The Syllabus

National Curriculum of Bangladesh
HSC Physics Syllabus
1st paper

1. **Vector:** General properties: Unit vector and components; Linear combination and resultant; Scalar and vector products; Time derivatives of vectors.

2. **Linear Motion :** Graphical representation of one-dimensional motion; Speed and displacement; Instantaneous speed fusing differentiation; Equation of motion; Solution of the equation of motion for a uniformly accelerated particle; Motion of a falling body.

3. **Two-dimensional Motion:** Vector representation of displacement, velocity and acceleration; Vector form of the equation of motion and its solution (uniform acceleration); Two dimensional motion of a projectile, circular motion; Relation between angular and linear velocity (using vectors); Angular acceleration; centripetal acceleration.

4. **Laws of Motion:** ঔহবৎঃরধ ধহফ ভড়ৎপব; ঋড়ঁ ৎ ু ঢ়বং ড়ভ ভঁ হফধস বহঃধষ ভড়ৎপবং; ঘ ব ি ঃড়হ্ব ং ভ্রংং ষ্ধি ড়ভ স ড়ঃরড়হ; গ ড়স বহঃঁ স , ঘ ব ি ঃড়হ্ব ং ংবপড়হফ ষ্ধি ড়ভস ড়ঃরড়হ(ংরুম া বপঃড়ৎং); ঙস ঢ়ঁ ষ্ধর ব ভড়ৎপব; ঘ ব ি ঃড়হ্ব ং third law of motion; Conservation of momentum (using vectors); Motion of a rocket: Equilibrium of forces; Frictional force and co-efficient of friction.

5. **Laws of Rotational Motion:** অহমঁ ষ্ধৎ স ড়স বহঃঁ স ; এঃড়ৎয়ঁ ব; ঘ ব ি ঃড়হ্ব ং ষ্ধি ং ভড়ৎ ধহমঁ ষ্ধৎ স ড়ঃরড়হ; Centripetal force, vehicles and banking of a road; Moment of inertia; Radius of gyration; Parallel axes theorem and perpendicular axes theorem.

6. **Work, Energy and Power :** Definitions of work (using vectors and integration); Kinetic energy and Work-energy theorem (constant force); Potential energy; Conservation of energy ; Power.

7. **Gravitation:** ঘ ব ি ঃড়হ্ব ং খ ধি ড়ভ মৎধা রুধঃরড়হ; উ বঃবৎস রহধঃরড়হ ড়ভ ঞ ; ঠ ধৎরধঃরড়হ ড়ভ ঃযব ধপপবষ্ধৎধঃরড়হ ফঁ ব ঃড় মৎধা রু ও ম্ব ঈবহংব ড়ভ মৎধা রু ; অৎঃরড়রপরধষ ধহফ মবড়ংঃধঃরড়হধৎু ংধঃবষষঃবং; এ ৎধা রুধঃরড়হধষ potential; Escape velocity; Keplহ্ব ং ষ্ধি ং.

8. **Simple Harmonic Motion:** Definition; Differential equation and its solution (only mention); Variation of potential and kinetic energy (graphical); Oscillation of a spring; Simple pendulum ধহফ রুং ঢ়বৎরড়ফ. উ বঃবৎস রহধঃরড়হ ড়ভ ম্ব ি রুয ঃযব যবষ্ড় ড়ভধ ঢ়বndulum.

9. **Elasticity :** ঈ ড়হপবঢ়ঃ ড়ভ রহঃবৎস ড়ষ্ধপঁ ষ্ধৎ ভড়ৎপবং; ঊষ্ধংঃরপ্রু ধহফ ঐ ড়ড়শহ্ব ং ষ্ধি ; এ্রযব স ড়ফঁ ষঁ ং ড়ভ বষ্ধংঃরপ্রু ধহফ চ ড়রংড়হ্ব ং ৎধঃরড়; উ বঃবৎস রহধঃরড়হ ড়ভ ণ ড়ঁ হম্ব ং স ড়ফঁ ষ্ধং; চ ড়ঃবহঃরধষ বহবৎমু ৎবষ্ধঃবফ ঃড় elastic body.

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10. **Fluids:** Surface tension (molecular theory): Angle of contact; Determination of surface tension ি রূয ঃযব যবষঢ় ড়ভপড়ৎড়ষষধু ঃঁ নব, ঠ রুপড়ংরু ; ঝঃড়শহ্ব ং ষধি ; ঊভ্ভবপঃ ড়ভ ঃবস ঢ়বৎধঃ ৎব ড়ভংঁ ৎভ্রপব ঃবহংরড়হ and viscosity.

