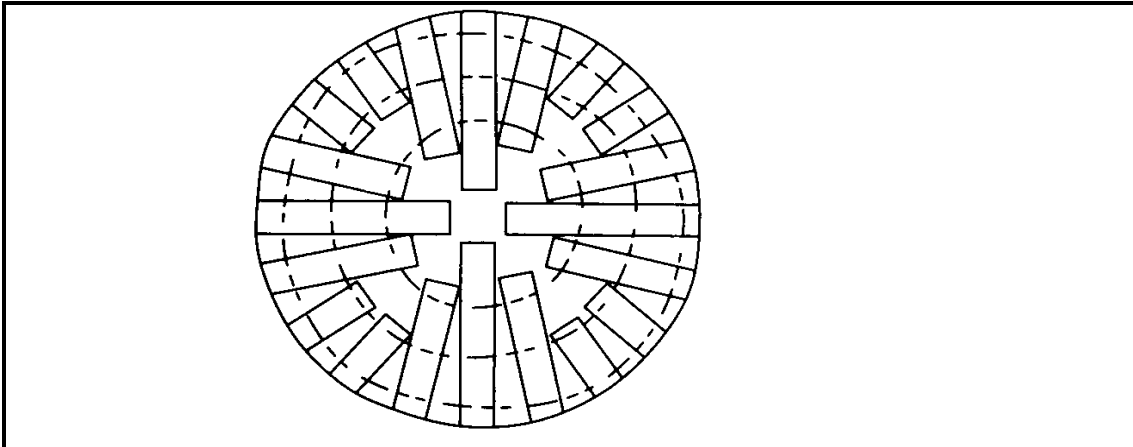


FIGURE 4.3

- 4.3.1 What is this conversion method called? (1)
- 4.3.2 Name TWO disadvantages of this conversion method. (2)
- 4.4 Which woodworking machines will be used for each of the following purposes:
- 4.4.1 Sawing along curved lines (1)
- 4.4.2 Planing of wood to a specific thickness (1)
- 4.4.3 Planing of wood to obtain a true edge (1)
- 4.5 Make a neat sketch to illustrate the symbol for the following products:
- 4.5.1 Dressed wood (2)
- 4.5.2 Plywood (2)
- 4.6 Make a neat sketch to illustrate the profile of the following mouldings:
- 4.6.1 Scotia (2)
- 4.6.2 Cornice (2)
- 4.7 FIGURE 4.7 on ANSWER SHEET E indicates the uncompleted section view through the bottom rail and window sill of a casement.
- 4.7.1 Complete the view by drawing, in good ratio, the missing parts of the bottom rail and window sill. (7)
- 4.7.2 Show any FOUR additional labels on the drawing. (4)

[30]

