

BHASVIC

Physics Department

July 2017

Preparing for A-Level Physics

Listed below are the tasks that you need to do before you come back in September. Please do them to the best of your ability. You will need to bring them to your first lesson in September as you will be using some of them in the lesson!

TASKS	Tick when complete
1. Make sure you have all the items on the equipment list.	
2. Complete the Independent Study for Units and Vectors.	
3. Watch the Veritasium video on YouTube about the pure Silicon sphere and the redefinition of the kilogramme.	
4. Complete the questions on triangles using trigonometry and Pythagoras.	
5. Complete the rearranging equations task.	

1. What do I need for September?

So you can get organised before you arrive, here is a list of the essential items you need for studying Physics at BHASVIC.

Items:

- Basic scientific calculator
- Clear 30cm ruler
- Small ringbinder
- Large lever arch file
- Dividers
- Lined paper

Details:

Approx. £8, most people have a Casio. This will be fine for any science subjects at BHASVIC.

You need to be able to see through it when drawing lines of best fit and tangents on graphs.

For carrying your current work to and from college

To organise your notes at home

2. Independent Study - Topic: Units and Vectors

You should be fully confident about the learning outcomes in normal font before the start of the topic.

You will develop your understanding of the learning outcomes in italics during the topic.

Revisit all the learning outcomes at the end of the topic and tick the columns that apply to you.

Learning outcome	I can recall this	I understand this	I need to revisit this
Remember units for physical quantities, SI base quantities and units with their symbols and prefixes.			
Convert units from using prefix. e.g. kA to A using standard form.			
Show the use of derived units of SI base units and the quantities that use them.			
Describe scalar and vector quantities. Choose whether a quantity is a vector or a scalar.			
Be able to do addition of 2 vectors by scale drawing.			
<i>Be able to do addition of 2 vectors by calculation. (Sine and cosine rules)</i>			
Be able to resolve a vector into 2 perpendicular components.			
<i>Be able to perform calculations involving vectors.</i>			

READ Chapter 2 of your textbook pages 8 and 9 (Physics Book scanned document).

Base Units and Prefixes:

Watch these videos from A Level Physics Online:

Base units:

<https://www.youtube.com/watch?v=jLRoseFxm30&index=2&list=PLIDtVvefFYT8OpWzDcHEZTCIQaEnQ3QoL>

Prefixes:

https://www.youtube.com/watch?v=O4tA6Nt_iig&list=PLIDtVvefFYT8OpWzDcHEZTCIQaEnQ3QoL&index=4

Copy and complete the table showing the SI base units:

Quantity	Base unit	Unit symbol
Time	second	s

Copy and complete the table showing the prefixes for SI units:

Prefix Name	Prefix symbol	Factor
peta		
tera		
giga		
mega		
kilo	k	$\times 10^3$
deci		
centi		
milli		
micro		
nano		
pico		
femto		

Derived Units:

READ Chapter 2 of your textbook pages 10 and 11.

Watch this video from A Level Physics Online:

<https://www.youtube.com/watch?v=Sb8cx4IOy8&list=PLIDtVvefFYT8OpWzDcHEZTCIQaEnQ3QoL&index=3>

Make notes of:

- examples of 5 derived quantities and units and express the units in SI base units.

Vectors and Scalars:

READ Chapter 2 of your textbook pages 12 and 13.

Watch this video from A Level Physics Online:

<https://www.youtube.com/watch?v=60oM8QgOdqI>

Make notes:

- Give examples of 3 scalars and 3 vectors with their SI units.
- Explain the difference between distance and displacement.
- Describe a vector.
- Describe a scalar.

Write out **worked example** of:

- Finding density and units - Lighter than air p12.

READ Chapter 2 of your textbook pages 14 and 15.

Watch this video from A Level Physics Online:

<https://www.youtube.com/watch?v=l36leG0dC64&list=PLIDtVvefFYT8fcFJK1DjfpEgojh2S5Ryy&index=2>

Make notes:

- Describe the steps to make a scale drawing of a vector triangle and finding the resultant.
- Draw a diagram showing how a force of 5N and a force of 8N at right-angles to each other combine to form a resultant vector and perform calculations to find the magnitude of the resultant and the angle it makes to the 8N force.

READ Chapter 2 of your textbook pages 16 and 17.

Watch this video from A Level Physics Online:

<https://www.youtube.com/watch?v=2kHCvtTjOJs>

Make notes:

- Write out **worked example** of a crosswind from p16.
- If a cannonball is fired with a velocity of 53ms^{-1} at an angle of 35° to the horizontal, calculate the horizontal and vertical components that would combine to give this velocity as a resultant.

In lesson – you will use the notes to help you:

Practice putting derived units into base SI units.

Apply scale diagram and calculation methods to find resultant vectors.

Use Cosine and Sine rules to find resultant forces when there is not a right angled triangle.

3.

