

Cambridge International AS & A Level

Paper 2 Practical MARK SCHEME Maximum Mark: 110 Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always whole marks (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded positively:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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Tasks 1 and 7

	A	В	С	D	E	F	G	Н	- 1	J	K	L
1	Christine's Con	str	uction Company									
2												
3	Building foundation	plann	er for brick/block walls		Soil/Rock data			Dry	Wet	Dry	Wet	kg/m2
5	Data entry		Enter all dimensions in metres		Soil code	Soil/Rock type		Width	Width	Depth	Depth	Load bearing
6	Building weighting factor	1.36						in mm	in mm	in mm	in mm	pressure
7	Type of construction:	В	Enter W (freestanding Wall) or B (building)									
8	Length of wall:	4	Enter length in metres		L		Strip/trench fill	600	600	500	600	
9	Height of wall:	1.5	Enter height in metres		G	Granite	Strip/trench fill	600	600	200	200	59000
10	Code for the type of soil:	W	Enter soil code, C,G,H,J,L,P,S,T,U,V or W		S	ф	Strip/trench fill	600		500	500	30000
11	Thickness of wall:	S	Enter S (single) or D (double)		T	Shale	Strip/trench fill	600	600	500	500	27000
12	Soil moisture level:	D	Enter W (wet) or D (dry)				Strip/trench fill	450	450	700	700	30000
13				ļ	W	Soft chalk	Unsuitable					
14	Foundations		Strip foundations are not suitable for this site		J	Gravel	Strip/trench fill	450	900	700	800	25000
15	Depth:		metres		Н	Gravel and sand	Strip/trench fill	450		700	700	20000
16	Width:		metres	ļ	С	Clay	Strip/trench fill	700	1000	1000	3000	10000
17	Length:		metres		P	¢	Raft foundation only					
18	The volume of foundations will be:		cubic metres		U	Sand	Strip/trench fill	600	600	800	700	15000
19	The volume of concrete will be:		cubic metres									
20	Weight of the wall will be:	1732.5	kilograms		Costs per cubic metre							
21	Exceeds the foundation's load bearing				Concrete:	\$85.30						
22	The concrete for the foundations will cost:				Empty portion:	\$22.00						

\	Rows 1 and 3	Orange background with black text	1 mark
	Row 1	Centre aligned, 28 points high	1 mark
\	Row 3	Centre aligned, 18 points high	1 mark
\	Row 4	½ height of row 5	1 mark
١	Cells A5 and C5	Bold	1 mark
	Cells A1:C1 and A3:C3	Merged	1 mark
	All rows	Sans-serif font	1 mark
	Cells B6 to B20	Centre aligned	1 mark
	Cells A5:A20 & A22	Right aligned	1 mark
	Cells C5:C20	Left aligned	1 mark
	Cells L5:L6	Merged and centre aligned	1 mark
		Wrapped text	1 mark
	A22	Bold	1 mark
	B22, F21:F22	Formatted as currency in \$ with 2dp [Task 7 mark]	1 mark
	Footer	Created at [time] on [date] on left	1 mark
		Filename and path on right	1 mark

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Task 2

		1 _	1 -	
	С	D	E	F
1				
2				
3			Soil/Rock data	
5	Enter all dimensions in metres		Soil code	Soil/Rock type
6				
7	Enter W (freestanding Wall) or B (building)			
8	Enter length in metres		L	Limestone
9	Enter height in metres		G	Granite
10	Enter soil code, C,G,H,J,L,P,S,T,U,V or W		S	Sandstone
11	Enter S (single) or D (double)		T	Shale
12	Enter W (wet) or D (dry)		V	Firm Chalk
13			W	Soft chalk
14	=IF(OR(B10=E13,B10=E17),"Strip foundations are r	not suitable for this site","")	J	Gravel
15	metres		Н	Gravel and sand
16	metres		С	Clay
17	metres		P	Peat
18	cubic metres		U	Sand
19	cubic metres			
20	kilograms		Costs per cubic metre	
21			Concrete:	85.3
22			Empty portion:	22
	C14	=IF() with correct syntax OR(,) B10=E13 B10="V B10=E17 B10="P ,"Strip foundations are not suitable,"" Blank of Conditional formatting applied when not blank white, centre aligned, bold text	1 m V" 1 m " 1 m e for this site" 1 m ell 1 m 1 m	nark nark nark nark nark nark nark nark