WOODWORKING

QUESTION 5: WINDOWS, DOORS AND WALL PANELLING

5.1 Name the parts and measurements 5.1.A to 5.1.H of the double casement window in FIGURE 5.1. (8)

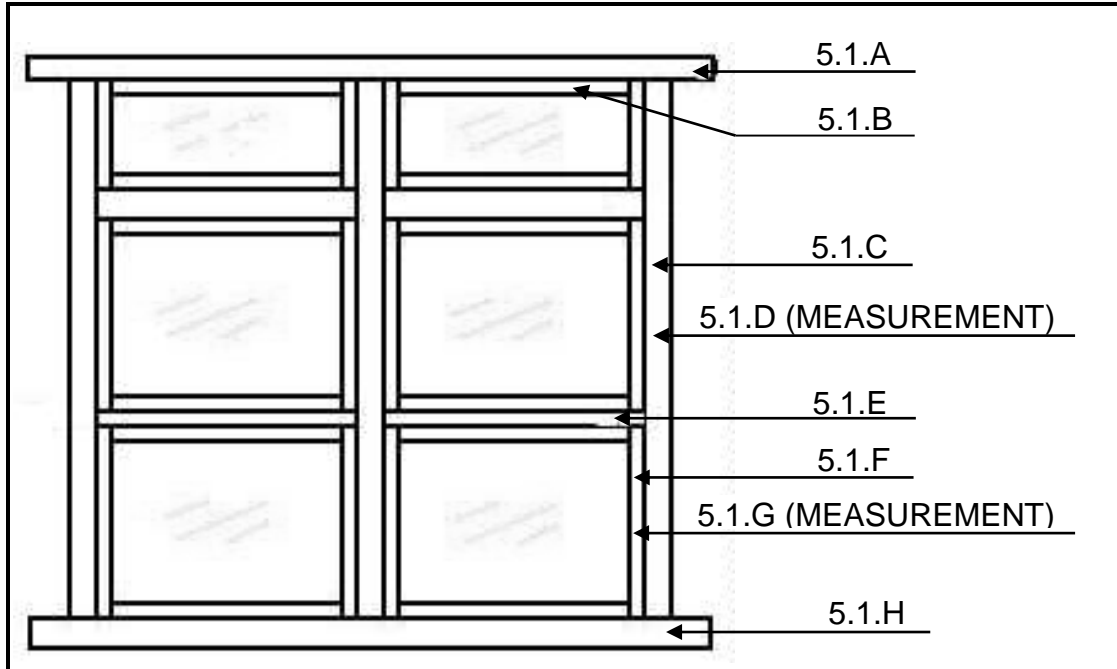


FIGURE 5.1

5.2 FIGURE 5.2 on ANSWER SHEET F shows the front elevation of a one-panel door.

5.2.1 Complete the section view AA by drawing, on good ratio, the bottom rail and the flat panel. (6)

5.2.2 Also show the thickness of the panel in the drawing. (1)

5.3 Make a neat freehand sketch, in good ratio, to illustrate the construction and parts of a ledged and braced batten door. (6)

5.4 Name FOUR advantages of plywood wall panelling. (4 x 1) (4)

5.5 What is the purpose of the horizontal and vertical grounds when plywood wall panelling is done? (1)

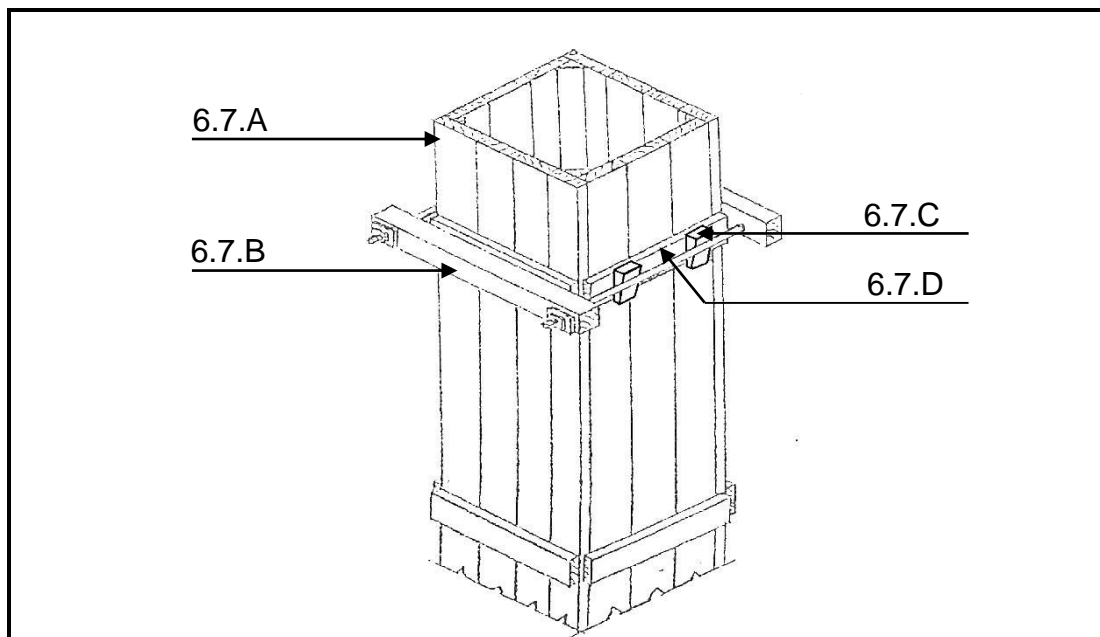
5.6 What is used for fixing the grounds of panelling to brick walls? (1)

5.7 Name THREE reasons why board products are ideal for built-in cupboards. (3 x 1) (3)

[30]

WOODWORKING**QUESTION 6: CENTERING, FORMWORK, SHORING AND SUSPENDED FLOORS**

- 6.1 Name FOUR factors which determine the design of arch centres. (4 x 1) (4)
- 6.2 What is the purpose of the wedge pair when a centre is positioned? (1)
- 6.3 Make a neat front elevation sketch of a rib for a semi-circular arch centre. Indicate the back segments with dotted lines. (5)
- 6.4 Describe THREE requirements for good formwork. (3 x 2) (6)
- 6.5 Why must the inner faces of formwork be treated with releasing oil? (1)
- 6.6 Briefly describe the disadvantage of formwork when the parts of formwork sides are not of even thickness. (2)
- 6.7 Name the parts 6.7.A to 6.7.D of the formwork in FIGURE 6.7.

