



**Standard 12**  
**PHYSICS**  
**Part - I**

Time: 3.00 Hours

Marks: 70

**Choose the correct answer:****15×1=15**

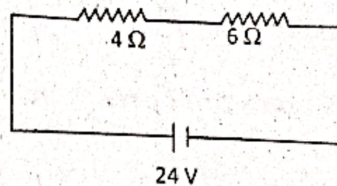
- 1) Which of the following is NOT true for electromagnetic waves?
  - a) it transports energy
  - b) it transport momentum
  - c) it transports angular momentum
  - d) In Vacuum it travels with different speeds which depend on their frequency
- 2) If the velocity and wavelength of light in air is  $V_a$  and  $\lambda_a$  and that in water is  $V_w$  and  $\lambda_w$ , then the refractive index of water is
  - a)  $\frac{V_w}{V_a}$
  - b)  $\frac{V_a}{V_w}$
  - c)  $\frac{\lambda_w}{\lambda_a}$
  - d)  $\frac{V_a \lambda_a}{V_w \lambda_w}$
- 3) Two light waves have intensity ratio 9 : 1. If the superpose, the ratio of intensity maximum to minmium is
  - a) 10 : 8
  - b) 9 : 1
  - c) 4 : 1
  - d) 2 : 1
- 4) The threshold wave length for a metal surface whose photo electric work function is 3.313 ev is
  - a)  $4125 \text{ \AA}$
  - b)  $3750 \text{ \AA}$
  - c)  $6000 \text{ \AA}$
  - d)  $2062.5 \text{ \AA}$
- 5) Two metallic spheres of radii 1 cm and 3 cm are given charges of  $-1 \times 10^{-2} \text{ C}$  and  $5 \times 10^{-2} \text{ C}$  respectively. If they are connected by a conducting wire, the final charge on the bigger sphere is
  - a)  $3 \times 10^{-3} \text{ C}$
  - b)  $4 \times 10^{-2} \text{ C}$
  - c)  $1 \times 10^{-2} \text{ C}$
  - d)  $2 \times 10^{-2} \text{ C}$
- 6) A platinum wire has resistance  $2\Omega$  at  $0^\circ\text{C}$  and  $6.8\Omega$  at  $80^\circ\text{C}$ . The temperature coefficient of resistance is
  - a)  $3 \times 10^{-2}/^\circ\text{C}$
  - b)  $1.5 \times 10^{-2}/^\circ\text{C}$
  - c)  $3 \times 10^{-4}/^\circ\text{C}$
  - d)  $3 \times 10^{-2}/^\circ\text{C}$
- 7) The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at that place?
  - a)  $30^\circ$
  - b)  $45^\circ$
  - c)  $60^\circ$
  - d)  $90^\circ$
- 8) A.C. Generator uses the principle of
  - a) Self inductance
  - b) Mutual induction
  - c) Electro magnetic induction
  - d) All these
- 9) The charge of cathode rays particle is
  - a) positive
  - b) negative
  - c) neutral
  - d) not defined
- 10) If the input to the NOT gate is A=1011, its output is
  - a) 0100
  - b) 1000
  - c) 1100
  - d) 0011
- 11) The energy stored in an inductor of 50 mH carrying a current of 4 A is
  - a) 0.04J
  - b) 0.4J
  - c) 4.0J
  - d) 0.8J
- 12) Two thin lenses of focal length  $f_1$  and  $f_2$  are in contact with each other. The power of the combination is
  - a)  $\frac{f_1}{f_2}$
  - b)  $\sqrt{\frac{f_1}{f_2}}$
  - c)  $\sqrt{\frac{f_1 + f_2}{f_1 f_2}}$
  - d)  $\frac{f_1 + f_2}{f_1 f_2}$
- 13) In hydrogen spectrum, wavelength of the first line in Balmer series is  $\lambda$ , then the wave length of the second line is
  - a)  $\frac{20\lambda}{27}$
  - b)  $\frac{27}{20}\lambda$
  - c)  $\frac{5\lambda}{36}$
  - d)  $\frac{36}{5}\lambda$
- 14) A toaster operating at 240 V has a resistance of  $120\Omega$ . It power is
  - a) 400 w
  - b) 2w
  - c) 480 w
  - d) 240 w
- 15) Which one of the following is the natural nano material?
  - a) Peacock feather
  - b) Peacock beak
  - c) Grain of sand
  - d) skin of the whale

## Part - II

Answer any 6 of the following questions. Q.No. 24 compulsory.

6×2=12

- 16) Define electric dipole. Give example
- 17) Calculate the potential difference across  $4\Omega$  resistor in the given electric circuit.
- 18) State Fleming's Right hand rule.
- 19) Why are electromagnetic waves non mechanical?
- 20) Why do clouds appear white?
- 21) Light of wavelength  $5000\text{ \AA}$  produces diffraction pattern of the single slit of width  $2.5\ \mu\text{m}$ . What is the maximum order of diffraction possible?
- 22) Define stopping potential
- 23) What is half life of a radio active nucleus?
- 24) A transistor in commonbase configuration has current gain  $\alpha = 0.98$  and  $I_E = 1\text{ mA}$ , find the values of  $I_C$  and  $I_B$



## Part - III

Answer any 6 of the following questions.

6×3=18

Answer the question 33 compulsory.

- 25) What are the differences between Coulomb force and gravitational force?
- 26) Explain how will you convert a moving coil galvanometer into an ammeter?
- 27) The magnetic flux passing through a coil perpendicular to its plane is a function of time and is given by  

$$\phi_B = (2t^3 + 4t^2 + 8t + 8)\text{wb}$$
 If the resistance of the coil is  $5\Omega$ , determine the induced current through the coil at  $t=3$  second
- 28) Write the properties of electromagnetic waves
- 29) Derive the relation between  $f$  and  $R$  for a spherical mirror.
- 30) Two polaroids are kept in line with an angle  $30^\circ$  between their axes. If unpolarised light of intensity  $I$  is passed through the first polaroid, calculate the intensity of emergent light from the second polaroid
- 31) What is a photo cell? Write the applications of photo cell?
- 32) State and prove De Morgan's theorems
- 33) Calculate the time required for 60% of a sample of Radon undergo decay. The half life of radon = 3.8 days

## Part - IV

Answer the following questions in detail.

5×5=25

- 34) a) Explain the principle, construction and working of transformer.  
(OR)  
 b) Explain the principle, construction and working of a full wave rectifier with circuit diagram
- 35) a) State Gauss law in electro statics. Obtain the expression for electric field due to an infinite long charged wire  
(OR)  
 b) Obtain the equation for band width in Young's double slit experiment.
- 36) a) State Ampere's Circuital law. Find the magnetic field due to a long straight conductor using Ampere's circuital law  
(OR)  
 b) Using Bohr's atom model, derive an expression for radius of electron orbit in Hydrogen atom.
- 37) a) What is a spectrum? Explain the different types of emission spectrum  
(OR)  
 b) Obtain Einstein's photo electric equation with necessary explanation
- 38) a) Obtain the condition for bridge balance in Wheatstone's bridge  
(OR)  
 b) Obtain lens maker's formula. Using it deduce the lens equation.

-----