



Rewarding Learning

General Certificate of Secondary Education
2010**Technology and Design**Unit 1:
Technology and Design Core**[GTD11]****WEDNESDAY 26 MAY, AFTERNOON**

GTD11

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

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

Write your answers in the spaces provided in this question paper.

Answer **all eleven** questions.

On **page 3** we have provided formulae for you to use with this paper.

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.

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

Total Marks	
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PLEASE NOTE:

On **page 3** we have provided formulae
for you to use with this paper.

Questions for this paper begin on **page 4**.

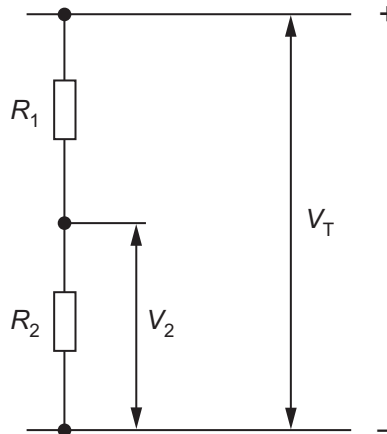
Formulae for GCSE Technology and Design

You should use, where appropriate, the formulae given below when answering questions which include calculations.

1 Potential Difference = current \times resistance ($V = I \times R$)

2 For potential divider

$$V_2 = \frac{R_2}{R_1 + R_2} \times V_T$$



3 Series Resistors $R_T = R_1 + R_2 + R_3 \text{ etc}$

Parallel Resistors $\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$ or $R_T = \frac{R_1 + R_2}{R_1 + R_2}$

4 Gear ratio of a simple gear train = $\frac{\text{number of teeth on driven gear}}{\text{number of teeth on driver gear}}$

For a compound gear train:

Total Gear ratio = the product of the gear ratios of all the subsystems

i.e. $GR_T = GR_1 \times GR_2 \times GR_3 \dots$

5 Mechanical Advantage = $\frac{\text{Load}}{\text{Effort}}$

6 Velocity Ratio = $\frac{\text{Distance moved by effort}}{\text{Distance moved by load}}$






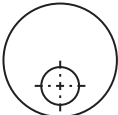
7 Pneumatics

Force = Pressure \times Area ($F = P \times A$)

8 Time Constant $T = R \times C$

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

Table 1

Sketch of symbol	Type of symbol	Name of symbol
	Electronic	Lamp
		LDR
	Pneumatic	
 © Crown Copyright	Warning sign	
		
		
		Cam

[9]

Examiner Only	
Marks	Remark

2 Computers are increasingly used in the manufacture of products in industry.

(a) Write down the meaning of the following acronyms:

CAD:

CAM:

CNC: _____ [3]

(b) Fig. 1 shows a simulation process to create letters on a Perspex block using a CNC machine. Simulation plays an important role in CNC work. Give a reason for this.

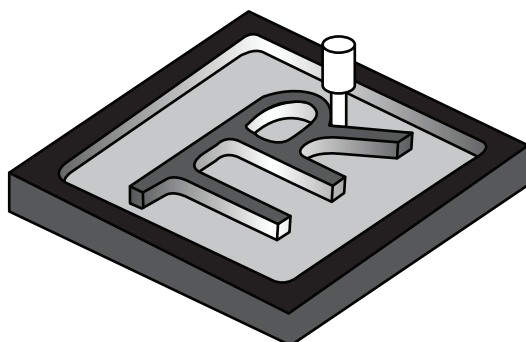
[5]

Fig. 1

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(Questions continue overleaf)

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(Questions continue overleaf)

(c) (i) Explain how a part can be stamped.

[1]

(ii) Explain the function of component D in the circuit.

[2]

Examiner Only	
Marks	Remark

8 Fig. 8 shows a circuit which is used to control output voltage.

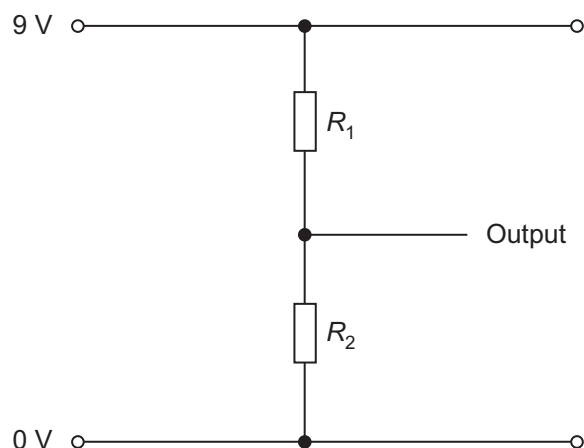


Fig. 8

- (a) (i)** Name the type of control circuit shown in **Fig. 8**.

Name _____ [2]

- (ii) If the two resistors labelled R_1 and R_2 in **Fig. 8** each had the same value of $10\text{ k}\Omega$, state the expected output voltage.

Output voltage _____ [2]

- (iii) Given that colour coded bands are used to identify the value of resistors, use the information below to state the colours of the first three bands on a $10\text{ k}\Omega$ resistor.

0 = Black 1 = Brown 2 = Red 3 = Orange 4 = Yellow
5 = Green 6 = Blue 7 = Violet 8 = Grey 9 = White

Colour Band 1 _____ [1]

Colour Band 2 _____ [1]

Colour Band 3 _____ [1]

- (b)** In the space below, calculate the output voltage from **Fig. 8** if R_1 had a value of $6\text{ k}\Omega$ and R_2 had a value of $10\text{ k}\Omega$.

[3]

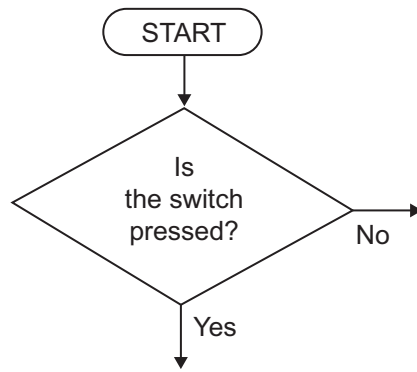


Fig. 10

(c) Identify the input in the above process.

Input: _____ [1]

Examiner Only	
Marks	Remark

[Turn over

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