**FIGURE 6.7**

- (4)
- 6.8 In which circumstances will flying shoring be used? (2)
- 6.9 What is the advantage of flying shoring? (1)
- 6.10 Indicate whether the following statements are TRUE or FALSE. Write only the word 'true' or 'false' next to the number in the ANSWER BOOK.
- 6.10.1 Rising hinges lift the door when it opens (1)
- 6.10.2 Sinkless hinges are used for heavy gates (1)

6.11 Answer the following questions with regard to the shoring in FIGURE 6.11.

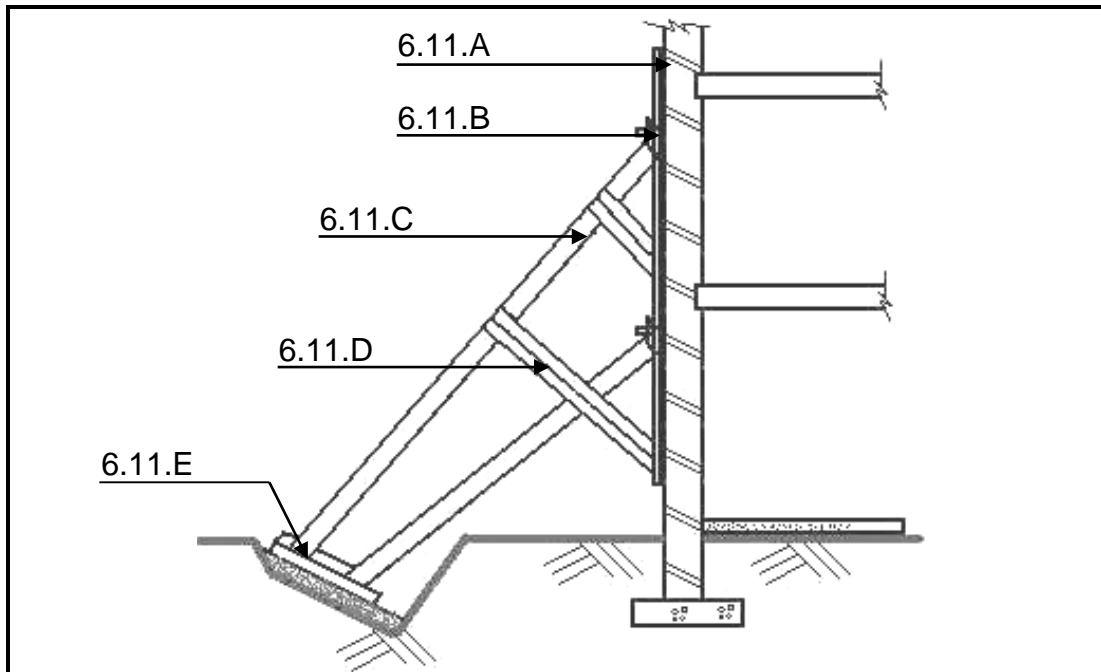


FIGURE 6.11

- 6.11.1 What is this shoring called? (1)
- 6.11.2 Describe the purpose of this shoring. (2)
- 6.11.3 Name the parts 6.11.A to 6.11.E. (5)

