XII

SECTION – A (15 X 1 = 15 M)

CHOOSE THE CORRECT BEST ANSWER

1.The speed of light in an isotropic medium depends on, (a) its intensity (b)its wavelength (c) the nature of propagation (d) the motion of the source w.r.t medium

2. The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is

a) 4125Å   b) 3750Å

c) 6000Å   d) 2062.5Å

3. 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.

a) 6m   b) 0 m   c) 5m   d) 3m

4.positive Thomson effect example

a) silver   b) Neon   c) Helium   d) mercury

5. A non-conducting charged ring carrying a charge of q, mass m and radius r is rotated about its axis with constant angular speed ω. Find the ratio of its magnetic moment with angular momentum is

(a) $\frac{q}{m}$ (b) $\frac{2q}{m}$

(c) $\frac{q}{2m}$ (d) $\frac{q}{4m}$

6. Suppose a cyclotron is operated to accelerate protons with a magnetic field of strength 1 T. Calculate the frequency in which the electric field between two Dees could be reversed.

a) 15.3 Hz   b) 1.53Hz   c) 15.3MHz   d) 1.53 MHz

7. In an oscillating LC circuit, the maximum charge on the capacitor is Q. The charge on the capacitor when the energy is stored equally between the electric and magnetic fields is

(a) $\dfrac{Q}{2}$ (b) $\dfrac{Q}{\sqrt{3}}$

(c) $\dfrac{Q}{\sqrt{2}}$ (d) Q

8. The average value of AC is ……,.. times
a) 0.637   b) - 0.637   c) 0.707   d) -0.707

9. The transverse nature of light is shown in, (a) interference (b) diffraction (c) scattering (d) polarisation
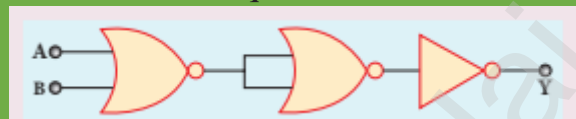
10.The instantaneous magnitude of the electric and magnetic field vectors in electromagnetic wave are related by
               a) E/B   b) B/E   c) E x B   d) All

11.The particle which gives mass to protons and neutrons are
a) Higgs particle b) Einstein particle c) Nanoparticle d) Bulk particle

12. The given electrical network is equivalent to

         a) AND gate b) OR gate   c) NOR gate d) NOT gate

13.A radioactive nucleus (initial mass number A and atomic number Z) emits two α-particles and 2 positrons. The ratio of number of neutrons to that of proton in the final nucleus will be

(a) $\dfrac{A-Z-4}{Z-2}$ (b) $\dfrac{A-Z-2}{Z-6}$

(c) $\dfrac{A-Z-4}{Z-6}$ (d) $\dfrac{A-Z-12}{Z-4}$

14. Different types of modulus
            a) 1   b) 2   c) 3   d) 5

15.A person has farsightedness with the far distance he could see clearly is 75 cm. Calculate the power of the lens of the spectacles needed to rectify the defect.
        a) 2.67 D   b) 2.67 nm   c) 2.67 cm   d) 2.67mm

SECTION – B (6 X 2 = 12 M)

ANSWER ANY 6 QUESTIONS : COMPULSORY Q.NO 24.

16.Explain centre frequency or resting frequency in frequency modulation

17 .Difference between polar molecule and non polar molecule

18. Determine the number of electrons flowing per second through a conductor, when a current of 32 A flows through it

19.Obtain the equation for apparent depth

20.The current sensitivity of a galvanometer can be increased by

21What are sub atomic particles?

22.List out the advantages of stationary armature-rotating field system of AC generator.

23.What are Fraunhofer lines? How are they useful in the identification of elements present in the Sun?

24.How many photons per second emanate from a 50 *mW* laser of 640 *nm*?

SECTION - C (6 X 3 = 18 M)

ANSWER ANY 6 QUESTIONS Q.NO 24.

25.Discuss about Nicol prism

26.Relation between drift velocity and current

27.Compute the torque experienced by a magnetic needle in a uniform magnetic field

28.Mention the various energy losses in a transformer.

29.Discuss the Hertz experiment.

30.A capacitor of capacitance $\dfrac{10^2}{\pi}\mu F$ is connected across a 220 V, 50 Hz A.C. mains. Calculate the capacitive reactance, RMS value of current and write down the equations of voltage and current.

31.Calculate the magnetic field at the centre of a square loop which carries a current of 1.5 A, length of each side being 50 cm

32.Obtain the expression for electric field due to an uniformly charged spherical shell

33.Four silicon diodes and a 10 Ω resistor are connected as shown in figure below. Each diode has a resistance of 1Ω. Find the current flows through the 10Ω resistor
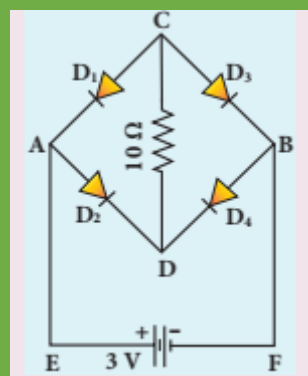
SECTION – C (5 X 5 = 25 M)

ANSWER ALL QUESTIONS

34 **a)** Explain in detail the construction and working of a Van de Graaff generator.

(OR)

b)Prove the following Boolean expressions using the laws and theorems of

i) $(A+B)(A+\bar{B}) = A$

ii) $A(\bar{A}+B) = AB$

Boolean algebra.   iii) $(A+B)(A+C) = A+BC$

35 a) Derive the equation for acceptance angle and numerical aperture of optical fibre

(OR)

b) Two electric bulbs marked 20 W – 220 V and 100 W – 220 V are connected in series to 440 V supply. Which bulb will get fused?

36.a) What are the possible harmful effects of usage of Nanoparticles? Why?

(OR)

b) A short bar magnet has a magnetic moment of 0.5 J /T Calculate magnitude and direction of the magnetic field produced by the bar magnet which is kept at a distance of 0.1 m from the centre of the bar magnet along (a) axial line of the bar magnet and (b) normal bisector of the bar magnet

37 a) Derive an expression for phase angle between the applied voltage and current in a series RLC circuit

(OR)

b) Explain the idea of carbon dating.

38.Write short notes on (a) microwave (b) X-ray (c) radio waves (d) visible spectrum

(OR)

b) Obtain the equation for resultant intensity due to interference of light