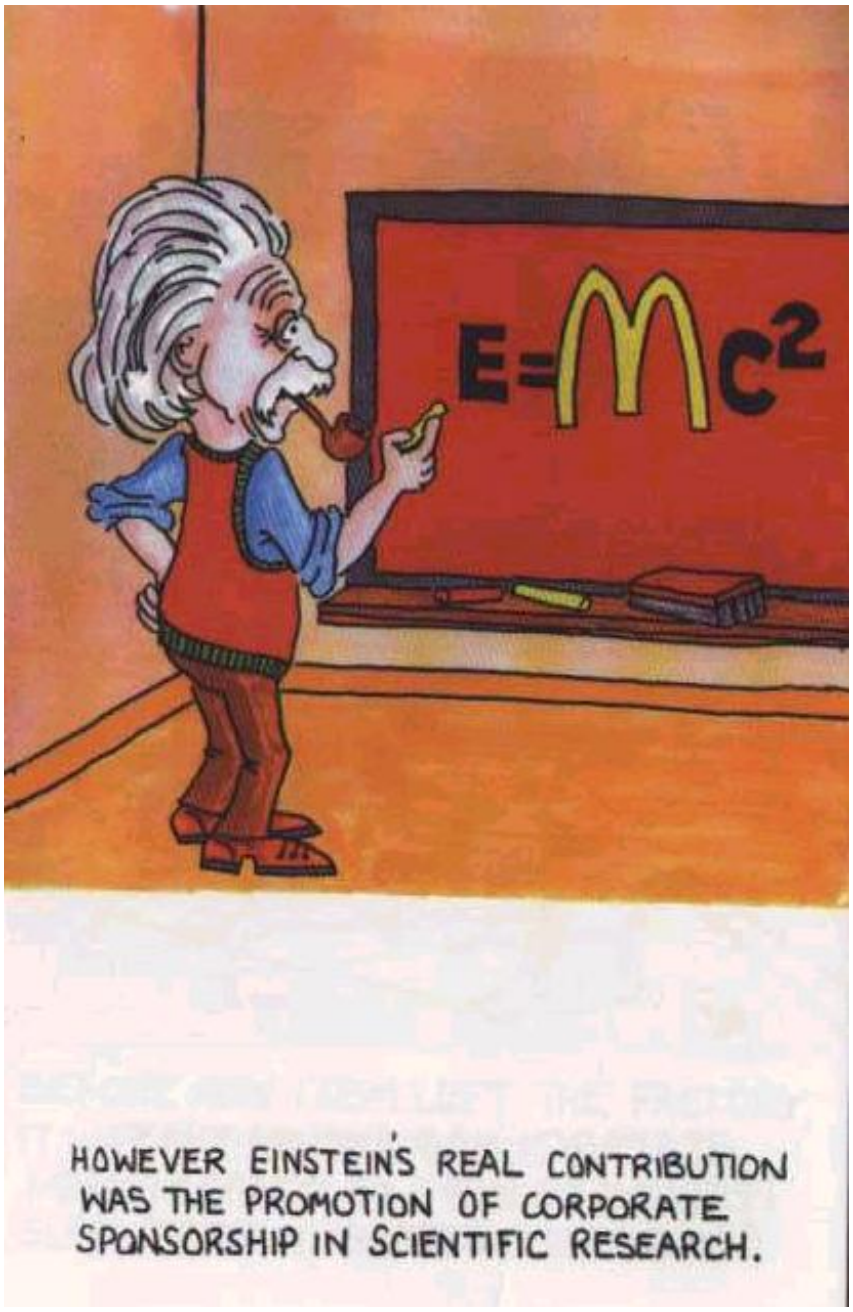
Physics Revision

2017



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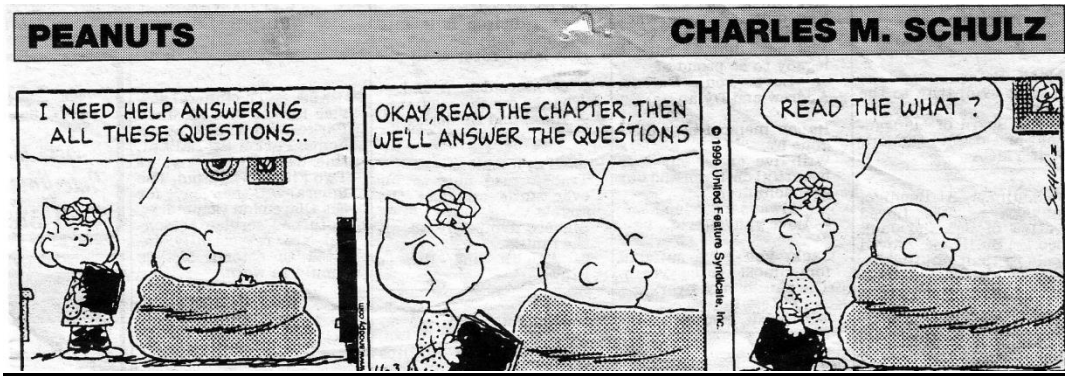
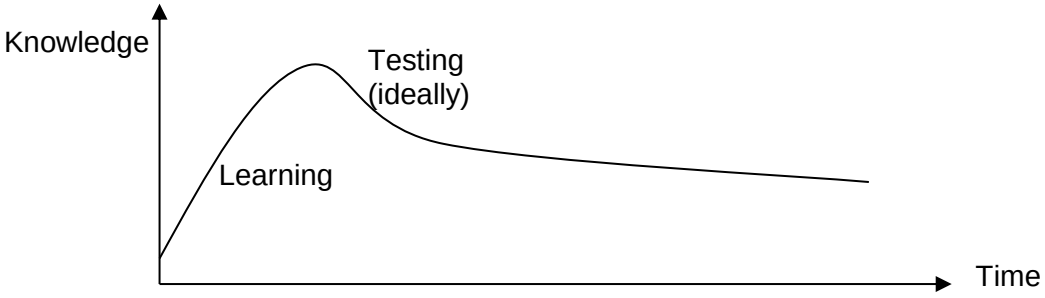
Physics study plan 2017

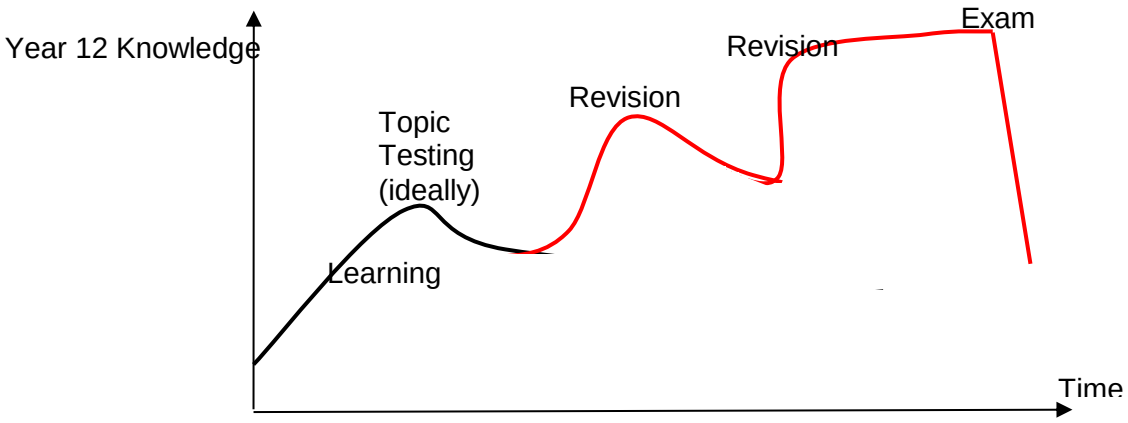


Knowledge

The general knowledge graph looks like this:



You start with a base level of knowledge about a concept; you increase this level, hopefully peaking at the time of testing. After this, since you are learning other new work, your comprehension of the original work diminishes with time. So to maximize your learning, you need repetition of the information at regular intervals.



The process of revision means that you start from a higher base level, and hopefully, reach a greater level of understanding of the material. The more often you undergo the revision process, the greater the comprehension of the material.

- Relearning is always quicker than learning for the first time, so the more often you do it, the more efficient it becomes.

