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| **TERM 1** |  | **Week Days and Lessons** | **Learning Outcome** | **Skill Level** | **Example** | **Activity** | **Resources** |
| **Week 9** | **Rotation System** | *Monday:*  *Lesson 1:*  **Rotational Energy.** | 24 Describe the total energy of a rolling object using both translational  and rotational energy  25 Calculate the total energy of a rolling object using both translational  and rotational energy | 2  2 | Do all examples, 1,2,3 | Activity 9D.  Quest: 1-5 | Chapter 9.  Page 150-153 |
| *Tuesday:*  *Lesson 2:*  **Torque.** | 26 Explain how torque works to change rotational kinetic energy of an object or system  27 Calculate changes in energy of a system (rotational kinetic energy,  translational kinetic energy, potential energy) when provided with angular or linear velocity | 3  2 | Do all example,1,2,3 | Activity 9B.  Quest: 1-3 | Page 140 – 144. |
| *Wednesday:*  *Lesson 3*  **Angular Momentum.** | 28 Design an experiment to explore effects of external torques on  rotational kinetic energy  29 Predict the behavior of colliding bodies in a rotational collision situation by analyzing angular impulse and change of angular momentum | 4  4 | Do all example1,2 | Activity 9C.  Quest: 1,2,3,5 & 6 | Page 146 -148. |
| *Thursday:*  *Lesson 4* | * **Complete Activities** * **Refer to answer sheet and correct your work.** * **Post on Year 13 Physic Forum on any question confused on.** | | | | |
|  |  | *Friday:*  *Lesson 5* | * **Complete Activities** * **Refer to answer sheet and correct your work.** * **Post on Year 13 Physic Forum on any question confused on.** | | | | |

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| **TERM 1** |  |  | **Learning Outcome** | | **Skill Level** | | **Example** | | **Activity** | | **Resources** | |
| **Week 10** | **Rotational Motion** | *Monday:*  *Lesson 1:*  **Oscillation Systems** | 1 State the SHM equation for displacement.  2 State the SHM equation for velocity  3 State the SHM equation for acceleration  4 Identify/label positions of minimum displacement/velocity/acceleration.  5 State the SHM equation for acceleration.  6 State the SHM equation for maximum acceleration.  7 Illustrate SHM with a variety of examples. | | 1  1  1  2  2  2  2 | | Example,1,2,3 | | Activity 10A.  Quest: 1-4 | | Chapter 10.  Page 155-158 | |
| *Tuesday:*  *Lesson 2:*  **Simple Harmonic Motion** | 5 Calculate the displacement of a particle undergoing simple harmonic motion  6 Calculate the velocity of a particle undergoing simple harmonic motion  7 Calculate the acceleration of a particle undergoing simple harmonic motion | | 2  2  2 | | Example,1,2,3 | | Activity 10C.  Quest: 1-5. | | Page 164-169 | |
| *Wednesday:Lesson3:*  **Example of** **Simple Harmonic Motion** | 8 Calculate the time or frequency of a particle undergoing simple  harmonic motion  9 Calculate the angular frequency using the formula (ω =2πf) of a particle undergoing simple harmonic motion.  10 Calculate the angular frequency using the formula (ω =2π/T) of a particle undergoing simple harmonic motion.  10 Calculate the force acting on the mass at different positions in a simple harmonic motion  11 Calculate the angular frequency /spring constant / mass of a spring using the formula | | 2  2  2  2  2 | | E.g. 1,2 | | Activity 10D.  Quest: 1-5 | | Page 171-174 | |
| *Thursday:*  *Lesson 4:*  **Simple Harmonic Motion and Circular Motion** | 11 Calculate the force acting on the mass at different positions in a simple harmonic motion.  12 Describe oscillations in SHM in terms of amplitude, period and  frequency  12 Identify positions of maximum displacement, velocity and acceleration in SHM  13 Use the equations of motion to solve problems in simple harmonic  motion | | 2  2  3 | | E.g. 1,2 | | Activity 10B.  Quest: 1-5 | | Page 159-164 | |
|  |  | *Friday:*  *Lesson 5* | * ***Complete Activities*** * ***Refer to answer sheet and correct your work.*** * ***Post on Yr 13 Physic Forum on any question confused on.*** | |  | |  | |  | |  | |
|  | **TERM 1** |  | **Learning Outcome** | | **Skill Level** | | **Example** | | **Activity** | | **Resources** | |
