

Centre Number				
Candidate Number				

General Certificate of Secondary Education 2016

Technology and Design

Unit 1: Technology and Design Core

[GTD11] TUESDAY 24 MAY, MORNING

GTD11

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Questions which require drawing or sketching should be completed using an H.B. pencil. All other questions must be completed using blue or black ink only.

Do not write in pencil or with a gel pen.

Answer all questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 90.

Quality of written communication will be assessed in Question 11.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

<u>99</u>32

24GTD1101

Table 1 shows a number of different symbols. Using the first row as a guide, complete the table.

Sketch of Symbol	Type of Symbol	Name of Symbol
\bigotimes	Electronic	Bulb
		SPST Switch
	Mechanical	
		Wear hand protection
		Primary or Secondary cell (Battery)
— ●		Pressure Source
· · · · · · · · · · · · · · · · · · ·		[{

Table 1

9932

24GTD1102

92 vg Learning Œ Œ **C** Ð Œ Œ Ð Œ Ð Œ Ð Œ Œ Ð Œ Ð Œ Œ ÐÐ Œ Ð Œ Bernardia Ð Œ Ð <u>C</u> Ð Œ Ð Œ Ð

Œ

BLANK PAGE

DO NOT WRITE ON THIS PAGE

(Questions continue overleaf)

9932

[Turn over

24GTD1103

y Learning Œ Ð Œ Ð Œ ÐÐ Œ Ð Œ Ð Œ Ð Œ Ð Œ Œ ÐÐ Œ ÐÐ Œ DD vg Learning Ð Œ Ð Œ Ð Œ ÐÐ Œ ÐÐ Œ Ð Œ Œ Ð Œ Ð Œ





Fig. 1

- © Wavebreakmedia Ltd / Thinkstock
- (a) Give two benefits of using the CAD process.

_ [2]

24GTD1104

(b)	When the CAD design is completed the file is downloaded to a CNC machine.		
	Name three CNC machines that may be used in a school workshop.		
	Machine 1:	[1]	
	Machine 2:	[1]	
	Machine 3:	[1]	
(c)	The CAM process is used in industry; give one benefit of using this process.		

_____ [1]

[Turn over

24GTD1105

- Ð Œ Ð Œ ÐÐ Œ Ð 0 ÐÐ Œ Ð <u>C</u> Ð Ð Œ Ð Œ ÐÐ <u>C</u> Ð Œ ÐÐ Œ Ð Œ Ð Œ Ð Œ Ð Œ ÐÐ Œ Ð Œ ÐÐ Œ Ð Œ ÐÐ Œ Ð 0: E O:
- **3 Fig. 2** shows a mechanism for winding a cable on to a drum. The drum is turned by a system of gears using a handle as shown.



24GTD1106



24GTD1107

5	Cur	rent, voltage, and resistance are three common terms used in electronics.	
	(a)	State the name of each electronic unit used to measure current, voltage and resistance.	
		Current	
		Voltage	
		Resistance	[3]
	(b)	Resistors are used with LEDs in electronic circuits. Draw the circuit symbol for resistor and a LED.	а
		Resistor	
		LED	
			[3]
	(c)	A $3.3 \text{k}\Omega$ resistor is to be used in an electronic circuit. Use the information below to identify the colour code for the first three bands shown on the resistor.	W
		0 = Black 1 = Brown 2 = Red 3 = Orange 4 = Yellow 5 = Green 6 = Blue 7 = Violet 8 = Grey 9 = White	
		Band 1 colour	[1]
		Band 2 colour	[1]
		Band 3 colour	[1]
9932			



Ø

BLANK PAGE

DO NOT WRITE ON THIS PAGE

(Questions continue overleaf)

9932

[Turn over

24GTD1109

Œ ÐÐ Œ ÐÐ Œ Parcel ÐÐ Œ ÐÐ **Conveyor Belt** Œ ÐÐ Œ Ð Œ Ð Œ ÐÐ Α_____ Œ ÐÐ Œ ÐÐ Œ Ð Œ ___ [1] ÐÐ Œ Ð Œ ÐÐ Œ ÐÐ Œ ÐÐ <u>C</u> Ð Œ Ð Œ Ð Œ ÐÐ Œ

Ð

O:

Ð Œ

В C_____[3] (ii) State one safety check which should be carried out before testing the circuit.

