



Physics

1. Calculate the time period of a simple pendulum. A simple pendulum with a hollow spherical bob is taken. How will the time period change? (a) When the bob is completely filled with a liquid and (b) When it is partially filled with the liquid ? Give reasons for your answer.
2. A body is simultaneously acted upon by two simple harmonic vibrations of same frequency but different amplitudes. Calculate the resultant displacement.
The equation representing a progressive wave motion is given by $Y = \sin(660\pi t + 0.002\pi x)$. Calculate the frequency and velocity of the wave.
3. State the first law of thermodynamic and bring out the difference between reversible and irreversible processes.
A vessel contains air at 60°C . To what temperature must it be heated to expel one-third of air. The pressure remaining constant neglect the small change in the volume of the vessel.
4. (a) Explain why the projection screen in a cinema is made of rough and white material.
(b) What is the colour of a object due to ? If A is the angle of a prism and μ the refractive index and δ is the deviation of a ray through the prism, prove that for a thin prism and small angle of incidence $\delta = (\mu - 1)A$.
5. Explain what is meant by neutral point in a magnetic field. Explain the terms declination and dip.
The similar poles of strength 20 and 80 units are kept separated by a distance of 10 cm. in air. Find the position of neutral points on the line joining the two poles.
6. A hollow conducting sphere of radius a is charged with electricity to a potential V the total charge is Q . Calculate
(a) Electric field intensity just outside the sphere.
(b) Electric intensity inside the sphere.
(c) Potential at a distance r from the centre where $r < a$.
A sphere of radius 10 cm. is charged to 10 e.s.u. of electricity. Calculate the work done in giving to it an additional charge of 4 units electricity.
7. Explain the working of a Wheatstone bridge circuit for measurement of resistance.
A metallic wire has a certain resistance. If the wire is stretched so that its length is doubled, what happens to its resistance? It may be assumed that the volume and resistivity of the wire remain unchanged.
8. Explain why an ammeter should have small resistance and a voltmeter high resistance.
Two coils one a primary and another a secondary are mutually coupled together. An a.c. current flows through the primary. What will be its effect on the secondary and explain the principle. What will happen if a d.c. current flows through the primary?



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9. Define the atomic weight and atomic number of an element. Which of these two determine the chemical properties of the element? What is meant by the half-life period of a radio-active substance?

If half-life period of a radioactive substance be 2 days then after how many days will $1/6^{\text{th}}$ part of the substance is left behind?

10. What do you mean by photoelectric work function and threshold frequency? Write down Einstein's photoelectric equation and explain its significance.

A metal has the value of photoelectric work function as 1.32 eV. What is the longest wave length that causes photoelectric emission from the metal surface?

$$e = 4.8 \times 10^{-10} \text{ e.s.u.}$$

$$h = 6.6 \times 10^{-27} \text{ ergs second.}$$