Watch the following video

<https://www.youtube.com/watch?v=ZMByI4s-D-Y>

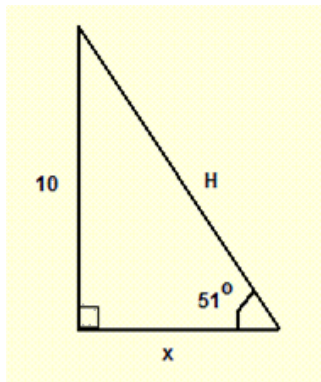
Write down any questions you have:

4.

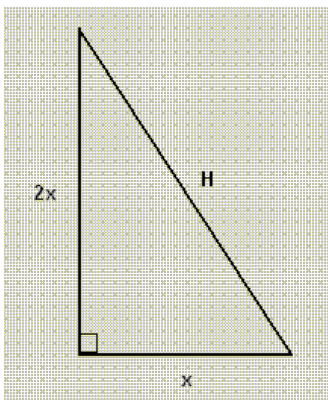
Triangles in Physics (Trigonometry and Pythagoras)

You will be very familiar with trigonometry and Pythagoras' theorem from GCSE maths! In A-level Physics, they also play a large part.

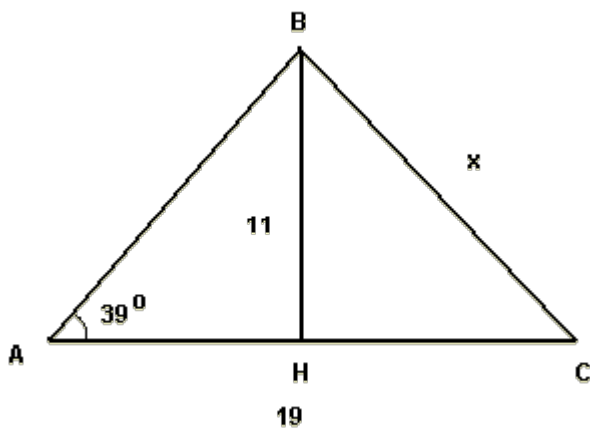
(i) Find x and H in the right-angled triangle below.



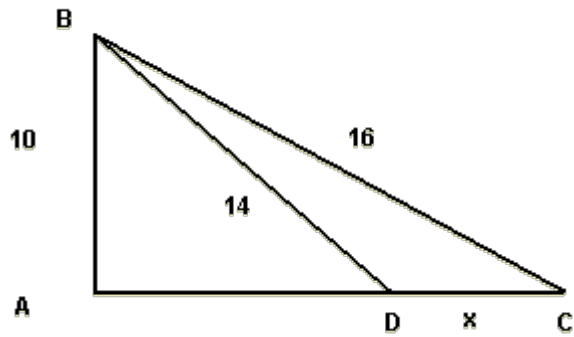
(ii) Find the lengths of all sides of the right-angled triangle below if its area is 400cm^2 .



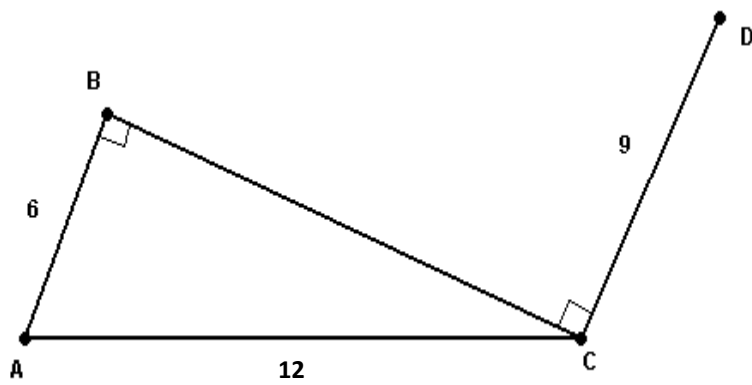
(iii) BH is perpendicular to AC . Find x , the length of BC .



(iv) ABC is a right-angled triangle with a right angle at A. Find x the length of DC.



(v) Find the length of segment BD.



5. MATHS PRACTICE - Transposition (rearranging) of Equations

1.	$v^2 - u^2 = 2as$	$s =$
2.	$v^2 - u^2 = 2as$	$v =$
3.	$s = ut + \frac{1}{2} at^2$	$a =$
4.	$s = ut + \frac{1}{2} at^2$	$u =$
5.	$I = nAqv$	$v =$
6.	$T = 2\pi \sqrt{\frac{l}{g}}$	$g =$
7.	$QV = \frac{1}{2} mv^2$	$v =$
8.	$F = 6\pi\eta rv$	$\eta =$
9.	$n\lambda = d \sin \theta$	$\theta =$
10.	$V = \frac{4}{3} \pi r^3$	$r =$
11.	$A = 4\pi r^2$	$r =$
12.	$E = \frac{Fl}{Ae}$	$e =$
13.	$L = 4\pi r^2 \sigma T^4$	$T =$
14.	$I = \frac{P}{4\pi r^2}$	$r =$
15.	$\frac{hc}{\lambda} = \phi + \frac{1}{2} mv^2$	$v =$