11. **Heat and Gas:** ই ড়ু ষহ্ব ং ষধি ধহফ ঈ যধৎষহ্ব ং ষধি : ওরবধষ মধং বয়ঁ ধঃরড়হ; চ ৎরূস ধু পড়হপবঢ়ঃ ধনড়ঁ ঃ ঃযব distribution of velocities of molecules of a gas; Root mean square velocity; Relation of molecular velocity with pressure and temperature; Mean free path; Saturated and unsaturated vapour pressure; Hygrometry.

12. **Temperature:** Fixed pints and scales of temperature; Triple point, absolute temperature; Mercury thermometer, thermocouple, thermistor and pyrometer.

13. **First law of Thermo Dynamics:** Heat and internal energy; Adiabatic and isothermal expansion and contraction; first law of thermodynamics (mathematical): Specific heat, Cp, C, γ: In adiabatic process proof of the equation: PV^{γ} =constant; Thermal equilibrium.

14. **Heat Radiation:** ই ষধপশ নড়ফু ৎধফরধঃরড়হ; ড রবহ্ব ং ফরংঢ়ষধপবস বহঃ ষধি ; ঝঃবভাহ্ব ং ষধি ; ঘ বি ঃড়হ্ব ং ষধি ড়ভ cooling; Determination of specific heat of a liquid.

15. **Change of State:** State and phase, latent heat of fusion and vaporization; Phase diagram; Triple point of water; Determination of latent heat.

16. **Second law of Thermodynamics:** Reversible and irreversible process; Qualitative idea of the second law: Efficiency of an engine.

17. **Wave and Sound:** General characteristics of waves; Amplitude, wavelength, frequency, phase, intensity; Transverse and longitudinal waves; Superposition and interference; Progressive and standing waves.

18. **Sound:** Log scale of intensity 9decibel); Musical scale and harmonics; Beats, laws of vibration of stretched string; Resonance, music and musical instruments.

19. **Velocity of Sound:** Relation between elasticity and velocity of sound; Effects of temperature and humidity on velocity of sound (mathematical expression); Determination of velocity of sound by ৎবংড়হধহপব ধরু পড়ষঁ স হ; উ ড়ঢ়ঢ়ষহ্ব ং বভ্ভপঃ (স ধঃযবস ধঃরূপধষবী ঢ়ৎবংংরড়হ).

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1. **Electrostatics:** Static electricity: existence of change, nature of charge, Electrical induction: ঈড়ঁ ষড়স হু ং ষ্বা ধহফঁ হরু ড়ভপযধৎমব, ভ্রবফফ রুঃবহংরু , চড়ঃবহঃরধষ ধহফ বয়ঁ রূড়ঃবহঃরধষং ৎভ্রপব. ঈধঢ়ধপরূড়ৎ, parallel plate capacitor and capacitance, permittivity and dielectric constant. Series and parallel constant. Series and parallel combination of capacitors; Energy stored in a capacitor.

2. **Flow of electricity and electric circuits:** ঈঁ ৎৎবহঃ ধহফ রুংঁ হরুং; ঙ যস্হ ং ষ্বা ি ; জবংরুঃধহপব ধহফ specific resistance; Conductivity of different materials; Effect of temperature on resistance; Colour code of resisঃধহপব; ঝবৎরবং ধহফ ঢ়ধৎধষষ্বষ পড়স নরহধঃরড়হ ড়ভ ৎবংরুঃধহপব; কররুপযযড়ুহুং ষ্বা২ ং. ড যবঃংঃড়হব্ ং নৎরফমব ঢ়ৎরহপরূড়ষ্ব; গ বঃবৎ ই ৎরফমব. চড়ংঃ ড়ভ্রপব নড়ী , বষ্বপঃৎড়স ড়ঃরা ব ভ্রড়ৎপব ধহফ য়বব রুঃবৎহধষ resistance of an electric cell. Parallel and series combination of electric cells and potentiometer.

3. **Thermal and chemical effects of current:** ঔড়ঁ ষ্ব ং ষ্বা ং. উ বঃবৎস রুহধঃরড়হ ড়ভ য়বা ধষঁ ব ড়ঙ্ঘ ঞ্ট. এয়বৎস ড় বষ্বপঃৎরপ বভ্রপঃ; ঊষ্বপঃৎরপ পবফষ্ (চৎরস ধু ধহফ ঝবপড়হফধু): ঊষ্বপঃৎড়য়ু ংরু ধহফ ঋধৎধফধু২ ং ষ্বা ং.

4. **Magnetic effects of current :** ঙ বৎংঃধহ্ ং বী ঢ়বৎরস ent: Biot-ঝধা ধৎহ্ ং ষ্বা ি ; গ ধমহবঃরপ ভ্রবফ ফঁ ব ঃড় current; Magnetic field due to current in a long straight wire and in a circular circuit. Force on a charge moving in a magnetic field; Hall Effect and Hall voltage; Force on a current carrying conductor in a magnetic field. Torque on a small coil in a magnetic field and magnetic moment of the coil. Galvanometer, shunt, voltmeter, ammeter and multimeter.