| **Week 11** |  | *Monday:*  *Lesson 1:*  **Energy in Simple Harmonic Motion** | 14. Analyze SHM in terms of potential and kinetic energy  15 Calculate the kinetic energy in Simple Harmonic motion.  16 Calculate the potential energy in Simple Harmonic motion.  17 Calculate the total energy in Simple Harmonic Motion.  18 Represent Potential Energy, Kinetic Energy and Total Energy graphically.  15. Interpret algebraic representations of SHM | | 3  2  2  3  3 | | E.g. 1,2,3 | | Activity 10E.  Quest: 1,2 | | Page 176-179 | |
| **Tuesday:**  **Lesson 2:**  **Damped Simple Harmonic Motion** | 17 Define Underdamped Oscillation.  18 Define Overdamped Oscillation.  19 Define critically damped Oscillation.  20 Interpret graphical representations of SHM.  21 Describe effects of damping on SHM  18 Describe effects of forced vibrations on SHM  19 Describe effects of resonance on SHM  20 Determine the maximum speed of an oscillating system | | 1  1  1  3  2  2  2 | | E.g. 1,2 | | Activity 10E.  Quest: 3,4 | | Page 180-182 | |
| *WednesdayLesson3:*  **Damped Simple Harmonic Motion** | 21 Explain the difference between overdamped and critically damped  oscillations and justify their use in practical applications  22 Explain the link between SHM and waves | | 4  3 | | E.g. 1,2 | | Activity 10E.  Quest: 3,4 | | Page 180-182 | |
| *Thursday:*  *Lesson 4:*  **Reference Circle** | 23 Relate SHM to the reference circle to explain the time period or  frequency of the motion  24 Relate SHM to circular motion to explain the displacement of the  motion | | 3  3 | | E.g. 1 | | Activity 10B.  Quest: 1-5 | | Page 160-164 | |
| *Friday:*  *Lesson 5*  **Reference Circle** | 25 Solve quantitative problems involving SHM  26 Compare and contrast SHM with uniform circular motion and justify their use in practical applications. | | 3  4 | | E.g. 1 | | Activity 10B.  Quest: 1-5 | | Page 160-164 | |
|  | TERM 1 |  | | **Learning Outcome** | | **Skill Level** | | **Example** | | **Activity** | | **Resources** | |
| **Week 12** | **Electricity and Electromagnetism** | *Monday:*  *Lesson 1:*  **Current, Energy, Resistance & Current** | | 1 State Ohm's Law  2 State Kirchoff's Law  3 State Kirchhoff's current Law / Junction Rule.  4 State Kirchhoff’s voltage law/ Loop rule.  5 Write Kirchhoff’s current rule in a given circuit.  6 Write Kirchhoff’s voltage rule in a given circuit.  3 Calculate current using Ohm's and or Kirchoff's Law | | 1  1  1  1  1  2 | | E.g. 1,2  E.g. 1 | | Activity 13A.  Quest: 1-4 | | Page 219-221.  Page 227-228 | |
| *Tuesday:*  *Lesson 2:*  **Kirchhoffs Law** | | 4 Calculate voltage using Ohm's and or Kirchoff's Law  5 Calculate resistance using Ohm's and or Kirchoff's Law  6 Calculate internal and effective resistance in a circuit | | 2  2  2 | | E.g. 1,2 | | Activity 13C:  Quest: 1-6 | | Page 227-233 | |
| *Wednesday:*  *Lesson 3:*  **Capacitors in DC Circuit** | | 7 Draw the symbol of a capacitor.  8 Define capacitance  8 Describe the action of a capacitor  9 Explain parallel plate capacitors and their capacitances. | | 1  2  3 | | E.g. 1,2,3,4 | | Activity 14A:  Question 1-3 | | Page 235-240 | |
| *Thursday:*  *Lesson 4:*  **Network of Capacitors** | | 10 Determine capacitance given charge and voltage.  11 Derive expressions for total capacitance in series and in parallel.  12 Identify series and parallel parts in the combination of connection of capacitors. | | 2  2  2 | | E.g. 1,2 | | Activity 14B:  Quest: 1-5 | | Page 241-245 | |
| *Friday:*  *Lesson 5* | | * ***Complete Activities*** * ***Refer to answer sheet or solutions and correct your own work.*** * ***Post on Year 13 Physic Forum on any question confused on.*** | | | | | | | | | |

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|  | **TERM 2** |  | **Learning Outcome** | **Skill Level** | **Example** | **Activity** | **Resources** |
| **Week 1** |  | *Monday:*  *LESSON 1:* | 13 Calculate the effective capacitance in series given individual capacitances.  14 Calculate the effective capacitance in parallel given individual capacitances.  15 List some uses of capacitors. | 2  2  2 | E.g. 1,2 | Activity 14B:  Quest: 1-5 | Page 241-245 |
| *Tuesday:*  *LESSON 2:*  **Charging and Dis-Charging a Capacitor** | 16 Express in equation form the energy stored in a capacitor.  17 Explain the importance of the time constant, τ, and calculate the time constant for a given resistance and capacitance. | 2  3 | E.g. 1 | Activity 14C:  Quest: 1-3 | Page 246-251 |