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Tasks 3 and 4

ask	3 3 and 4					
		В				
1	ristine's Co	B15	=IF(C14<>"")	<mark>, </mark>		1 mark
2		2.0	,""			1 mark
\vdash	uilding foundatio	r	VLOOKUP(B10, E8:K18,			1 mark 1 mark
5			6+	15(5(0) 5 0 (1)		1 mark
⊢—	1.36		IF(B12="W",1,0)	=IF(B12="D",0,1)		1 mark
7			,FALSE) Whole VLOOKUP /1000	,0)		1 mark 1 mark
8	4		Alternative for lookup:			IIIIaik
9	1.5		VLOOKUP(B10,			1 mark
10			E8:K18,			1 mark
11			IF(B12="W",7,6)		IF(B12="D",6,7)	2 marks
12			,FALSE)			1 mark
13		1				
14						
15	=IF(C\$14<>"","",VLOOKUP(B	\$10,\$E\$8:\$K18,6+IF(\$	B\$12="W",1,0),0)/1000)			
16	=IF(C\$14<>"","",VLOOKUP(B	\$10,\$E\$8:\$K18,4+IF(\$	B\$12="W",1,0),0)/1000)			
	=IF(C\$14<>"","",B8)					
	=IF(C\$14<>"","",B15*B16*B1					
19	=IF(C\$14<>"","",ROUNDUP(E	B18*1.07,2)				
-	=IF(B7="B",1.5,1)*IF(UPPER(B11)="S",B8*	*99*55*3.5*2)			
21						
22	=IF(C\$14<>"","",B19*F21+(6	5-(B19-6*INT(B19				
		B16	=IF(C\$14<>"","",)			1 mark
			VLOOKUP(B10,E8:K18			1 mark
			,4+IF(B12="W",1,0),0)			1 mark
		D17	/1000 =IF(C\$14<>"" "")			1 mark
		B17	=IF(C\$14<>"","",) B8			1 mark 1 mark
			טם			I IIIaik

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\sqcup		B18	=IF(C\$14<>"","",)		1 mark
	wistingle Cons		B15		1 mark
1	hristine's Cons		*B16	,	1 mark
2		D40	*B17	4	1 mark
\vdash		B19	=IF(C\$14<>"","",)		1 mark
3	uilding foundation pl		ROUNDUP() B18*1.07		1 mark 1 mark
-			,2	Λ	1 mark
5		B20	=IF(B7="B",,)	=IF(B7="W", ,)	1 mark
$\overline{}$	1.36	520	1.5	1	1 mark
7			1	1.5	1 mark
$\overline{}$	4		*		1 mark
\vdash	1.5		=IF(B11="S", ,)	=IF(B11="D", ,)	1 mark
10			,B8*B9*55*3.5	,B8*B9*55*3.5*2	1 mark
11			,B8*B9*55*3.5*2	,B8*B9*55*3.5	1 mark
12					
13					
14					
15	=IF(C\$14<>"","",VLOOKUP(B\$10,\$	E\$8:\$ <i>V</i> \$12=	"W",1,0),0)/1000)		
16	=IF(C\$14<>"","",VLOOKUP(B\$10,\$i	E\$8F F(\$B\$12=	"W",1,0),0)/1000)		
17	=IF(C\$14<>"","",B8)				
18	=IF(C\$14<>"","",B15*B16*B17				
19	=IF(C\$14<>"","",ROUNDUP(B18*1.	.07,2))			
20	=IF(B7="B",1.5,1)*IF(UPPER(B11)=	"S",B8*B9*55*3.5,B8*	B9*55*3.5*2)		
21					
22	=IF(C\$14<>"","",B19*F21+(6-(B19	-6*INT(B19/6)))*F22)			

