ENGINEERING PHYSICS

BRANCH:- ALL

SEMESTER – FIRST

These important questions have been prepared using your previous exam papers (PYQs), verified concepts, and additional reference from trusted online academic sources.
For deeper understanding, please refer to your class notes as well.

1️⃣ HIGH & LONG IMPORTANT QUESTIONS

These are descriptive, derivation, or long explanation questions that carry the highest marks and are frequently repeated.

1. **State and explain Newton's three laws of motion.** Define force, momentum, and impulse, and write their S.I. units.
2. Define and explain **Young's Modulus of Elasticity, Bulk Modulus of Elasticity, and Modulus of Rigidity.** Derive the relation between them (though the syllabus asks for the relation without derivation, explaining the concepts is key).
3. Explain the variation of **acceleration due to gravity ('g')** with altitude and depth. How is 'g' related to the Universal Gravitational Constant (G)?
4. Describe the three modes of **transmission of heat** (Conduction, Convection, and Radiation) with one example of each. State the law of thermal conductivity and define its coefficient along with its S.I. unit.
5. Explain the **construction and working of a He-Ne Laser**. State the special properties of laser light. **OR** Explain the construction and working of a **Photoelectric Cell**.
6. State Newton's Law of Viscosity and define the **coefficient of viscosity**. State and explain **Stokes' Law**, and briefly explain the concept of terminal velocity.
7. Derive the three equations for a uniformly accelerated motion, where symbols have their usual meanings .

2️⃣ IMPORTANT & SHORT QUESTIONS (70–80% probability)

These include definitions, short conceptual explanations, differentiations, and direct, simple numerical problems.

1. Define **Echo and Reverberation**. Explain any two methods to reduce reverberation in an auditorium.
2. Define: **Stress, Strain, and Elastic Limit**. Write their S.I. units.
3. Explain the phenomenon of **capillary action** with suitable examples. Write the relation between surface tension, capillary rise , and radius of capillary .
4. Define and differentiate between **longitudinal wave** and **transverse wave**. Also, define **Node and Antinode** in a stationary wave.
5. Define the three scales of temperature: **Centigrade scale, Fahrenheit scale, and Kelvin scale**.

6. Define unit, and explain **fundamental unit** and **derived unit** with examples. [1]
7. Derive the relation among velocity , frequency , and wavelength of a wave.

3 "AA BHI SAKTA HAI" QUESTIONS (Low probability but smart picks)

These cover new syllabus areas and high-value questions that appeared rarely but are essential for a complete study.

1. Explain the production of **X-rays** using a Coolidge tube. Write its two most important properties and two engineering applications.
2. Define **Reynolds number** and explain its significance in determining the type of fluid flow (Streamline or Turbulent).
3. Define the terms **Linear Expansion, Aerial Expansion, and Cubical Expansion**. Write the relation between the three coefficients of expansion.
4. What do you mean by **dimensions of a physical quantity**? Write the dimensional formula of **momentum, impulse, universal gravitational constant (G), and stress**. [2020]
5. State **Hooke's law**. Explain why steel is considered more elastic than copper.

SHORT REVISION NOTES

Unit	Topic	Important Formula Name	Key Definition / Concept
1: Units & Measurements	**Kinematics**	**Three Equations of Motion (e.g.,**	**g**(Acceleration due to Gravity) decreases with **altitude** (height) and **depth**.
	Dimensions	-	**Principle of Homogeneity** states that the dimensions of all terms on both sides of an equation must be the same.
2: Properties of Matter	**Elasticity**	**Young's Modulus Formula**	**Hooke's Law:** Stress is directly proportional to Strain (within the elastic limit). **Steel is more elastic than Rubber.**
	Surface Tension	**Capillary Rise Formula**	Surface tension is the $\text{Force per unit length}$. It is responsible for the spherical shape of liquid drops.
	Viscosity	**Stokes' Law Formula**	**Terminal Velocity** is the constant speed reached by a falling object when the drag force equals the force of gravity.
3: Heat	**Heat Transfer**	**Thermal Conductivity Formula**	Modes: **Conduction** (vibration), **Convection** (movement of fluid), **Radiation** (electromagnetic waves).
4: Waves, Light & Laser	**Waves & Sound**	**Wave Velocity Formula**	**Reverberation** is the persistence of sound. **Node** and **Antinode** are points of minimum and maximum amplitude in a stationary wave.
	LASER	-	Properties: **Monochromatic**, **Coherent**, **Directional**, **High Intensity**. Principle: **Stimulated Emission**.
5: Modern Physics	**Photoelectric Effect**	**Einstein's Photoelectric Equation**	**Work Function (W_0)** is the minimum energy needed to eject an electron from a metal surface.
	X-Rays	-	Produced using a **Coolidge Tube**. Properties: High penetrating power, highly energetic electromagnetic waves.

[Diploma wallah]

DIPLOMA WALLAH (SWANGAM 💗)