| *Wednesday:*  *LESSON 3:*  **Charging and Dis-Charging a Capacitor** | 18 Explain why batteries in a flashlight gradually lose power and the light dims over time  19 Draw voltage-time graph for given data for a capacitor  20 Draw current-time graph for given data for a capacitor | 3  2  2 | E.g. 1 | Activity 14C:  Quest: 1-3 | Page 246-251 |
| *Thursday:*  *LESSON 4:*  **Charging and Dis-Charging a Capacitor** | 21 Describe what happens to a graph of the voltage across a capacitor over time as it charges  22 Describe what happens to a graph of the voltage across a capacitor over time as it discharges | 2  2 | E.g. 1 | Activity 14C:  Quest: 1-3 | Page 246-251 |
| *Friday:*  *LESSON 5:*  **Charging and Dis-Charging a Capacitor** | 23 Interpret voltage/time graphs for a capacitor  24 Interpret current/time graphs for a capacitor  25 Calculate the time constant  26 Explain how a timing circuit works and suggest improvements to  Existing applications.  27 Calculate the necessary speed of a strobe flash needed to “stop” the movement of an object over a particular length. | 3  3  2  4  3 | E.g. 1 | Activity 14C:  Quest: 1-3 | Page 246-251 |

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|  |  |  | **Learning Outcome** | **Skill Level** | **Example** | **Activity** | **Resources** |
| **Week 2** |  | *Monday:*  *Lesson 1 :* **Demonstrating understanding of electrical systems.** | 1 State the cause of magnetism  2 Define magnetic field  3 Define magnetic flux  4 Draw characteristic magnetic field lines for simple magnets  5 Draw characteristic magnetic field lines for current carrying wires | 1  1  1  1  1 |  |  | Page 217 - 275 |
|  |  | *Tuesday:*  *Lesson 2:*  **Demonstrating understanding of electrical systems.** | 5 Calculate the flux of a uniform magnetic field through a loop of arbitrary orientation.  6 Describe the relationship between the rate of change of flux and the  voltage induced across a conductor  7 Describe methods to produce an electromotive force (emf) with a magnetic field or magnet and a loop of wire. | 2  2  2 |  |  | Page 217 - 275 |
|  |  | *Wednesday:*  *Lesson 3:*  **Demonstrating understanding of electrical systems.** | 8 Calculate emf, current, and magnetic fields using Faraday’s Law  9 Explain the physical results of Lenz’s Law  10 Calculate the induced voltage in a coil with a constant angular  velocity in a uniform magnetic field  11Calculate emf, force, magnetic field, and work due to the motion of an object in a magnetic field. | 2  3  2  2 |  |  | Page 217 - 275 |
|  |  | *Thursday:*  *Lesson 4:*  **Demonstrating understanding of electrical systems.** | 12 Explain how a transformer works.  13 Calculate voltage supplied by the mains in a transformer  14 Calculate current supplied by the secondary coil in a transformer.  15 Calculate number of turns in a coil. | 3  2  2  2 |  |  | Page 217 - 275 |
|  |  | *Friday:*  *Lesson 5:*  **Demonstrating understanding of electrical systems.** | 16 Define inductance  17 List the factors that affect the size and direction of the induced  voltage of an inductor  18 Calculate the inductance of an inductor.  19 Calculate the energy stored in an inductor. | 1  2  2  2 |  |  | Page 217 - 275 |
|  |  | *Lesson 5: Continue.* | 20 Calculate the emf generated in an inductor.  21 Discuss how various modern safety features in electric circuits work, with an emphasis on how induction is employed. | 2  4 |  |  |  |

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|  | **TERM 2** |  | **Learning Outcome** | **Skill Level** | **Example** | **Activity** | **Resources** |
| **Week 3** | **AC Circuit.** | *Monday:*  *LESSON 1:*  **AC Circuit** | 1. Define the RMS voltage  2. State the effect of capacitance on current in an AC circuit  3. State the effect of inductance on current flow in an AC circuit  4. Sketch voltage and current versus time in simple inductive circuits.  5. Sketch voltage and current versus time in simple capacitive circuits. | 1  1  1  2  2 | E.g. 1,2,3 | Activity 16A:  Quest: 1-6 | Page 275-283 |
| *Tuesday:*  *Lesson 2:*  **Ac in a Capacitor** | 6. Sketch voltage and current versus time in simple resistive circuits.  7. Calculate inductive and capacitive reactance.  8. Calculate current and/or voltage in simple inductive circuits. | 2  2  2 | E.g. 1,2 | Activity 16B:  Quest: 1-3 | Page 283-286. |