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Task 5

	A
1	Chri
2	
3	Buil
5	Data entry
6	Building weighting factor
7	Type of construction:
8	Length of wall:
9	Height of wall:
10	Code for the type of soil:
11	Thickness of wall:
12	Soil moisture level:
13	
14	Foundations
15	Depth:
16	Width:
17	Length:
18	The volume of foundations will be:
19	The volume of concrete will be:
20	Weight of the wall will be:
21	=IF(B20/B8>=VLOOKUP(B10,E8:L18,8,0),"Exceeds the foundation's load bearing","")
22	The concrete for the foundations will cost:

A21	=IF() with correct syntax	1 mark
	B20/B8	1 mark
	>=	1 mark
	VLOOKUP(B10,E8:L18,8,0)	1 mark
	,"Exceeds the foundation's load bearing"	1 mark
	, , , , , , , , , , , , , , , , , , ,	1 mark
	Conditional formatting replicated from C14	1 mark

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Task 6

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	В
1	nristine's Construction Company
2	
3	uilding foundation planner for brick/block walls
5	
6	1.36
7	В
8	4
9	1.5
10	W
11	S
12	D
13	
14	
15	=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,6+IF(\$B\$12="W",1,0),0)/1000)
16	=IF(C\$14<>"",VLOOKUP(B\$10,\$E\$8:\$K18,4+IF(\$B\$12="W",1,0),0)/1000)
17	=IF(C\$14<>"","",B8)
18	=IF(C\$14<>"","",B15*B16*B17)
19	=IF(C\$14<>"","",ROUNDUP(B18*1.07,2))
20	=IF(B7="B",1.5,1)*IF(UPPER(B11)="S",B8*B9*55*3.5,B8*B9*55*3.5*2)
21	
22	=IF(C\$14<>\"","".B19*F21+(6-(B19-6*INT(B19/6)))*F22)

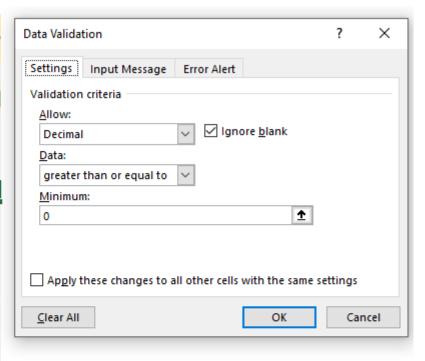
```
=IF(C$14<>"","", ...)
B22
                                                                              1 mark
                     B19
                                                                              1 mark
                     *F21
                                                                              1 mark
                     (...concrete cost...) + (...empty cost with B19 included ...) 1 mark
                                        inside brackets not needed if MOD
                     (6-( ... ))
                                                                              1 mark
                     B19
                                              MOD( ... )
                                                                              1 mark
                                              B19
                                                                              1 mark
                     6*
                                                                              1 mark
                     INT( ... )
                                              6
                                                                              1 mark
                     B19/6
                                              ✓ if 5 above
                                                                              1 mark
                     (...empty cost with B19 included...)*F22
                                                                              1 mark
```