24GTD1110

6 Fig. 4 shows a pneumatic circuit for removing parcels from a conveyor belt.

-0>

С

Fig. 4

В

(i) Name the components A, B and C.

Е

Α

D

9932

(iii) Explain how the circuit operates to remove a parcel from the conveyor belt by referring to the function of each of the components A, B, C, D and E.

Component A	
Component B	
Component C	
Component D	
Component E	[5]

9932

[Turn over

24GTD1111

7 Fig. 5 (a) shows an aluminium photo frame holder. Fig. 5 (b) shows the pattern for making the aluminium holder. This is to be shaped to enable a photograph with a card backing to slide down into the frame as shown.



The centre part of the aluminium is to be removed for the picture to be seen. To start this process a hole is drilled in the corner as shown in **Fig. 5 (b)**.

[2]

(a) Outline the purpose of drilling this hole.

(b) Name the two tools used to mark the centre of the hole in preparation for drilling. (i) _____ (ii) _____ [2] 9932

24GTD1112

O:

(c) Suggest how the sides of the holder as shown by the dotted lines could be bent to produce the shape shown in **Fig. 5 (a)**.

_____ [2]

9932

[Turn over

24GTD1113

- Ð Œ DD Œ ÐÐ Œ ÐÐ Œ ÐÐ Œ ÐÐ Œ ÐÐ Œ Ð Œ Ð Œ ÐÐ Œ ÐÐ <u>C</u> ÐÐ Œ ÐÐ Œ Ð Œ ÐÐ Œ Ð Œ ÐÐ Œ ÐÐ <u>C</u> Ð Œ Ð Œ Ð Œ Ð Œ Ð O:
- 8 Four electronic components are each described by the following statements **A**, **B**, **C** and **D**.
 - A The component functions as an electronic switch when a voltage of 0.7 volts is applied at the base leg.
 - **B** The component responds to changes in light levels.
 - **C** The component makes an audible noise when operated.
 - **D** The component responds to changes in temperature to function.
 - (a) Complete **Table 2** by naming the electronic component that is described by each statement.

Letter	Name of Electronic Component
Α	
В	
С	
D	

Table 2

[4]

24GTD1114

9932

(b) The circuit shown in Fig. 6 requires completion by correctly adding the three component symbols described by the statements A, C and D. Complete the circuit by adding the missing circuit symbols.





[Turn over



9932

- Ð Œ DD va Leerning Œ ÐÐ Œ ÐÐ Œ ÐÐ Œ ÐÐ Œ Ð <u>C</u> ÐÐ Œ Ð O: ÐÐ Œ ÐÐ Œ ÐÐ Œ ÐÐ Œ Ð Œ Ð Œ Ð Œ ÐÐ Œ ÐÐ 0 ÐÐ Œ Ð Œ ÐÐ Œ Ð Œ Ð O:
- **9 Fig. 7** shows an outline plan view of the layout of a semi-automatic barrier system for a car park.



The barrier is activated by inserting a ticket. When the ticket is inserted, the barrier motor rotates to lift the barrier to the open position. It takes 6 seconds for the barrier to reach the fully open position before the barrier motor is turned off. A membrane switch on the road detects when the car has moved past the barrier. The barrier motor then rotates to lower the barrier to the closed position. The time taken for the barrier to close is 6 seconds. The motor then is turned off and the program ends.

9932



24GTD1116

Complete the flow chart in **Fig. 8** to illustrate the program to control the automatic barrier at a car park.



Fig. 8

24GTD1117

	ıg.	9 shows a pair of hedge shears.
/:		Current a suitable material for the blades and the bandles
(1)	Suggest a suitable material for the blades and the handles.
		Give a reason, other than cost, for your choice.
		Blade material
		Reason
		Handle material
		Reason [4]
(i	ii)	Name the mechanism used in the shears.
	-	[1]
(i	iii)	Give one advantage of using shears with longer handles.
		[2]
		[-]
22		

y Learning y Learning Rowarding y Learning Rowarding Rowarding y Learning

ia Learning Rowarding Ig Learning Rowarding Rowarding

Page g Learning Rowarding g Learning

Rewarding POD Ig Learning

g Learning Rewarding

Rewarding Ig Learning Rewarding

I Constant g Learning Rewarding g Learning

Rowardine POD Ig Learning

Rowarding Rowarding Page Learning Rowarding Rowarding Rowarding

ia Learning Rowarding ig Learning

ig Learning Rowarding Ig Learning

Rowarding

Rewarding Ig Learning Rewarding

Rowardine POD Ig Learning

Ig Learning Rowarding g Learning Rowarding Rowarding

Rewarding kg Learning Rewarding

y Learning Rowarding

Rowarding PDD Ig Learning

24GTD1118

(iv) Suggest a reason for the design features at **B**.