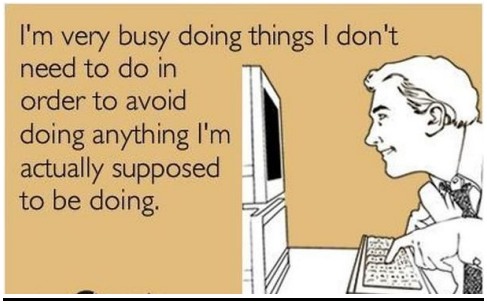
- Theory suggests something along the following lines, (but this varies immensely with individuals). In general you remember

~ 10% of what you hear
~ 25% of what you read
~ 40% of what you write
~ 70% of what you do
~ 85% of what you teach

Avoiding procrastination

Procrastination adds significantly more time to tasks, adding further stress and workloads.

- Ask yourself the following questions:
  Why am I procrastinating?
  What benefits will be derived by putting the task off until later?
  *What benefits will be derived by **NOT** putting the task off until later?*
- Break large tasks into smaller more achievable milestones and/or start with the smallest or most pleasant task. Hopefully this will get you into the right frame of mind and provide you with the motivation to tackle the larger tasks at hand.
- Think about what you want to achieve before you sit down to study. This will help organise your ideas and goals before you sit down and will help avoid procrastination, as you will know where to begin.
- **Bottom line** – just accept the fact that you have to complete the task and get on with it.



Improving your links to memory

You need to train your brain to remember. You can do this by:

- regularly reviewing your work.
- looking at subjects (topics/ideas) from other angles and using other sources of information.
- discussing ideas with other students.
- teaching other students, explaining ideas to others.
- writing the main points on cards and constantly referring to them.
- keep a separate log book for recording new techniques, facts and ideas.
- setting plans of attack to follow for specific problems. E.g. Always read the labels on the axes of graphs, at the start of any question involving a graph.

Improving your understanding

When trying to understand new material you need to use as many senses as possible. Reading material out aloud is a particularly useful process. It requires a lot more brain activity, but doesn't take any more time.

- Listen to yourself as you read questions, this eliminates skipping over information.
- Practise this skill out aloud at home and at school, but train yourself to do it under your breath in exams.

How to increase the effectiveness of your study

- Set an achievable amount of work to get done.
- Use a list to structure your study
- Be active and focused throughout.
- Enjoy the challenge of improving yourself.
- Reward yourself with quality sport/leisure.
- Move forward with purpose and determination.
- You need to know what you know, and know what you don't know. Then work on your areas of weakness.
- Quality, not quantity, is the secret.
- You need to practise the way you intend to perform on the exam.

How to succeed at physics

- Do as many past papers as possible; you should do a minimum of 12 - 20 trial papers.
- Use a range of papers, you can download free papers from www.itute.com, or http://engageeducation.org.au/
- You can join The School for Excellence and access free resources at www.TSFX.com.au
- For the best set of solutions to VCAA exams, use Vicphysics: www.vicphysics.org
- Ask questions of your teacher, both in class and out of class time. Come in each day with a list of what you need to find out from your teacher.
- Only use a scientific calculator.

Cheat sheet

- You have the equivalent of 2 A4 sheets of notes.
- Make sure that all dot points are covered on your sheets.
- Make sure that it is your own cheat sheet, don't try to use some-one else's.
- You can put some worked examples on it, maybe some sample calculations or some sample answers to common explain type questions or to questions that you have difficulties answering.
- Don't just copy from your cheat sheet. These days the exam writers go to great lengths to try to eliminate this. Reword your information to fit the question.
- Include a table that identifies the formulas that apply to Photons and Matter.

At home exam preparation

- You must have a timetable that is viable and achievable.
- Timetable in your interruptions. Ensure that you maintain a reasonable exercise regime. It maintains balance, and helps you to sleep at night.
- Set out a program that has 60 min (or whatever you are used to) blocks.
- Remember, that very, very few people work best late at night or with music blaring in the background, and this will not happen during the exam.
- You need to get this sense of satisfaction from achieving your study goals.
- Don't try to work in long straight sessions as they become inefficient. The rate at which material can be absorbed after a few hours drops for most people.
- When correcting trial papers instead of just giving yourself an overall percentage, divide it up into the sections and analyse your performance.
- If you don't have enough time to do a whole paper, just do part of it.
- Get another physics student to correct your answers if possible as well as correcting it yourself.
- Make sure that you practice your reading time. It is extremely important!!!

Exam preparation

- Know when the exam is: **Wednesday 15th November 9:00 am – 11:45 am**
- Know what you are going to get on your exam.
- Read past papers and the examiners reports to learn the style of the exam.
- 130 marks for 150 minutes work.

