

CLASS XII SAMPLE PAPER PHYSICS

Time allowed: 3 hours

Maximum Marks: 70

Time – 3 hrs

General Instructions: All questions are compulsory.

1. Q. No. 1 to 5 -1 mark each ,Q. No. 6 to 10 - 2 marks each Q. No .11 to 22 -3 marks each,Q. No 23 is a value based question of 4 marks , Q. No 24 to 26 - 5 marks each.

You may use the following physical constants wherever necessary:

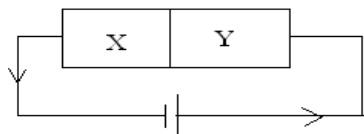
$c=3 \times 10^8 \text{ m/s}$ $h=6.6 \times 10^{-34} \text{ Js}$ $e=1.6 \times 10^{-19} \text{ C}$ $N_A = 6.023 \times 10^{23} /\text{mole}$ $c=3 \times 10^8 \text{ m/s}$ $h=6.6 \times 10^{-34} \text{ Js}$ $e=1.6 \times 10^{-19} \text{ C}$

1. Draw curves showing variation of electric intensity with distance from center for a charged spherical shell and for a conducting charged solid sphere.
2. If the current flowing in the wire of potentiometer be decreased, what will be effect on the position of zero deflection in potentiometer? Explain
3. How does magnifying power change in length of tube for a given microscope?
4. Why the transmission of signals using sky wave is restricted to frequencies upto 30 MHz?
5. In the nth orbit of hydrogen atom, Find the ratio of the radius of the electron orbit and debroglie wavelength associated with it
6. For a given angle of incidence on one face of prism, the angle of deviation is $(180^\circ - 2A)$ where A is the angle of prism. If the refractive index of material is $\sqrt{3}$. Find the angle of prism.
7. Prove that an electric dipole held in uniform electric field does not experience force but experiences a torque. Deduce an expression of torque.
8. In a plane e.m. waves, the electric field oscillates sinusoidally with a frequency of $2.0 \times 10^{10} \text{ Hz}$ and amplitude 48 Vm^{-1} . What is the wavelength of the wave and amplitude of magnetic field.
9. A proton and neutron have same kinetic energy. Which one will have larger de-broglies wavelength?
10. Prove that the charge moving at right angle to a uniform magnetic field does not undergo change in kinetic energy.

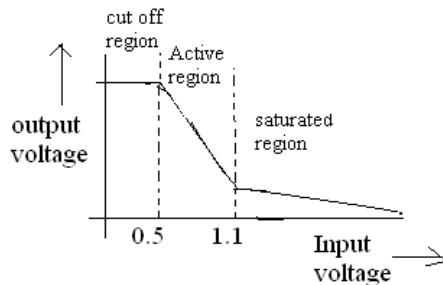
OR

Write expression for the force acting per unit length between two parallel conductors carrying currents I_1 and I_2 respectively. Define one ampere current using this formula.

11. Two intrinsic semiconductors X and Y are doped with As and In respectively and then connected as shown in figure: (1) Identify the device so formed. (2) Identify the biasing and draw V-I curve for this biasing.



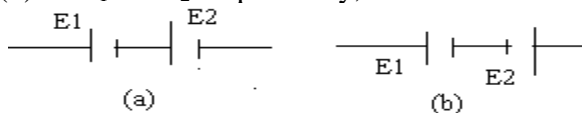
12. Draw block diagram showing the production and transmission of AM waves.
 13. A graph is plotted between output and input voltage of n-p-n transistor. Using graph explain how will transistor as a switch?



14. Radiation of frequency 10^{15} Hz is incident on three photo-sensitive surfaces A,B, and C. Following observations are recorded: (1) from surface A there is no photo-emission (2) from surface B photo-emission occurs but the photo-electrons have zero kinetic energy (3) from surface C photo-emission occurs but the photo-electrons have kinetic energy Explain above observations on the basis of Einstein's photo-electric equation.
 15. Draw neat and labeled diagram of astronomical telescope in normal adjustment. If the magnification of telescope is 10 and the length of the tube is 40cm, find the focal lengths of eyepiece and objective lenses.
 16. Explain the working of p-n junction as the full wave rectifier. How will the pure d.c. at the out put of rectifier be obtained.
 17. What is the binding energy of a nucleon? In certain star, three alpha particles combine to form a C_6^{12} nucleus. Calculate the energy produced in this reaction. Mass of $He_2^4 = 4.002604$ amu and mass of $C_6^{12} = 12.0000$ amu. Assuming $1\text{amu} = 931\text{ MeV}$
 18. Write expression for torque experienced by the current carrying coil placed in uniform magnetic field. Using this relation show that in moving coil galvanometer current $I \propto \theta$, where θ is the deflection in the coil. Why do we use radial magnetic field in galvanometer?
 19. A battery of emf "E" and internal resistance 'r' sends currents I_1 and I_2 , when connected to external resistances R_1 and R_2 respectively. Find the emf and internal resistance of the battery.