_____[2]

9932

[Turn over

24GTD1119

Rewarding
Ð
ig Learning
A:
Rewarding
22
vg Learning
Howaroing
Ð
ig Learning
- Oli
Rewarding
29
ig Learning
Rewarder
200
Ð
ig Learning
Œ
Rewarding
\mathcal{T}
ig Learning
Z
ig Learning
Œ
Rewarding
Ð
ig Learning
9
Ð
ig Learning
A
Rewarding
22
vg Learning
Œ
Rewarding
Ð
ig Learning
A:
Rowarding
Rowarding
Rewarding
Rewarding Page 19 Learning
Rowarding Powarding va Learnina
Rowarding Rowarding Va Learning Rowarding
Reverding Reverding Val Learning Reverding DOD
Rewarding Decemina Rewarding Rewarding Rewarding g Learning
Rowarding DOD kg Learning Rowarding DOD g Learning
Rowarding Rowarding g Learning G G Rowarding g Learning g Learning Rowarding Rowarding
Rewarding DD ig Learning DD g Learning DD g Learning Rewarding Rewarding
Rewarding POD ig Learning POD g Learning POD Rewarding Rewarding POD Rewarding POD Rewarding POD Rewarding
Reverting PCD a Learning PCD Reverting PCD Reverting PCD Reverting
Revearing PCD a Lemma Revearing PCD PCD Revearing PCD PCD Revearing PCD PCD Revearing PCD PCD Revearing PCD PCD PCD PCD PCD PCD PCD PCD
Reserving POD y Learning POD y Learning POD Reserving POD POD POD POD POD POD POD POD
Construction Researching Deal Learning Deal
Construction Revealing a Learning Construction g Learning g Learning g Learning g Learning g Learning g Learning
Constraints Researching Researching Resear
Constraints Researching Researching Constraints Researching Resear
Construint Post Post Post Post Post Post Post Pos
Construint Researching Part Learning Part Learning
Constraints Researching Part Learning Part Learn
Constraints Researching Parameters Researching Parameters Paramete
Consecting Page 200 12 Learner Page 200 Page 200 Pa
Construint Researching Part Learning Part Learning Part Learning Part Learning Part Part Researching Part Part Researching Part Researching Par
Constraints Researching PCD a Learning PCD Researching PCD a Learning PCD a Learning PCD PCD PCD PCD PCD PCD PCD PCD
Constructions Page 1 Learning Page 1 L
Constanting Page Sector Researching Page Sector Researching Researching Page Sector Researching Resear
Construint Particular
Constraints Participation Particip
Constanting Const
Constraints Const
Constraints Researching PCD Researching R
Constanting Personality Perso
Constanting Page 1 Learning Page 1 Lea
Constraints Const
Construints Reserved in Particular Reserved in Reserved
Constraints Reserved in Reserved in Reser
Constanting Const
Constraints Const
Construints Const
Constraints Reserved in Reserved in Reser
Constraints Const
Constanting Page 1 Learning Page 1 Lea
Constraints Const
Construints Particular Parti

Æ

1	Dowel joints are used in the construction of a wooden frame. The frame is to be
	made using four pieces of mahogany each 400 mm long, 60 mm wide, 15 mm thick.
	Each of the four corner joints should be constructed using two dowels.

For **one corner**, describe the process of preparing the two ends of the wood; marking out; making and assembling the two dowel joint structure. When the joint is constructed it should be a permanent structure and the dowels should not be seen. Make reference to any appropriate safety precautions used in this process.

The quality of written communication will be assessed in this question.

24GTD1120

9932

	[10]
E END OF THE QUESTION P	APER
	E END OF THE QUESTION P

24GTD1121

DO NOT WRITE ON THIS PAGE



24GTD1122

DO NOT WRITE ON THIS PAGE

9932



24GTD1123

DO NOT WRITE ON THIS PAGE

For Examiner's use only			
Question Number	Marks		
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
Total Marks			

Examiner Number

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA will be happy to rectify any omissions of acknowledgement in future if notified.

204908

24GTD1124