Task 8

Christine's Construction	on Compar	Data Validation	?	×	
		Settings Input Message Error Alert			
Building foundation planner for	brick/block wal	Validation criteria Allow: List ✓ Ignore blank			
1.36		List Ignore blank			
В		between V			
4		Source:			
1.5		W,B <u>↑</u>			
W					
S					
D		Apply these changes to all other cells with the same settings			
			_		
=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,6+IF(\$B\$12="	'W",1,0),0)/1000)	Clear All OK	Cance	el	
=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,4+IF(\$B\$12="	NATI 4 0) 0) /1000)				
=IF(C\$14<>"","",B8)		ules applied to all cells B7 to B12	1 ma		
=IF(C\$14<>"","",B15*B16*B17)		opropriate error messages includes data to be (re-)entered	1 ma		
=IF(C\$14<>"","",ROUNDUP(B18*1.07,2))		or B	1 ma		
=IF(B7="B",1.5,1)*IF(UPPER(B11)="S",B8*B9*55*3.5,B8*		€0 and decimal	1 ma	ark	
		-0 and decimal	1 ma	ark	
=IF(C\$14<>"","",B19*F21+(6-(B19-6*INT(B19/6)))*F22)		ook up from list	1 ma		
		ell references used	1 ma		
		3:E18 or list C,G,H,J,L,P,S,T,U,V,W or D	1 ma		
		סר D	1 ma 1 ma		

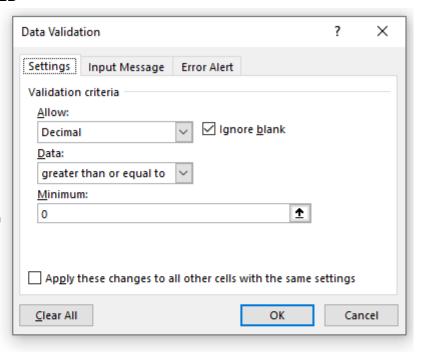
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Building foundation planner for brick/block wa
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=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,6+IF(\$B\$12="W",1,0),0)/1000)
=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,4+IF(\$B\$12="W",1,0),0)/1000)
=IF(C\$14<>"","",B8)
=IF(C\$14<>"","",B15*B16*B17)
=IF(C\$14<>"","",ROUNDUP(B18*1.07,2))
=IF(B7="B",1.5,1)*IF(UPPER(B11)="S",B8*B9*55*3.5,B8*B9*55*3.5*2)
=IF(C\$14<>"","",B19*F21+(6-(B19-6*INT(B19/6)))*F22)



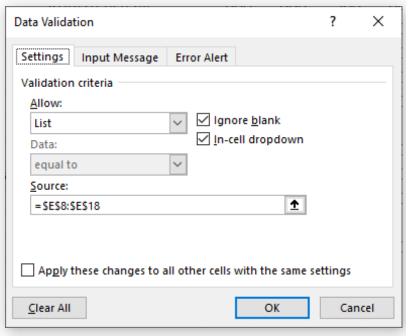
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Christine's Construction Compar
Building foundation planner for brick/block wa
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=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,6+IF(\$B\$12="W",1,0),0)/1000)
=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,4+IF(\$B\$12="W",1,0),0)/1000)
=IF(C\$14<>"","",B8)
=IF(C\$14<>"","",B15*B16*B17)
=IF(C\$14<>"","",ROUNDUP(B18*1.07,2))
=IF(B7="B",1.5,1)*IF(UPPER(B11)="S",B8*B9*55*3.5,B8*B9*55*3.5*2)
=IF(C\$14<>"","",B19*F21+(6-(B19-6*INT(B19/6)))*F22)



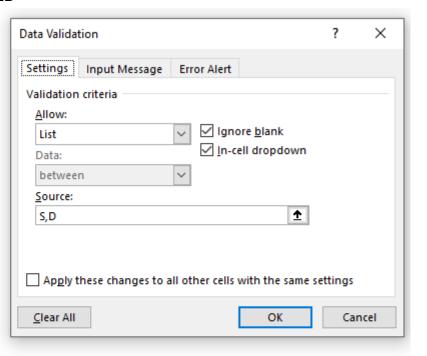
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Christine's Construction Compar
Building foundation planner for brick/block wal
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=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,6+IF(\$B\$12="W",1,0),0)/1000)
=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,4+IF(\$B\$12="W",1,0),0)/1000)
=IF(C\$14<>"","",B8)
=IF(C\$14<>"","",B15*B16*B17)
=IF(C\$14<>"","",ROUNDUP(B18*1.07,2))
=IF(B7="B",1.5,1)*IF(UPPER(B11)="S",B8*B9*55*3.5,B8*B9*55*3.5*2)
=IF(C\$14<>"","",B19*F21+(6-(B19-6*INT(B19/6)))*F22)



