



## Standard 12

## PHYSICS

## Part - I

Marks: 70

15×1=15

Time: 3.00 hrs

**Note:** i) Answer all the questions. ii) Choose the most appropriate answer from the given four options and write the option code and the corresponding answer.

- 1) Two metallic sphere of radii 1 cm and 3 cm are given charges of  $-1 \times 10^{-2}$  c and  $5 \times 10^{-2}$  C respectively. If these are connected by a conducting wire, the final charge on the bigger sphere is  
 a)  $3 \times 10^{-2}$ C      b)  $4 \times 10^{-2}$ C      c)  $1 \times 10^{-2}$ C      d)  $2 \times 10^{-2}$ C
- 2) A carbon resistor of  $(47 \pm 4.7)$  K $\Omega$  to be marked with rings of different colours for its identification. The colour code sequence will be  
 a) yellow-green-violet-gold      b) yellow-violet-orange-silver  
 c) violet-yellow-orange-silver      d) green-orange-violet-gold
- 3) A non-conducting charged ring carrying a charge of q, mass m and radius r is rotated about its axis with constant angular speed  $\omega$ . Find the ratio of its magnetic moment with angular momentum is  
 a) a/m      b)  $2q/m$       c)  $q/2m$       d)  $q/4m$
- 4) The instantaneous values of alternating current and voltage in a circuit are  $i = \frac{1}{\sqrt{2}} \sin(100\pi t)$  A and  $v = \frac{1}{\sqrt{2}} \sin(100\pi t + \frac{\pi}{3})$  V. The average power in watts consumed in the circuit is  
 a)  $\frac{1}{4}$       b)  $\frac{\sqrt{3}}{4}$       c)  $\frac{1}{2}$       d)  $\frac{1}{8}$
- 5) A ray of light travelling in a transparent medium of refractive index n falls, on a surface separating the medium from air at an angle of incidents of  $45^\circ$ . The ray can undergo total internal reflection for the following n  
 a)  $n = 1.25$       b)  $n = 1.33$       c)  $n = 1.4$       d)  $n = 1.5$
- 6) When light is incident on a soap film of thickness  $5 \times 10^{-5}$  cm, the wavelength of light reflected maximum in the visible region is  $5320 \text{ \AA}$ . Refractive index of the film will be  
 a) 1.22      b) 1.33      c) 1.51      d) 1.83
- 7) When a metallic surface is illuminated with radiation of wavelength  $\lambda$ , the stopping potential is V. If the same surface is illuminated with radiation of wavelength  $2\lambda$ , the stopping potential is V/4. The threshold wavelength for the metallic surface is  
 a)  $4\lambda$       b)  $5\lambda$       c)  $5/2\lambda$       d)  $3\lambda$
- 8) The half-life period of a radioactive element A is same as the mean life time of another radio active element B. Initially both have the same number of atoms. Then  
 a) A and B have the same decay rate initially      b) A and B decay at the same rate always  
 c) B will decay at faster rate than A      d) A will decay at faster rate than B
- 9) If a small amount of antimony (Sb) is added to germanium crystal  
 a) it becomes a p-type semiconductor      b) the antimony becomes a acceptor atom  
 c) there will be more free electrons than hole in the semiconductor  
 d) its resistance is increased
- 10) A concave mirror is held in water, what should be the change in focal length of the mirror?  
 a) increases      b) decreases      c) remains the same      d) none of these
- 11) De-morgans theorem solves  
 a) Truth table      b) logic gates expression      c) boolean algebra      d) all the above
- 12) During Einstein's photo electric experiment, what changes are observed when the frequency of the incident radiation is increased?  
 a) The value of saturation current increases      b) no effect  
 c) the value of stopping potential decreases  
 d) the value of stopping potential increases
- 13) The electron emitted in  $\beta$  radiation originates from where?  
 a) inner orbits of atoms      b) free electrons existing in nuclei  
 c) the decay of a neutron in nuclei      d) proton escaping from the nucleus

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- 14) What happens to the wavelength of a photon after it collides with an electron?  
 a) infinite    b) increases    c) decreases    d) remains the same
- 15) For capacitors connected in series, the total capacitance is  
 a) same as that of value of total resistances in parallel connection  
 b) sum of the individual values  
 c) same as that of value of total resistance in series    d) none of these

**Part - II****6 × 2 = 12****II. Answer any six of the following questions. Question no. 24 is compulsory.**

- 16) What is polarisation?  
 17) Write a short note on super conductor.  
 18) State Fleming's right hand rule.  
 19) Give two uses of UV radiation.  
 20) Mention any two difference between interference and diffraction.  
 21) Define stopping potential.  
 22) Calculate the radius of  ${}_{79}\text{Au}^{197}$  nucleus.  
 23) Define forbidden energy gap.  
 24) Consider a point charge +q placed at the origin and another point charge -2q placed at a distance of 9 m from the charge +q. Determine the point between the two charges at which electric potential is zero.

**Part - III****6 × 3 = 18****III. Answer any six of the following. Question number 33 is compulsory.**

- 25) Give the Barthusan conditions for sustained oscillations.  
 26) What is half life of a radio active nucleus? Give the expression.  
 27) The reflected light is found to be plane polarised when an unpolarised light falls on a denser medium at  $60^\circ$  with the normal. Find the angle of refraction and critical angle of incidence for total internal reflection in the denser to rarer medium reflection.  
 28) State Snell's law of refraction.  
 29) What are the differences between coulomb force and gravitational force.  
 30) Give any three properties of each of dia/para/ferro magnetic materials.  
 31) Mention the ways of producing induced emf.  
 32) State Kirchoff's voltage rule.  
 33) An electron is accelerated through a potential difference of 81V. What is the de Broglie wavelength associated with it? To which part of electromagnetic spectrum does this wavelength correspond?

**Part - IV****5 × 5 = 25****IV. Answer all the questions.**

- 34) Obtain the expression for electric field due to an infinity long charged wire.  
 (OR)  
 Discuss the working of cyclotron in detail.
- 35) Transistor function as a switch. Explain.  
 (OR)  
 Describe the microscopic model of current and obtain general form of Ohm's law.
- 36) i) What is dispersion? Obtain the equation for dispersive power of a medium.  
 ii) The angle of minimum deviation for equilateral prism is  $37^\circ$ . Find the refractive index of the material of the prism.  
 (OR)  
 Obtain the equation for bandwidth in Young's double slit experiment.
- 37) Discuss the spectral series of hydrogen atom.  
 (OR)  
 i) The self inductance of an air-core solenoid is 4.8 m.H. If its core is replaced by iron core, then its self inductance becomes 1.8 H. Find out the relative permeability of iron.  
 ii) How will you induce an emf by changing the area enclosed by the coil?
- 38) Give the construction and working of photo emissive cell.  
 (OR)

Explain the types of absorption spectrum.

Kindly send me your questions and answer keys to us : Padasalai.Net@gmail.com