

Sample Paper – 2012
Class – XII
Subject – Physics

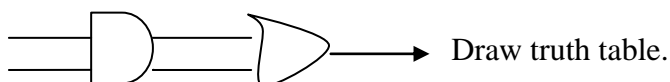
There are 30 question. Question 1 to 8 carry one mark each, question 9 to 18 carry two marks, question 19 to 27 carry three marks each, and question 28 to 30 marks 5 marks each.

Time Allowed : 3 hours

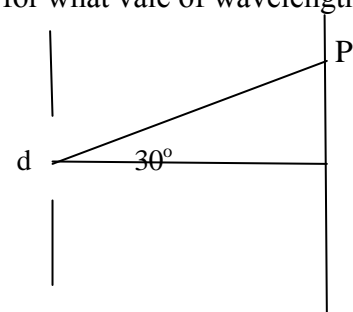
Maximum Marks: 70

1. If the current and voltage applied across an ideal inductor is 1A and 5 Volts what will be the power consumed by this inductor?
2. How the angular separation of interferences fringes in young would's double slit experiment changes if distance between the slit and screen doubled.
3. .Draw a graph to show the variation of impact parameter (in alpha particle scattering)with scattering angle Θ .
4. An electron and alpha particle have same debroglie wavelength, how are their kinetic energy related to each other.
5. An electron beam passes through a region of crossed electric and magnetic fields of Strengths E and B respectively. For what value of electron speed the beam will remain un deflected.
6. The mean life of radioactive sample is T_m , what is the time in which 50% of sample would get decayed.
7. Resistance R is connected across cell of emf E, internal resistance of the cell is r, potential difference across terminals is V, write the expression of r in terms of E,V and R.
8. Name and arrange the electromagnetic wave in increasing order used in (A) cancer treatment (B) preserve food stuffs (c) radar.
9. The oscillating magnetic field in a plane electromagnetic wave is given by $B_y = 8 \times 10^{-6} \sin \{ 2 \times 10^{11}t + 300\pi \}$ T. calculate the wavelength of the electromagnetic wave and equation of oscillating electric field.
10. Define magnetic susceptibility of a material. Name two elements, one having positive and other having negative susceptibility, what does negative susceptibility signify.

11.



12. A 10 m long wire of uniform cross section and 20Ω resistance is used in potentiometer. The wire is connected in series with a battery of 5 V along with an external resistance of 480Ω . If an unknown emf is balanced at 6m length of wire. Calculate potential gradient of wire, and value of E.
13. Draw a plot of variation of amplitude versus ω for an amplitude modulated wave. explain sky wave propagation.
14. A wheel with 10 metallic spokes each 0.5 m long is rotated with angular speed of 120 revolution per min in a plane normal to the earth magnetic field. If the earth's magnetic field at the given place is 0.4 gauss, find the induced emf between axle and the rim of the wheel.
15. Define Q factor, draw the graph of between angular frequency and current in LCR circuit for resistance R and 2R.
16. Sketch a graph of showing the variation of binding energy per nucleon as a function of mass number A, for large number of nuclei, state briefly from which region of the graph, can release the energy in the process of nuclear fusion be explained.
17. Write the mathematical relation between mobility and drift velocity of charge carriers in a conductor. Name the mobile charge carriers responsible for conduction of electric current in an (a) an electrolyte (b) an ionised gas.
18. Define electric field line, draw lines of forces when metal sphere is placed in uniform electric field.
19. A slit of width 'd' is illuminated by white light. For what value of d is the first minimum, for red light $\lambda = 650$ nm, located at point P. for what value of wavelength of light will the first diffraction maxima also fall at P



20. Define the terms modulation, name three types of modulation used for a message signal using continuous carrier wave, explain the meaning of any one of these.
21. Explain transformer on the basis of principle, diagram, and losses.

22. Derive a mathematical expression for the force per unit length experienced by each of the two long current carrying conductors placed in parallel to each other hence define one ampere of current. Explain why two parallel straight conductors carrying current in the opposite direction kept near each other in air repel.
23. At any instant of time applied voltage in A.C circuit containing L is $V = 100 \sin 50t$, find the expression for current, and draw the graph between inductive reactance and frequency.
24. Draw the diagram of compound microscope. How is the resolving power of a microscope affected when (a) wavelength of illuminating radiation is decreased (b) the diameter of objective decreases.
25. Derive the expression for parallel plate capacitor. Explain the effect on capacitance when dielectric is inserted between the capacitance.
26. What reasoning led to de-Broglie to put forward the concept of matter waves? The wave length λ , of a photon and the de-Broglie wavelength associated with a particle of mass m , has the same value say λ . Show that the energy of photon is $\frac{2\lambda mc}{h}$ times the kinetic energy of the particle.
27. State and prove Gauss theorem.
28. Derive the mirror formula which gives the relation between u , v , f . Calculate the distance d so that the real image of an object at O , 15 cm in front of a convex lens 10 cm be formed at the same point O . The radius of curvature of the mirror is 20 cm. Will the image be erect or inverted.
29. Explain common emitter amplifier, define current gain, power gain. Why common emitter is preferred over common base.
30. Is current density a vector or scalar quantity, derive the relation between current density and the potential difference across wire of length l , area of cross section A and current density n . How does current density vary if (a) increase in temperature, (b) decrease in potential gradient, (c) increase in area.

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