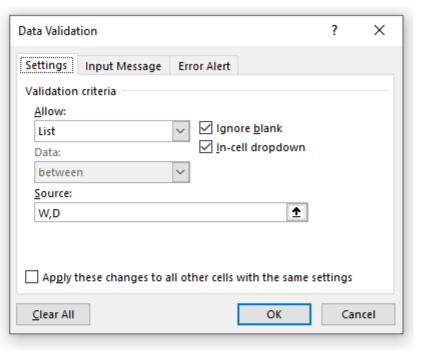
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Christine's Construction Compar
Building foundation planner for brick/block wal
banang roamation planner for street, stock was
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=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,6+IF(\$B\$12="W",1,0),0)/1000)
=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,4+IF(\$B\$12="W",1,0),0)/1000)
=IF(C\$14<>"","",B8)
=IF(C\$14<>"","",B15*B16*B17)
=IF(C\$14<>"","",ROUNDUP(B18*1.07,2))
=IF(B7="B",1.5,1)*IF(UPPER(B11)="S",B8*B9*55*3.5,B8*B9*55*3.5*2)
=IF(C\$14<>"","",B19*F21+(6-(B19-6*INT(B19/6)))*F22)



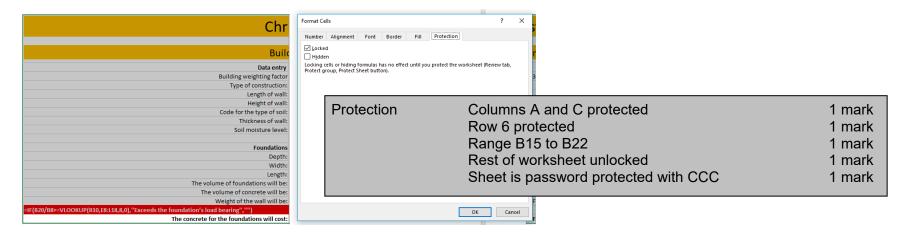
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Christine's Construction Compar
Building foundation planner for brick/block wal
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D ×
=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,6+IF(\$B\$12="W",1,0),0)/1000)
=IF(C\$14<>"","",VLOOKUP(B\$10,\$E\$8:\$K18,4+IF(\$B\$12="W",1,0),0)/1000) =IF(C\$14<>"","",B8)
=IF(C\$14<>"","",B15*B16*B17) =IF(C\$14<>"","",ROUNDUP(B18*1.07,2))
=IF(B7="B",1.5,1)*IF(UPPER(B11)="S",B8*B9*55*3.5,B8*B9*55*3.5*2)
=IF(C\$14<>"","",B19*F21+(6-(B19-6*INT(B19/6)))*F22)



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Task 9



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Task 10

Christine's Construction Company

Building foundation planner for brick/block walls

Building weighting factor 1.36 Type of construction: W

W Enter W (freestanding Wall) or B (building)

Length of wall:

4 Enter length in metres 1.5 Enter height in metres

Height of wall: Code for the type of soil:

W Enter soil code, C,G,H,J,L,P,S,T,U,V or W

Thickness of wall:

S Enter S (single) or D (double)

Soil moisture level:

Enter W (wet) or D (dry)

Foundations

Depth: metres Width: metres

Width: Length:

The volume of foundations will be:
The volume of concrete will be:
Weight of the wall will be: 1155

ili wili be.