| *Wednesday:*  *Lesson 3:*  **Phase relationship in a capacitor-resistor circuit** | 9. Calculate current and/or voltage in simple capacitive circuits.  10. Calculate current and/or voltage in simple resistive circuits.  11. Calculate the impedance in a RLC series circuit.  12.Calculate the phase angle, resonant frequency, power, power factor in a RLC series circuit. | 2  2  2  2 | E.g. 1,2,3 | Activity 16C:  Quest:1-3.  Activity 16D:  Quest: 1-3 | Page 286-303 |
| *Thursday:*  *Lesson 4:*  **Phase relationship in a capacitor-resistor circuit** | 13. Calculate the voltage, and/or current in a RLC series circuit.  14. Draw the circuit diagram for an RLC series circuit.  15. Explain the significance of the resonant frequency. | 2  2  3 | E.g. 1,2,3 | Activity 16E:  Quest:1-3  Activity 16F:  Quest: 1- 2 | Page 286-303 |
| *Friday:*  *Lesson 5:*  **The LCR Circuit** | 16. Determine maximum voltage output of a circuit.  17. Calculate angular frequency for an AC circuit.  18. Calculate the reactance of a capacitor.  19. Determine current of resonance. | 2  2  2  2 | E.g. 1,2 | Activity 16G:  Quest: 1-2  Activity 16H:  Quest: 1-6 | Page 304-312 |

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|  | **TERM 2** |  | **Learning Outcome** | **Skill Level** | **Example** | **Activity** | **Resources** |
| **Week 4** | **Waves** | *Monday:*  *LESSON 1***:**  **Types of Waves** | 1. Define wave characteristics (wavelength, amplitude, speed)  2. Identify variables which affect wave speed  3. Solve wave problems involving speed, distance and time | 1  2  2 | E.g. 1,2,3 | Activity 4A:  Quest: 1-4  Activity 4B:  Quest: 1-4 | Chapter 4:  Page 49-63 |
| *Tuesday:*  *Lesson 2:*  **Standing Waves** | 4. Define a standing wave  5. Identify the wavelength of a standing wave in a diagram  6. Calculate the wavelength of a standing wave | 1  1  2 | E.g. 1 | Activity 5A:  Quest: 1-6 | Chapter5:  Page 67-74 |
| *Wednesday:*  *Lesson 3:*  **Musical Notes** | 7. Draw standing wave patterns for different instruments  8. Calculate the frequency of a standing wave  9. Explain what the harmonic series for a given string musical instrument would be | 2  2  3 | E.g. 1,2,3 | Activity 5B:  Quest: 1-4 | Page 74-80 |
| *Thursday:*  *Lesson 4:*  **Musical Notes;** | 10. Calculate resonance frequency  11. Describe how beats are generated in waves  12. Calculate the frequency of a wave in a given context | 2  2  1 | E.g. 1,2,3 | Activity 5B:  Quest: 1-4 | Page 74-80 |
| *Friday:*  *Lesson 5:*  **Musical Notes.** | 13. Determine an unknown using the wave speed formula  14. Determine the speed of wave in a given context  15. Determine the frequency of a wave in a given context  16. Explain differences in effects of sound waves | 1  1  1  2 | E.g. 1,2,3 | Activity 5B:  Quest: 1-4 | Page 74-80 |
|  | **TERM 2** |  | **Learning Outcome** | **Skill Level** | **Example** | **Activity** | **Resources** |
| **Week 5** | **Waves** | *Monday:*  *LESSON 1:*  **Doppler Effects** | 17. Construct graphs to describe standing waves.  18. Interpret textual information and diagrams in order to solve problems using the wave equation | 1  3 | E.g. 1 | Activity 6A;  Quest: 1-5 | Chapter6.  Page 81-86 |
| *Tuesday:*  *Lesson 2:*  **Doppler Effects** | 19. Predict with reasons, how changes in the medium of wave travel will affect the properties of the wave  20. Describe examples of the Doppler Effect for both sound and light | 4  2 |  |  | Page 81-86 |
| *Wednesday:*  *Lesson 3:*  **Doppler Effects** | 21. Explain how the Doppler Effect changes the way sound is perceived when the source of sound is moving  22. Explain the difference in actual and apparent frequencies of sound waves when the source of sound is moving away from observer | 3  3 |  |  | Page 81-86 |
| *Thursday:*  *Lesson 4:*  **Doppler Effects** | 23. Explain the difference in actual and apparent frequencies of sound waves when the source of sound is moving towards observer  24. Calculate the apparent frequency of a wave perceived from different locations. | 3  2 |  |  | Page 81-86 |
| *Friday:*  *Lesson 5:*  **Doppler Effects** | 25. Explain the effects of differences in speeds of sound and light  26. Describe the characteristics of a standing wave in terms of frequency, wavelength, amplitude, period, speed. | 3  2 |  |  | Page 81-86 |