The exam

- The exam is on the entire year's work
- You only have 15 minutes reading time to read approximately 40 pages.

Exam day

- Make sure that you have had plenty of sleep. You need a clear mind, and in general, most of what you try to cram in the night before just comes out jumbled in the exam. All I would recommend is a reading through the relevant questions from the 2016 paper, and the VCAA practice paper, with relevant solutions.
- Check equipment: ruler, (preferably plastic, to make drawing lines of best fit easier), scientific calculator (in degree mode), spare batteries for the calculator, cheat sheet, black and blue pens and highlighter.

Reading time

- You have 15 minutes reading time to read the paper. This will be impossible, so you need to read the questions that you find difficult, to ensure that you have a clear understanding of what the question is requiring you to do.
- Check paper, by turning to the back and finding the end of the paper.
- Read as many questions as is possible, carefully, to find the Physics.
- Look at all the graphs/pictures, try to guess the question, i.e. think about the question.
- Read the axes of the graphs. Look for the variables on both axes, and check the units. Make a mental note of all non-standard units.
- Do any simple multiple choice questions in your head.
- Make sure that you use the entire 15 mins

Writing

- Tidy up all the 'mental' notes that you made during reading time.
- Put in your start/finish times for each section, and try to stick to them.
- Get out your highlighter and start using it to pick out important information.
- Don't write in size 6 font because it is hard for the marker to read.
- Don't use a light pencil because it can be difficult to read.
- ONLY write on Black or Blue pen.
- Only write within the box on the page.
- Start your answer on the left hand side of the page, (not in the middle), in case you need to cross it out and rewrite an answer.
- Don't waste time on questions early in the paper, if you can't do them, come back to them later.
- Re-read all the questions, using the highlighter to identify key elements in the questions.
- If the question is worth more than 2 marks, use the dummy principle to answer the question, assume the marker is a dummy, spell your answer out in great detail.
- Use diagrams, worked examples etc. in explain type answers. Remember, that the marker actually wants to give you marks, a good diagram is often worth marks.
- Answer explain type questions in point form.

Multiple choice questions

- For multiple choice questions the following technique should be used:
  Don't read the answers, do the question yourself first. There is usually 1 correct answer and up to 4 very good distracters
  Be very careful before you change your answer.

Problem solving on the exam

- Sometimes it is difficult to work out what the question is asking, so cut out all the peripheral information and find the physics.
- Try to remember similar questions in older papers, and answer the same way.
- Don't panic, if you don't know what a question is asking, leave it out for the moment, and come back to it later.
- Look at the units in the answer box, for any clues.

Themes across the paper

In each of the sections of the paper there are some common elements.
The paper has a variety of styles of questions, ranging from straight forward to complex

- Substitute values into a formula
- Read information from a graph or table of values
- Draw a graph from data
- Interpret a diagram
- Apply information gained from a graph/table of values, to a new situation
- Explain a concept, experiment or why something happens

Exam techniques

- If you have time plan your answers.
- Expect the beginning parts of each question to be easy, so don't over complicate it.
- Make sure you are actually answering the question, have you given the response that you were asked to?
- Check the answer is a reasonable value. Expect the answer to make sense.

Last 15 minutes of the exam

- Check you have answered all questions.
- Fill in any empty spaces especially multiple-choice questions.
- Look at your significant figures and correct scientific notation. i.e. no surds.