6.12 Identify the parts and measurements 6.12.A to 6.12.D of the suspended timber floor in FIGURE 6.12. (4)

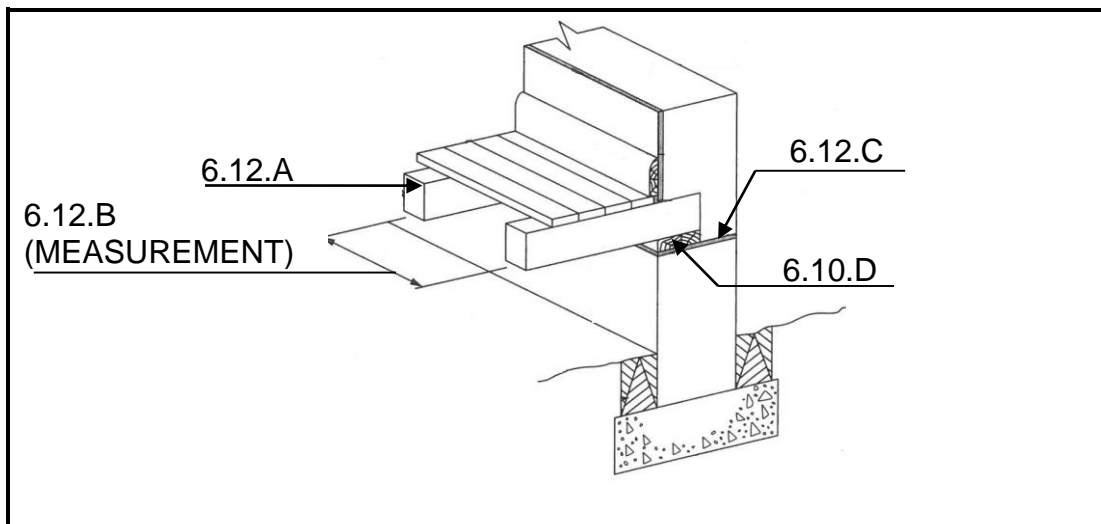


FIGURE 6.12

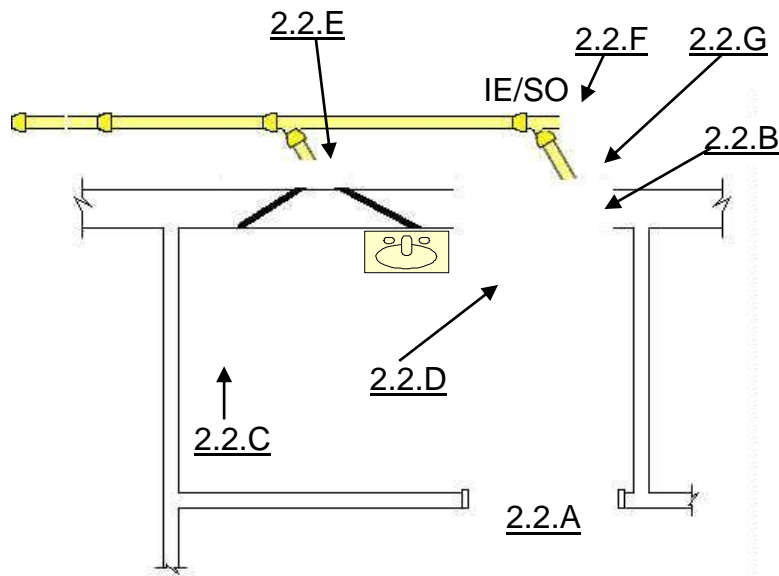
[40]

TOTAL SECTION D: 100
GRAND TOTAL: 200

ANTWOORDBLAD ANSWER SHEET	A	SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
		SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____

VRAAG / QUESTION 2.2

(22)



BATHROOM FLOOR PLAN

SCALE 1 : 50



BATHROOM INNER DIMENSIONS: 3m x 1,7m
 OUTER WALL THICKNESS: 280mm
 INNER WALL THICKNESS: 120mm

Door	2	
Window	2	
Shower	2	
Water closet	2	
Gully and abbreviation	2	
Rodding eye and abbreviation	2	
Vent pipe and abbreviation	2	
Measurements	8	
TOTAL	22	

ANTWOORDBLAD ANSWER SHEET	B	SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
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VRAAG / QUESTION 3.1

A	B	C	D
			3.1.1 CENTRE LINE (5)
		 m + m + m + m = m
			Minus: x m = = m
			3.1.2 VOLUME (3)
		 =