Or

Why potentiometer is said to be more sensitive than d.c. voltmeter? Two primary cells of emf's E_1 and E_2 ($E_1 > E_2$) are connected to the potentiometer wire. If the balancing lengths for the two combinations as shown in figure (a) and (b) are l_1 and l_2 respectively, find the ratio of E_1 and E_2 ?



20. "When a north pole of the magnet is moved (1) towards (2) away from the coil, a magnetic north and south poles are produced on the face of the coil." State the law in relation to an observation. Draw circuit diagram used to verify the law experimentally. What are the directions of current in each case?
 21. When a magnet is suspended freely in air, the following observations are recorded: magnet makes an angle θ from geographic axis and α from the horizontal line on earth. (1) draw diagram depicting the above situation (2) identify the angles θ and α (3) derive relation between vertical, horizontal component of earth and α

22. A wire of resistance $9\ \Omega$ and length l is cut into three equal parts. Each part is then stretched to length “ l ” and joined in parallel to each other, calculate the effective resistance and p.d. across each resistor if total current in the combination is 2.7 A .
23. There are many dangers in the use of nuclear power plants. These have been a number of situations in which these dangers have become real disasters, giving birth to safety and regulatory agencies.
- Name three main dangers of nuclear power plants.
 - How should the nuclear powers conduct themselves to avert these dangers?
 - Which human value should be in focus while building nuclear power plants?
24. A device can increase or decrease the input alternating voltage at output. Name this device and state the principle of working. Show its types diagrammatically. Give two ways of loss of energy in this device.

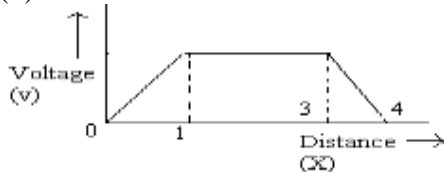
Or

Derive an expression for impedance of L-C-R circuit. Give the value impedance of the circuit when it is in resonance. What do you mean by Q-factor of resonant circuit? Give its physical significance. How will the Q-factor change when the resistance of the circuit (1) increases (2) decreases?

25. Show that the energy stored by the capacitor $\frac{1}{2} C V^2$, where V is the potential difference across the capacitor. A parallel plate capacitor, each plate area A and separation distance d , is charged to a potential difference V . The battery is removed and the space between the plates is covered with dielectric material of constant K . what change, if any, will take place in: (1) charge on plates (2) electric field intensity between the plates (3) capacitance of the capacitor. Justify your answer in each case.

Or

Can two electric lines of force intersect each other? Explain why? The variation of electric potential wrt to distance is shown in figure below. Draw a graph between electric field and distance. On moving a charge between two points lying on surface the work done is zero. Identify the surface and Draw this surface for a (1) point charge (2) uniform electric field.



26. Define total internal reflection. An object PQ is placed in front of right angled isosceles triangle prism of crown glass with critical angle 41° , find its image?

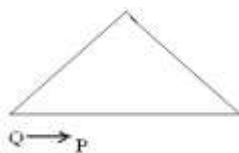


Figure 1

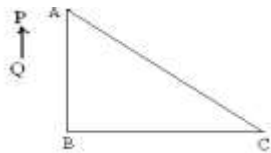


Figure 2

If the light just grazes along the surface AC (in figure 2) after falling on it, calculate the refractive index of the material. Name and explain the device whose working is based on TIR.

OR

By stating the sign conventions and assumptions used, derive the relation between object distance (u), image distance (V) and radius of curvature (R) of convex spherical surface when refraction takes place from

optically rare to optically denser medium. What would be the formula when the light falls from optically denser to optically rare medium?