Exceeds the foundation's load bearing The concrete for the foundations will cost:

Strip foundations are not suitable for this site

metres metres cubic metres cubic metres kilograms

Modelling		
、10a	W,4,1.5,W,S,D	1 mark
\	Error displayed in C14	1 mark
	Error displayed in A21	1 mark
	Blank cells in column B in B14:B19	1 mark
	All 4 documents as .pdf & professional output	1 mark

Created at 18:03 on 20/12/2018

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Christine's Construction Company

Building foundation planner for brick/block walls

Data entry Enter all dimensions in metres

Building weighting factor 1.36

Type of construction: W Enter W (freestanding Wall) or B (building)

Length of wall: 4 Enter length in metres Height of wall: 5 Enter height in metres

Code for the type of soil: J Enter soil code, C,G,H,J,L,P,S,T,U,V or W

Thickness of wall: D Enter S (single) or D (double)
Soil moisture level: D Enter W (wet) or D (dry)

Foundations

Depth: 0.7 metres
Width: 0.45 metres
Length: 4 metres
swill be: 1.26 cubic met

The volume of foundations will be: 1.26 cubic metres
The volume of concrete will be: 1.35 cubic metres
Weight of the wall will be: 7700 kilograms

The concrete for the foundations will cost: \$217.46

Modelling		
∖ 10b	W,4,5,J,D,D	1 mark
	Depth = 0.7 and Width = 0.45	1 mark
	Length =4 and Volume =1.26	1 mark
	Volume 1.35	1 mark
	Weight 7700	1 mark
	Cost \$217.46	1 mark

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Christine's Construction Company

Building foundation planner for brick/block walls

Data entry		Enter all dimensions in metres
Building weighting factor	1.36	
Type of construction:	В	Enter W (freestanding Wall) or B (building)
Length of wall:	28	Enter length in metres
Height of wall:	5.2	Enter height in metres
Code for the type of soil:	J	Enter soil code, C,G,H,J,L,P,S,T,U,V or W
Thickness of wall:	D	Enter S (single) or D (double)
Soil moisture level:	W	Enter W (wet) or D (dry)

Foundations

Depth: 0.8 metres Width: 0.9 metres Length: 28 metres

The volume of foundations will be: 20.16 cubic metres
The volume of concrete will be: 21.58 cubic metres
Weight of the wall will be: 84084 kilograms

The concrete for the foundations will cost: \$1,894.01

Modelling
10c B,28,5.2,J,D,W 1 mark
Cost \$1894.01 1 mark

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Christine's Construction Company

Building foundation planner for brick/block walls

Data entry		Enter all dimensions in metres	
Building weighting factor	1.36		
Type of construction:	В	Enter W (freestanding Wall) or B (building)	
Length of wall:	30	Enter length in metres	
Height of wall:	50	Enter height in metres	
Code for the type of soil:	U	Enter soil code, C,G,H,J,L,P,S,T,U,V or W	
Thickness of wall:	D	Enter S (single) or D (double)	
Soil moisture level:	W	Enter W (wet) or D (dry)	

Foundations

Depth: 0.7 metres Width: 0.6 metres Length: 30 metres

The volume of foundations will be: 12.6 cubic metres
The volume of concrete will be: 13.49 cubic metres
Weight of the wall will be: 866250 kilograms

Exceeds the foundation's load bearing

The concrete for the foundations will cost: \$1,249.92

 Modelling
 10d
 B,30,50,U,D,W
 1 mark

 Cell A21 Error message ref: weight
 1 mark

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Task 11

Audio		
j21music.mp3	Clip speed x2	1 mark
	Second track plays alongside	1 mark
	Starts after 2 seconds	1 mark
	Merged to monophonic	1 mark
	Audio file length – first 29.5 seconds	1 mark
	Exported as CCCsound_ZZ999_9999.mp3	1 mark
	Exported as CCCsound_ZZ999_9999.ogg	1 mark

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