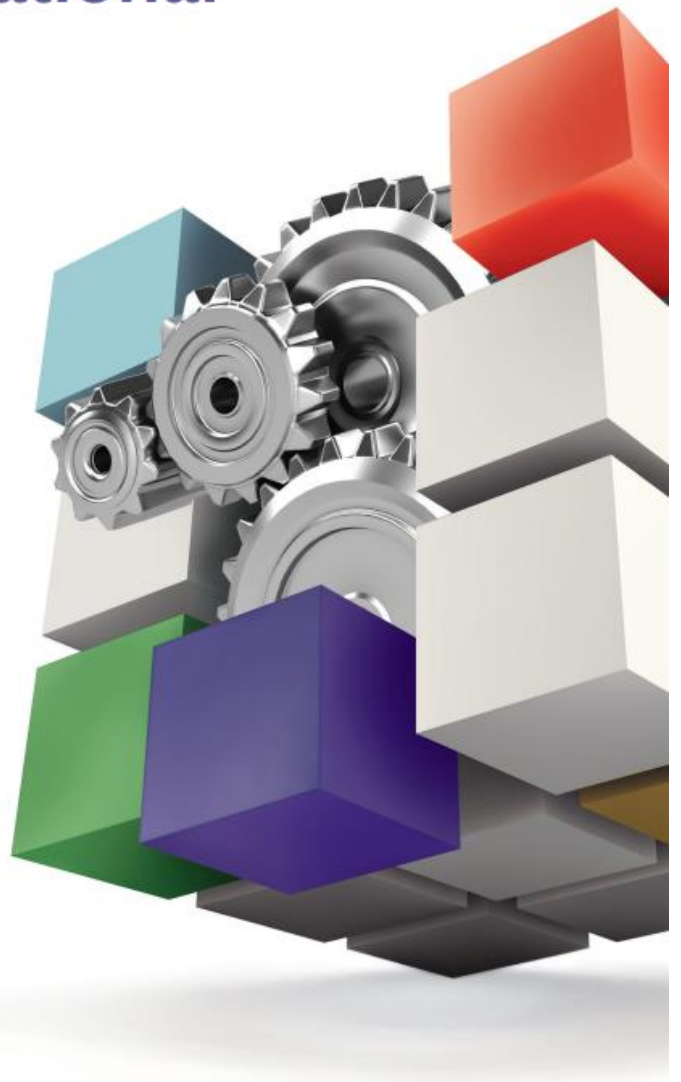
Year 12 Summer Preparation

Pearson BTEC

Pearson BTEC Level 3 National Certificate in Engineering



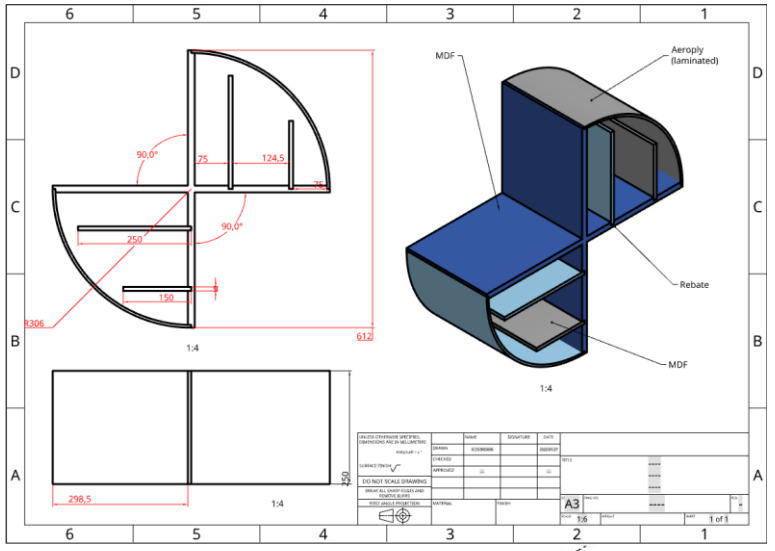
Supported by:

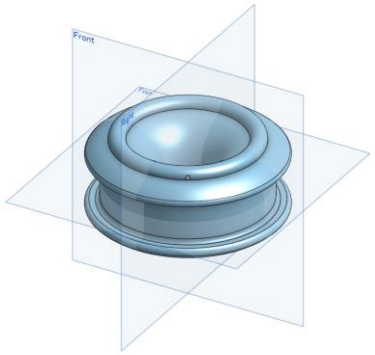
EngineeringUK

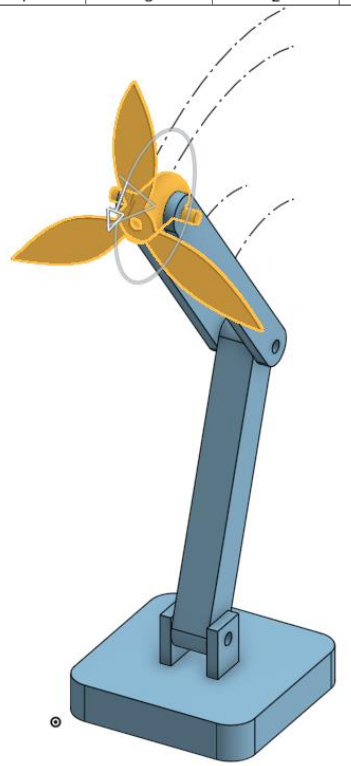
Task 1 – Computer Aided Design (CAD)

Use the links provided to complete the following task:

1. Set up an OnShape educational license (Instructions will be sent separately – **if you are a current CCS student, use your school email address**)
   Signup for Onshape for Education
2. OnShape basics – extrusion
   https://youtu.be/v9PYDtTx5OE
3. OnShape basics – revolving
   https://youtu.be/p2W3em5NTbc
4. Produce an original product or component using the basic skills learnt in tasks 2 & 3.







Task 2 – Algebraic equations – Indices: (Solve WITHOUT a calculator)

Summary of the rules of Indices

Operation	Rule
Multiplication	$a^m \times a^n = a^{m+n}$
Division	$a^m \div a^n = a^{m-n}$
Powers	$(a^m)^n = a^{m \times n}$
Reciprocals	$1/a^n = a^{-n}$
Fractional Indices	$a^{1/n} = \sqrt[n]{a}$
Index = 0	$a^0 = 1$
Index = 1	$a^1 = a$

1. $3^3 + 4^2$
2. 24^0
3. $12^5 \div 12^3$
4. $(5^2)^2$
5. $(3^5 \div 3^2) \div a^0$
6. 14^1
7. $(b^2)^3 \div b^6$

Task 2 – Algebraic equations – Indices: (Solve WITHOUT a calculator)

Algebraic Methods (Indices)

Calculate the following expressions into a single number:

1. $2^3 + 4^2$
2. $25^{0.5}$
3. $12^4 \div 12^2$
4. 10^3
5. $(3^3)^4$

Simplify the following expressions:

1. $b^2 \times b^4$
2. $(a^2)^5$
3. a^{-1}
4. a^{-2}
5. $(a^4)^{1/2}$

Solve the following equations to find a value for b (The answers are all whole numbers, and you can use trial and improvement after simplifying):

1. $b^5 \div b^3 = 49$
2. $b^4 = 81$
3. $4^b = 64$
4. $2 \times 3^b = 54$