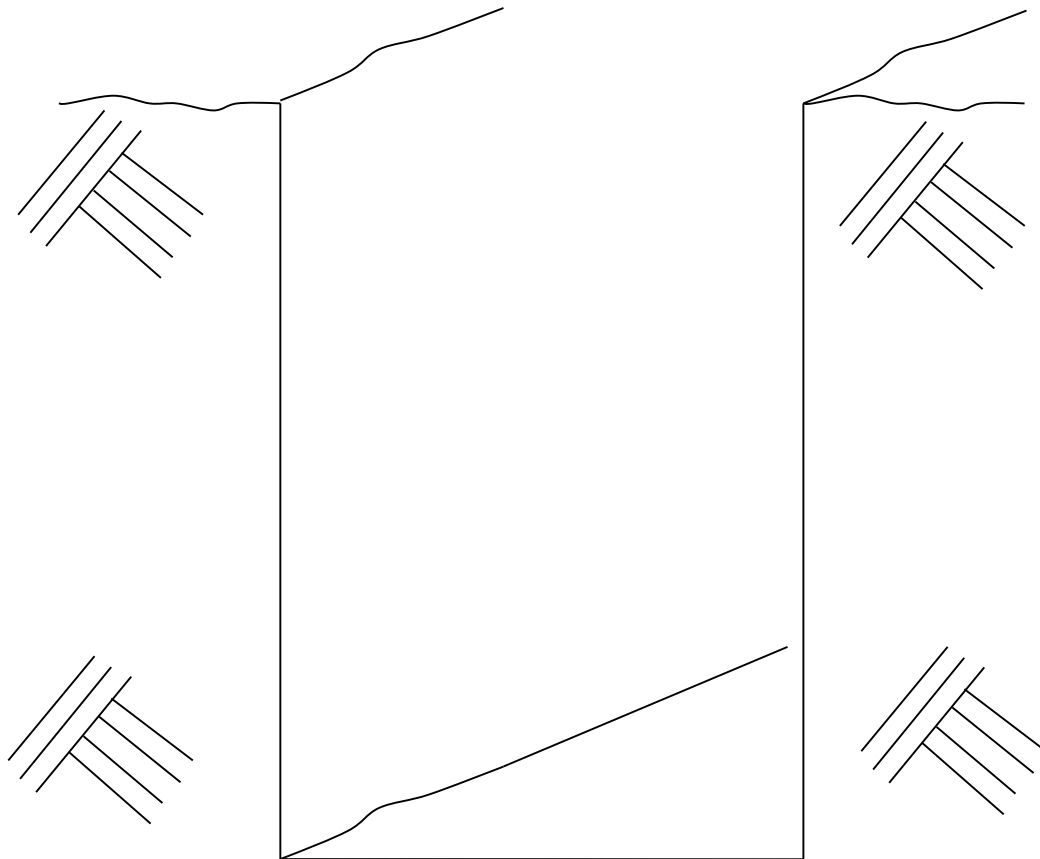
VRAAG / QUESTION 3.2 (14)

			AREA
			Total wall area
.....		
	.....	.....	Thus: Total wall area =
			TOTAL BRICKS
	.....		100 bricks/ m ² for single brick wall
.....	.....	.....	Thus: total bricks for wall
			Subtract
	.....		Opening A (3 m x 1,6 m)
.....	.....	.....	Opening A area: =
		
	.....	.....	Thus: Subtract bricks for opening A
			Subtract
	.....		Opening B (1 m x 1,6 m)
.....	.....	.....	Opening B area: =
		
	.....	.....	Thus: Subtract bricks for opening B
			TOTAL BRICKS:
			..... - ..... - ..... = ..... total number bricks

ANTWOORDBLAD ANSWER SHEET	C	CONSTRUCTION SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
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VRAAG / QUESTION 5.5

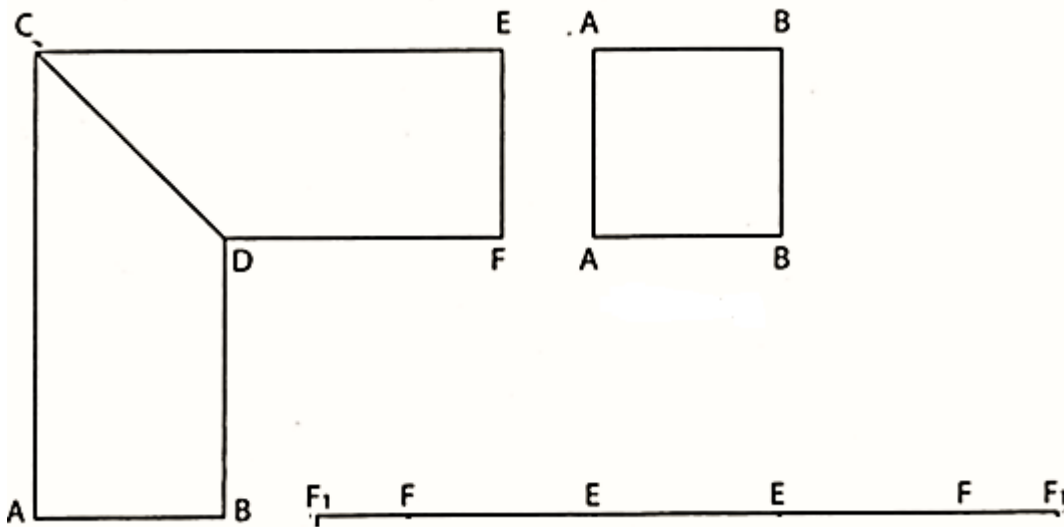
FIGURE 5.5 on ANSWER SHEET C shows an excavation of 1 metre deep and 0,7 metre wide in firm soil. Draw, in good ratio, the formwork for the excavation. Also show the labels of the THREE parts of the formwork. (7)

