



Physics

1. (a) What is meant by angle of repose?
(b) A block of mass 2 kg slides on an inclined plane which makes an angle of 30° with the horizontal. The coefficient of friction between the block and the surface is $\frac{\sqrt{3}}{2}$. What is the force applied to the block so that the block moves down with any acceleration.
2. (a) What is meant by intensity of sound in a medium and what is the relation between loudness and intensity?
(b) At what temperature will the speed of sound in air become double of its value at 0°C .
(c) When a star approaches the earth as it moves, the spectral lines are shifted towards ..
3. (a) What is meant by thermodynamics process and how it is classified?
(b) Calculate the change in entropy when 10 gm of ice at 0°C is converted into water at the same temperature.(The latent heat of water , $L = 80$ cal per mole.)
(c) Conduction of heat from a hot body to a cold body is an example for ...
4. (a) Distinguish between streamline and turbulent flow of fluids.
(b) A drop of water of radius 0.02 cm is falling through a medium whose density is 1.2 kg/m^3 and the coefficient of viscosity is $1.8 \times 10^{-5} \text{ NS/m}^2$. Find the terminal velocity of the drop.
5. (a) Define magnetic lines of force and magnetic flux.
(b) An electric field of 3000 V/m and a magnetic field of 0.8 Weber/m^2 act on moving electron without any force.
(i) Calculate the minimum speed of the electron (ii) draw the vectors E , V , and B .
6. (a) Write down an expression for the capacity of a parallel plate condenser when a dielectric is introduced between the plates.
(b) Twelve equal wires each of resistance 6 ohms are joined to form a skeleton cube. A current enters in one corner and leaves at the diagonally opposite corner. Find the equivalent resistance between the corners.
7. (a) (i) State the law of successive temperatures.
(ii) Define thermoelectric power.
(b) It is required to convert a galvanometer of current range of 15 mA and a voltage range of 750 mV into an ammeter of range 25 amp. Calculate the necessary shut resistance.



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8. (a) Define terms (i) Lux (ii) Phot
(b) What is the condition of achromatic combination of lenses in contact?
(c) A lens has one radius of curvature 15 cm and that other double of it. If its focal length is 20 cm, calculate its refractive index.
9. (a) (i) Define the term Half Life and mean life of radioactive substances and relate them.
(ii) calculate the radius of the first Bohr orbit of Hydrogen .
(b) The plate resistance of a triode is 3×10^3 A/volt. Find the amplification factor of the triode.
10. (a) (i) What is meant by photoelectric effect?
(ii) Write down the photoelectric equation.
(b) Calculate the de-Broglie wavelength associated with a proton moving with a velocity equal to $1/20^{\text{th}}$ of the velocity of light.
(c) Give one example for a simple cubic crystal structure. How many numbers of atoms will be there per unit cell and what is the combination number in a simple cube.