Levels of Performance in Physics for Grade Twelve at Independent schools

Level / Strand	High Level	Satisfactory Level	Low Level
The relation between work, energy and power	Student can: • define work, apply the concept of work and solve its formula. • Describe and define kinetic and potential energy and give examples of different forms of energy and interconversion by transducers of various kinds. • classify the energy as potential or kinetic. • describe the principle of energy conservation and apply it to simple examples. • Deduce and derive and apply the formula of kinetic and potential energy.	• Student can: • define work and apply the concept of work. • define kinetic and potential energy and the relationship between them. • define the energy as potential or kinetic. • mention the principle of energy conservation. • mention the formula of kinetic and potential energy. • know that in practical systems there is energy loss. • know the concept of efficiency.	Student can: • define work • define kinetic and potential energy. • know that there is energy loss. • define power.

	• know that in practical systems there is energy loss, particularly in the form of waste heat. • use the concept of efficiency to solve problems and calculate conversion efficiencies relating energy input to useful energy output. • describe power as the rate of doing work or converting energy, and solve problems using the formula of power.	• describe power as the rate of doing work. • write the formula of power	
The properties of Waves	Student can: • define and explain what happens to waves when they are reflected and refracted, and their diffraction, superposition,	Student can: • describe what happens to waves when they are reflected and refracted, and their diffraction, superposition,	Student can: • define the diffraction, superposition, destructive and constructive interference of waves.

	destructive and constructive interference of waves. • explain refraction of light and water waves in terms of waves, and explain that the velocity of waves changes during refraction and relate this to refractive index. • explain electromagnetic radiation and magnetic field, know that all electromagnetic waves travel the same velocity in the vacuum and describe the main characteristics of electromagnetic spectrum and their applications. • give examples of the reflection, refraction and interference of waves.	destructive and constructive interference of waves. • know that the velocity of waves changes • define the electromagnetic radiation in a vacuum and the different main sections of the electromagnetic radiation. • give some examples of the reflection or refraction or interference of waves.	• know the difference in waves velocity. • define electromagnetic radiation.
Electromagnetic induction	Students can: • describe the production of an induced e.m.f. by the relative motion between a conductor and a magnetic field and know the factors that influence the	Students can: • describe the production of an induced e.m.f. and know some of the factors that influence the magnitude of the e.m.f.	Students can • know that there is production of an induced e.m.f. • know that there is alternating current

	magnitude of the e.m.f. • know that alternating current is induced in a coil rotating in a uniform magnetic field and explain the operation of a simple AC generator. • describe the commercial production of alternating current using a gas turbine. • describe and use the concepts of square root of the mean square for current and voltage value, and the concepts of period , frequency and peak applied to alternating current, and solve numerical problems related to them. • describe the action of a transformer, explain its importance in the transmission of electricity and solve problems related to power transmission.	• know that alternating current is induced in a coil rotating in a uniform magnetic field and mention some of the operation of a simple AC generator. • describe the commercial production of alternating current. • use the concepts of square root of the mean square for current and voltage value, and the concepts of period , frequency and peak applied to alternating current. • describe the action of a transformer and explain its importance in transmission of electricity.	• know the production of alternating current. • know the concepts of square root of mean square for current and voltage value. • know the transformer.

The foundation of modern atomic and nuclear physics	Student can: • interpret the results of Rutherford's scattering experiment and describe how it led to modern models of the structure of the atom. • describe a simple model for the nuclear atom, use the common notation for representing nuclides and write equations representing nuclear transformations. • explain the spontaneous and random nature of nuclear decay, interpret decay data in terms of half life and explain the source of the background radiation. • Explain the properties of Alfa, Bita and Gama radiations including the dangers to human life and health. • know some common uses of radioisotopes.	Student can: • know and mention the results of Rutherford's scattering experiment. • know a simple model for the nuclear atom and use the symbols and write some nuclear equations • describe the nuclear decay and explain decay data in terms of half life. • distinguish between the three radiations. • know the reactions that happen in in stars. • distinguish between nuclear fission and nuclear fusion • explain the use of nuclear	Student can: • know Rutherford's scattering experiment. • know the atom. • a know of the nuclear decay. • know Alfa, Bita and Gama. • know that there are heavy elements. • know the nuclear fission and nuclear fusion. • know that there is energy. • Know that there is a television tube.

	• know the source of energy in stars including the sun. • distinguish between nuclear fission and nuclear fusion and know how heavier elements are formed in older stars by nuclear fusion. • explain and understand that nuclear fission can be used peacefully as a source of energy and that there are significant social, political and environmental dimensions to its use. • show an understanding of the properties of the electron and the operation of the cathode ray tube and the television tube.	fission as peaceful source of energy. • describe the properties of the election and the operation of the cathode ray tube.	