**FIGURE 5.5**

ANTWOORDBLAD ANSWER SHEET	D CIVIL SERVICES SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
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VRAAG / QUESTION 5.1

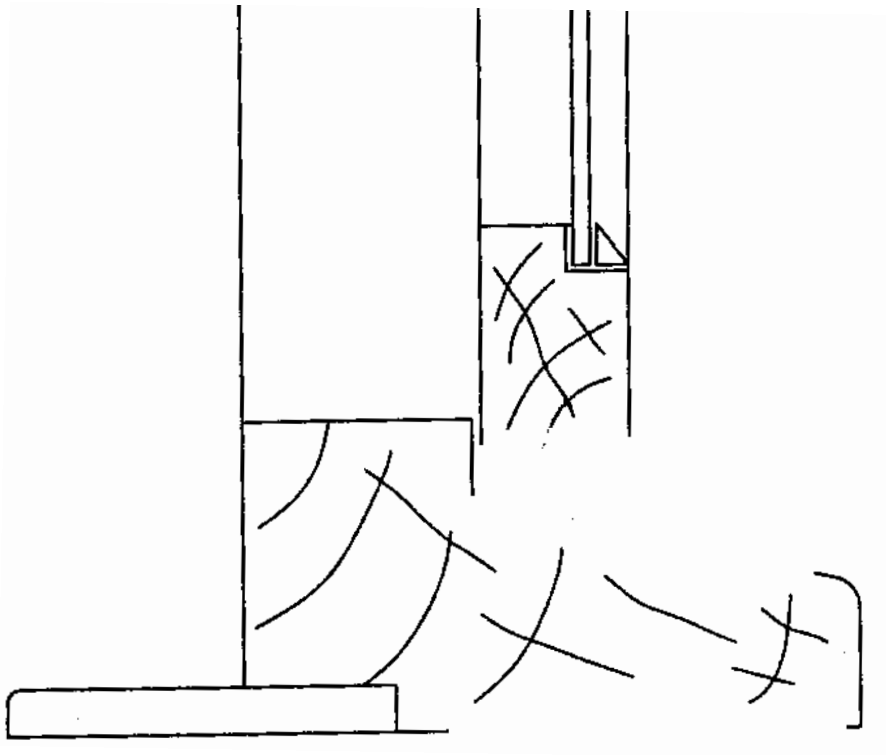
5.1 FIGURE 5.1 on ANSWER SHEET D shows a square pipe elbow. Use ANSWER SHEET D and develop and draw the development of the pipe elbow on scale 1 : 1. Show 4 mm for the seam allowance on both side of the development. (12)



ANTWOORDBLAD ANSWER SHEET	E	WOODWORKING SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAAM: _____ NAME: _____
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VRAAG / QUESTION 4.7

- 4.7 4.7.1 Complete the view by drawing, in good ratio, the missing parts of the bottom rail and windowsill. (7)
- 4.7.2 Show any FOUR additional labels on the drawing. (4)