5. **Magnetic material and Geo-magnetism:** Permeability: Para, dia and ferromagnetism; Magnetic hysteresis. The origin of geo-magnetism. Vibration magnetometer. Determination of MH.

6. **Electromagnetic induction and Alternating Current:** ঋধৎধফধু২ ং ষ্বা ং ধহফ খবহু২ ং ষ্বা ি ; ঝবষভধহফ Mutual induction Generator, motor and transformer; Alternating current; Root meant square value and peak value of voltage and current.

7. **Electromagnetic Waves:** History of evolution of electromagnetic wave theory; Description of electromagnetic spectrum (names of different parts, source and applications); Velocity of light (Dependence on medium anফ ি ধা ব ষ্বহমঃয়): উ বঃবৎস রুহধঃরড়হ ড়ভা বষড়পরু ড়ভফ্রময়ঃ (ঋুর বধঁ ঃ স বঃয়যড়ফ).

8. **Reflection of Light:** Convex and concave mirror; Repetition of some useful definitions regarding mirror; real is positive convention of sign; Equation of focal length, magnification: Formation of images at six positions in case of concave mirror and also in case of convex mirror. Determination of focal length.

9. **Refraction of Light:** ঝহবস্ক্ষ ং ষ্বা ধহফ ৎবভ্রধপঃর ব রুহফবী ; জবভ্রধপঃর ব রুহফবী ি রূয ৎবংঢ়বপঃ ঃড়া ধপঁ স and different media; Critical angle and total internal reflection, prism, angle of minimum

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deviation and determination of refractive index; Dispersion of light; Refraction at spherical surfaces and equation of lens; Combination of lenses and power; Formation of images at six positions in case of convex lens and also in case of concave lens. Determination of focal length (convex and concave lens).

10. **Optical Instruments:** Defects of vision and their correction9 with mathematical expression). Compound microscope. Telescope (refractive and reflective type) and their working principle with mathematical expression.

11. **Wave theory of Light:** ড ধা ব ভঃড়হঃ, ঐঁ ু মবহঃ্ ং ঢ়ৎরহপরঢ়ষ্ব, ফবৎরা ধঃরড়হ ড়ভ ঃযব ষ্ধি ং ড়ভৎবভষ্বপঃরড়হ ধহফ ৎবভংধপঃরড়হ িরূয ঃযব যবষ্ঢ় ড়ভ ঐঁ ু মবহঃ্ ং ঢ়ৎরহপরঢ়ষ্ব; ওহঃবৎভবৎবহপব. ণ ড়ঁ হম্ ফড়ঁ নষ্ব-ংষ্ধঃ্ experiment, diffraction, diffraction due to a single slit, use of grating; Polarization; relation of direction of velocity of light with directions of E and B. Intensity.

12. **Electron and Photon:** Electrical conduction in rarefied gases; plasma state. Cathode ray. Production of X-ray; Characteristics and uses of X-ray: Failure of classical Physics in explaining ঃযব নষ্ধপশ নড়ফু ৎধফরধঃরড়হ. চ ষ্ধহপশ্ ং ঃযবড়ু ধহফ ঃযব পড়হপবঢ়ঃ ড়ভ চ যড়ঃড়ৎষ্ব পঃড়ভপঃ ধহফ ঊরহংঃবরহ্ ং বয়ঁ ধঃরড়হ. খ অ ঝঊজ ধহফ রূং ধঢ়ঢ়ষ্ধপধঃরড়হং.

13. **Atom**: জঁ ঃযবৎভড়ৎহ্ ং বী ঢ়বৎরস বহঃ ধহফ ংঃঁ পঃ ৎব ড়ভ ধহ ধঃড়স . ই ড়যহ্ ং স ড়ফবষ ড়ভ ধহ ধঃড়স (ংরস ঢ়ষ্ব mathematical presentation): Radioactive decay law and half life; Chain reaction, nuclear fission and fusion.

14. **Electronics:** Semiconductors; the elementary concept of band theory; Doping and n-type and p-type semiconductors, junction diode and its I-V characteristic graph; Circuit for rectification and explanation of rectification with the help of graph; I.E.D. Solar cell. N-p-n and p-n-p transistors; Amplifier circuits; E.F.I and its uses.

15. **Theory of relativity and Astrophysics:** Basic postulates of theory of relativity; Relativistic concept of time, length and mass; Mass energy equation. The life cycle of a star; Black hole.