IMMACULATE CONCEPTION HIGH SCHOOL PHYSICS TERM 2 PLAN 2023 – 2024			
GRADE:	**12**		
TERM:	**2**		
WEEK:	**DATE**	**TOPICS**	**OBJECTIVES**
1	**Jan. 10–12**	**Harmonic motion**	**UWI Workshop** 1.1. use the equations of simple harmonic motion to solve problems. 1.2. recall the conditions necessary for simple harmonic motion. 1.3. describe graphically the changes in displacement, velocity and acceleration with time and with displacement for simple harmonic motion. 1.4. derive and use the period of the simple pendulum as T = 2p (l/g) ½ and of the mass on a spring as T = 2 p (m/k) ½ . 1.5. describe the interchange of kinetic and potential energy of an oscillating system during simple harmonic motion. 1.6. calculate the energy of a body undergoing simple harmonic motion 1.7. describe examples of forced oscillations and resonance. 1.8. discuss cases in which resonance is desirable and cases in which it is not. 1.9. describe damped oscillations and represent such motion graphically. 1.10. explain how damping is achieved in some real-life examples.

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			Lab Report - SHM
2	**Jan. 15-19**	**Waves**	1.1. use the following terms: displacement, amplitude, period, frequency, velocity in relation to the behavior of waves. 1.2. differentiate between transverse and longitudinal waves in terms of the movement of particles in the medium of transmission and the energy of the waves. 1.3. represent transverse and longitudinal waves graphically. 1.4. explain “polarization” and give examples of polarized waves. 1.5. derive and use the equation v = f l to solve problems involving wave motion. 1.6. use the relationship intensity is proportional to (amplitude)2 for a wave. 1.7. use the terms phase and phase difference with reference to the behavior of waves.
3	**Jan 22-26’**	**Waves**	1.8. distinguish between stationary and progressive waves. 1.9. explain the properties of stationary waves and perform related calculations.

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			1.10. explain the meaning of coherence as applied to waves. 1.11. explain the terms superposition and interference of waves. 1.12. state the conditions necessary for two-source interference fringes of waves to be observed and perform experiments to demonstrate this. 1.13. discuss the principles of interference and diffraction as applied to waves. 1.14. derive and use the approximation y =λlD/a to solve problems. 1.15. use the expression nl = a sinθ for interference and diffraction (a = slit spacing) 1.16. use the diffraction grating to determine the wavelength and frequency of light waves. Lab Report – Waves
4	**Jan 29-Feb. 2**	**Physics of the Ear and Eye**	1.10. describe practical applications of sound waves in industry, such as the use of sonar waves in determining the depth of the sea, and in medicine, such as in fetal imaging. 1.11. discuss application of sound waves to musical instruments.

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			1.12. apply the laws of reflection and refraction to the behavior of waves. 1.13. describe experiments to demonstrate diffraction of waves in both narrow and wide gaps. 1.21. discuss the nature of light as electromagnetic radiation with reference to its diffractive properties. 1.22. list the orders of magnitude of the wavelengths of the e-m spectrum. 1.23. define refractive index in terms of velocity of waves. 1.24. use Snell's Law. 1.25. explain total internal reflection and determine the value of critical angle. 1.26. identify and discuss practical applications of total internal reflection. **Course work: Waves**
5	**Feb. 5-9** (Spirit Week)	**Physics of the Ear and Eye**	1.1. discuss the response of the ear to incoming sound waves, in terms of sensitivity, frequency response and intensity. 1.2. state the orders of magnitude of the threshold of hearing and the intensity at which discomfort is experienced.

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			1.3. use the equation intensity level (in dB) = 10 log10 I/Io. 1.4. discuss the subjective qualities of the terms 'noise' and 'loudness'. 1.5. distinguish between converging and diverging lenses and discuss the significance of focal length, radius of curvature and the power of a lens. 1.6. solve problems using lens formulae: $1/u + 1/v = 1/f$ 1.7. discuss how the eye forms focused images of objects at different distances. 1.8. explain the terms 'depth of focus', 'accommodation', 'long sight', 'short sight', 'astigmatism', 'cataracts', and discuss how defects of the eye can be corrected. 1.9. discuss the formation of focused images in the simple camera and magnifying glass. **Coursework Physics of the Eye**
6	**Feb 12-14**	**Mid-term Break**	

