**PHYSICS DEFINITIONS**

**MECHANICS**

1. Define a **vector** as *a physical quantity that has both magnitude and direction* and give examples
2. Define a **scalar** quantity as *a physical quantity that has magnitude only* and give examples
3. Define **resultant vector** as *the single vector which has the same effect as the original vectors acting together*
4. Define **distance** *as the length of path travelled* and know that distance is a scalar quantity
5. Define **displacement** *as a change in position*
6. Define **speed** *as the rate of change of distance* and know that speed is a scalar quantity
7. Define **velocity** *as the rate of change of position (or displacement)* and know that velocity is a vector quantity
8. Define **acceleration** *as the rate of change of velocity*
9. Define **weight** $F\_{g} $*as the gravitational force the Earth exerts on any object on or near its surface*
10. Define **normal force**, $F\_{N}$, *as the perpendicular force exerted by a surface on an object in contact with it*
11. Define **frictional force due to a surface**, $F\_{f}$, *as the force that opposes the motion of an object* and acts parallel to the surface with which the object is in contact
12. State **Newton‘s first law**: *An object continues in a state of rest or uniform (moving with constant) velocity unless it is acted upon by a net or resultant force*
13. Define **inertia** *as the property of an object that causes it to resist a change in its state of rest or uniform motion*
14. State **Newton‘s second law:** *When a net force,*$ F\_{net}$*, is applied to an object of mass,* $m$*, it accelerates in the direction of the net force. The acceleration,* $a$*, is directly proportional to the net force and inversely proportional to the mass*
15. State **Newton‘s third law**: *When object A exerts a force on object B, object B simultaneously exerts an oppositely directed force of equal magnitude on object A*
16. Define **momentum** as*the product of the mass and velocity of the object*
17. State **Newton‘s second law in terms of momentum**: *The net force acting on an object is equal to the rate of change of momentum.* (Note: there are two acceptable statements of Newton’s Second Law)
18. State the **law of conservation of linear momentum**: *The total linear momentum of an isolated system remains constant* (is conserved)
19. Define an **elastic collision** *as a collision in which both momentum and kinetic energy are conserved*
20. Define an **inelastic collision** *as a collision in which only momentum is conserved*
21. Define **impulse** as *the product of the net force and the contact time*
22. Define the **work** **done on an object by a force** as *the product of the displacement and the component of the force parallel to the displacement*
23. Define **gravitational potential energy** as *the energy an object possesses due to its position relative to a reference point*
24. Define **kinetic energy** as *the energy an object has as a result of the object’s motion*
25. Define **mechanical energy** as *the sum of gravitational potential and kinetic energy at a point*
26. State the **law of conservation of energy** as *the total* *energy in a system cannot be created nor destroyed; only transferred from one form to another*
27. State the **principle of conservation of mechanical energy**: *In the absence of air resistance or any external forces, the mechanical energy of an object is constant*
28. State that the *work done by a net force on an object is equal to the change in the kinetic energy of the object* – **the** **work-energy theorem**
29. Define **power** *as the rate at which work is done* or the *rate at which energy is transferred*
30. State that the unit of power is the watt (W). **One** **watt** is defined as *the power when one joule of work is done in one second. (1 W = 1 J.s-1)*
31. Define **efficienc**y as *the ratio of output power to input power*
32. State **Newton‘s Law of Universal Gravitation**: *Every particle in the universe attracts every other particle with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centres*

**ELECTROSTATICS**

1. State **Coulomb’s law** in words as *the force between two charges is directly proportional to the product of the charges and inversely proportional to the distance between the charges squared*
2. Define the **magnitude of the electric field at a point** *as the force per unit positive charge*

**CURRENT ELECTRICITY**

1. Define **potential difference** as *the work done per unit positive charge*
2. Define **current** as *the rate of flow of charge*
3. State **Ohm’s Law**: *Current through a conductor is directly proportional to the potential difference across the conductor at constant temperature*
4. Define r**esistanc**e as *a material’s opposition to the flow of electric current*
5. Define **emf**as *the total energy supplied per coulomb of charge by the cell*

**ELECTRODYNAMICS**

1. State that **magnetic flux density (**$B$) is a representation of the magnitude and direction of the magnetic field
2. Describe that for a loop of area ($A$) in the presence of a uniform magnetic flux density ($B$), the **magnetic flux (**$Φ$**)** passing through the loop is **defined as** $Φ=BA cosθ$ where $θ$ is the angle between the magnetic flux density ($B$) and the normal to the loop of the area ($A$). No calculations required
3. Define **magnetic flux linkage** *as the product of the number of turns on the coil and the flux through the coil (*$NΦ$*)*
4. State **Faraday’s law of electromagnetic induction**: *the emf induced is directly proportional to the rate of change of magnetic flux (flux linkage)*
5. **State Lenz’s law**: *the induced current flows in a direction so as to set up a magnetic field to oppose the change in magnetic flux*
6. Define a **diode** as *a component that only allows current to flow in one direction*

**PHOTOELECTRIC EFFECT**

1. Define **threshold (cut-off) frequency (**$f\_{o}$**)** as *the minimum frequency of incident radiation at which electrons will be emitted from a particular metal*
2. Define **work function (**$W\_{o}$**)** as *the minimum amount of energy needed to emit an electron from the surface of a metal* and know that the work function is material specific