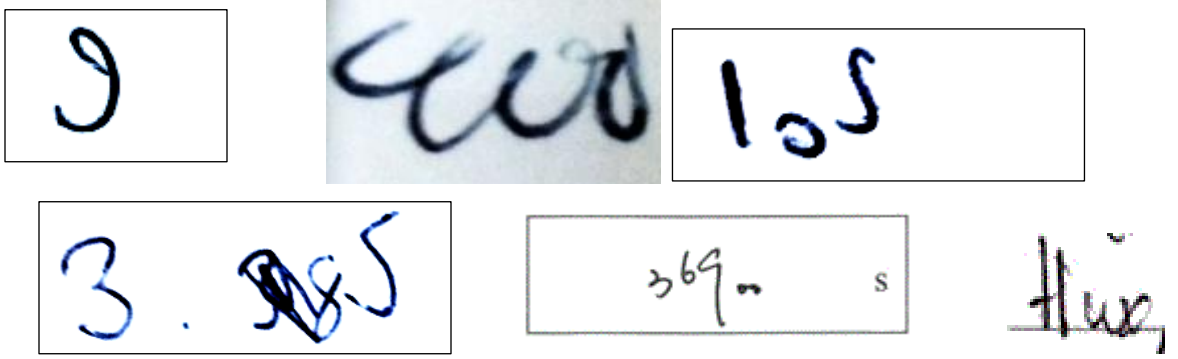
What's new in 2017

- A lot of content is new, without a wide range of past paper questions to practice on.
- Section A will have 20 multiple choice questions worth one mark each.
- Allow about 20 minutes for Section A.
- Section B will have 18 questions (some with many parts). Some questions will be quite time consuming, and have some parts worth up to 5 marks (so requiring detailed answers)
- The paper isn't divided into sections, so it is important to constantly monitor your progress.
- Time has the potential to be an issue for some students, so efficiency is important. In Section B, do each question as you come to it. The thinking for the first few parts should assist with the later parts of the question.

Examiners comments on recent papers

Written responses.

- Need to be clear and concise.
- Only give one answer, neatly cross out mistakes.
- Students should be encouraged to set out their work clearly, so assessors can follow what they have done.
- Where an answer box has a unit printed in it, give your answer in that unit.
- Handwriting



- Answer in dot point form. In particular, there is no need to restate the question in an answer.
- If question is worth 3 marks give 3 (but no more than 4) points.
- 'In questions worth more than 1 mark, appropriate working should be shown'. Full marks may not be awarded where only the answer is shown, and some credit can often be given for working even if the final answer is incorrect.
- Use equations and/or diagrams when appropriate. Diagrams should be sufficiently large.
- Many students lose marks from contradictions.
- Answers MUST relate to question, need a specific link to question, not just transposed from cheat sheet.
- Where values of constants are provided in the stem of the question or on the formula sheet, students are expected to use the number of significant figures given.
- It is important to show numbers substituted into formulas/equations
- Answers should be simplified decimal form. Rounding off should be done only at the end, not progressively after each step.
- Care needs to be taken when reading the scales on the axes and graphs.
- Vectors should be drawn from correct position and be of an appropriate length. The arrows representing the vectors should be drawn so that they originate from the point of application.
- Read and re-read your responses to be sure that they make sense.
- Students should ensure that their answers are realistic. Illogical answers should prompt students to check their working.

Calculators

- Students need to be familiar with the operation of the scientific calculator they will use in the exam. In particular, they must ensure that it is in scientific mode and that it does not truncate answers after one or two decimal places. This has happened a few times in Relativity questions
- Be careful when doing calculations involving powers of 10.

Areas of concern

- Application of vectors in Newton's second law and the constant acceleration formulas.
- Energy conversion and conservation (particularly in springs).
- The conversion of units; including areas.
- More complex projectile motion.
- Split ring/slip ring explanation.
- Clear explanation of the commutator in both motors and generators.
- In electromagnetic induction it is the change in flux that induces an EMF. It is not sufficient to say a changing magnetic field. Current will be produced only if the circuit is complete.
- Inverse square laws.
- You should always show all working, as markers look for it if answer is incorrect.
- If the question doesn't specifically state "show working" then markers go to answer in box.
- If specifically stated, you need to show the formula **and** your substitution to get full marks.
- "Show that.." questions are carefully checked for fudging.
- Series/parallel circuits
- Hand rules in electromagnetism. You need to specify exactly what the thumb, fingers, palm etc. are representing. There are MANY 'hand rules', and you need to be ultra-specific.
- Confusion between Faraday's law and Lenz's law.
- Understanding of flux and EMF, direction of induced current.
- Be prepared for path difference, and Photo-electric effect questions.
- The distinction between matter and electromagnetic radiation, and which formulas can be applied to each, as well as which value of Planck's constant to use.
- In light, in order for diffraction to occur the wavelength just needs to be of the same order of magnitude as the gap.
- Understanding of the photoelectric effect.
- Any calculated value for Planck's constant will be different to the expected value, but of the right order of magnitude.
- Electron energy levels diagrams and associated emissions and absorptions.
- How the wave nature of matter can explain the electron energy levels.
- Students should be able to correctly spell key Physics terms.