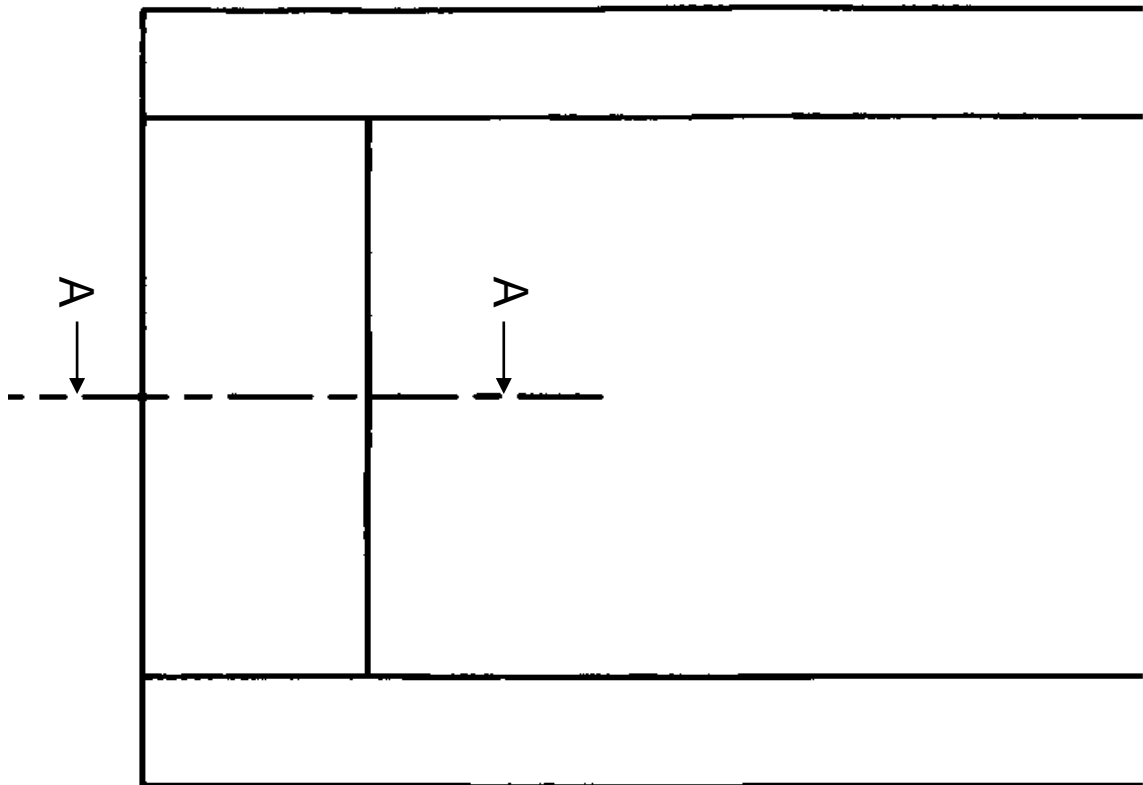


ANTWOORDBLAD ANSWER SHEET	F	WOODWORKING	NAAM: _____
		SIVIELE TEGNOLOGIE CIVIL TECHNOLOGY	NAME: _____

VRAAG / QUESTION 5.2

5.2 5.2.1 Complete the section view AA by drawing, in good ratio, the bottom rail and the flat panel. (6)

5.2.2 Also show the thickness of the panel on the drawing. (1)



FORMULA SHEET

IMPORTANT ABBREVIATIONS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
G	Centre of gravity	h	Height	d	Diameter
C	Centroid	b	Breadth/Width	r	Radius
L	Length	s	Side	A	Area
π	$\pi = \frac{22}{7} = 3,142$	ϕ	Diameter	V	Volume

FORMULAE

AREA OF	FORMULA (in words)	FORMULA (in symbols)	FORMULA FOR THE POSITION OF CENTROIDS	
			X-axis	Y-axis
Square	Side x Side	$s \times s$	$\frac{b}{2}$	$\frac{b}{2}$
Rectangle	Length x Breadth	$l \times b$	$\frac{l}{2}$	$\frac{b}{2}$
Right-angled triangle	$\frac{1}{2} \times \text{base} \times \text{height}$	$\frac{1}{2}b \times h$	$\frac{b}{3}$	$\frac{h}{3}$
Equilateral triangle/Pyramid	$\frac{1}{2} \times \text{base} \times \text{height}$	$\frac{1}{2}b \times h$	$\frac{b}{2}$	$\frac{h}{3}$
Circle	$\pi \times \text{radius} \times \text{radius}$	πr^2	Centroid is in the centre	
Circle	$\pi \times \text{diameter} \times \text{diameter divided by 4}$	$\frac{\pi d^2}{4}$		
Semi-circle	$\pi \times \text{radius } r \times \text{radius divided by 2}$	$\frac{\pi r^2}{2}$			Centroid is $0,424r$ on the centre line

Calculation of volumes of individual aggregates for concrete:

$$\text{Volume of material} = \text{Volume of concrete required} \times \frac{\text{Mix ratio of material}}{\text{Total mix ratio}}$$