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7	**Feb. 15-16**	**Design and Use of Thermometers**	1.1. discuss how a physical property may be used to measure temperature. 1.2. describe the physical features of specific thermometers 1.3. discuss the advantages and disadvantages of these thermometers. 1.4. recall that the absolute thermodynamic scale of temperature does not depend on the property of any particular substance. 1.5. determine temperatures in Kelvin, in degrees Celsius and on the empirical centigrade scales.
8	**Feb. 19-23**	**Design and Use of Thermometers** **Thermal Properties**	1.1. express the internal energy of a system as the sum of the kinetic and potential energies associated with the molecules of the system. 1.2. relate a rise in temperature to an increase in internal energy. 1.3. explain the terms ‘heat capacity’ and ‘specific heat capacity’. 1.4. perform experiments to determine the specific heat capacity of liquids and metals by electrical methods and by the method of mixtures. 1.5. explain the concepts of ‘melting’ and ‘boiling’ in terms of energy input with no change in temperature.

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			1.6. relate the concepts of melting and boiling to changes in internal potential energy. 1.7. explain the term ‘specific latent heat’. 1.8. use graphs of temperature against time to determine freezing or melting points and boiling points. 1.9. perform experiments to determine the specific latent heats. 1.10. explain the cooling which accompanies evaporation. 1.11. solve numerical problems using the equations $EH = mc\,\Delta\theta$ and $EH = mL$
9	**Feb. 26-Mar.1**	**Heat Transfer**	1.1. describe the mechanism of thermal conduction. 1.2. use the equation $Q/t = -kA\,\Delta\theta/\Delta x$ to solve problems in one-dimensional heat flow. 1.3. solve numerical problems involving composite conductors. 1.4. discuss the principles involved in the determination of thermal conductivity of good and bad conductors. 1.5. explain the process of convection as a consequence of a change of density, and use this concept to explain ocean currents and winds.

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			1.6. discuss thermal radiation and solve problems using Stefan’s equation. 1.7. explain the greenhouse effect. 1.8. discuss applications of the transfer of energy by conduction, convection and radiation. 1.9. discuss the development of heating and cooling systems to reduce the Caribbean dependency on fossil fuels. **Test: Thermometers, Thermal Properties, Heat Transfer**
		Kinetic Theory	1.1. use the equation of state for an ideal gas expressed as $pV = nRT$, and $pV = NkT$ 1.2. discuss the basic assumptions of the kinetic theory of gases. 1.3. explain how molecular movement is responsible for the pressure exerted by a gas. 1.4. derive and use the equation $pV = 1/3\ Nm <c2>$ 1.5. use $pV = 1/3\ Nm <c2>$ to deduce the equation for the average translational kinetic energy of monatomic molecules. 1.6. deduce total kinetic energy of a monatomic gas.
10 . 11	**Mar. 3 - 18**	**Mock Exams**	

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12	**Mar. 21 – 25**	**First Law of Thermodynamics**	1.1. use the term 'molar heat capacity'. 1.2. discuss why the molar heat capacity of a gas at constant volume is different from that of a gas at constant pressure. 1.3. Calculate the work done on a gas using $W = p\Delta V$; 1.4. Deduce work done from a p-V graph; 1.5. Express the first law of thermodynamics in terms of the change in internal energy, the heat supplied to the system and the work done on the system; 1.6. Solve problems involving the first law of thermodynamics.
13	**March 28-Apr. 1**	**Mechanical Properties of Materials**	1.1. explain and use the terms 'density' and 'pressure'. 1.2. derive and use the equation $\Delta p = \rho g \Delta h$ for the pressure difference in a liquid. 1.3. relate the difference in the structures and densities of solids, liquids and gases to simple ideas of the spacing, ordering and motion of their molecules. 1.4. describe a simple kinetic model for the behavior of solids, liquids and gases.

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			1.5. distinguish between the structure of crystalline and non-crystalline solids, with particular reference to metals, polymers and glasses. 1.6. discuss the stretching of springs and wire in terms of load [and] extension. 1.7. use the relationship among 'stress', 'strain' and 'the Young modulus' to solve problems. 1.8. perform experiments to determine the Young modulus of a metal in the form of a wire. 1.9. demonstrate knowledge of the force-extension graphs for typical ductile, brittle and polymeric materials. 1.10. deduce the strain energy in a deformed material from a force-extension graph. 1.11. distinguish between elastic and inelastic deformations of a material. 1.12. discuss the importance of elasticity in structures. **Mechanical Properties Course Work**