

HIGHER SECONDARY - SECOND YEAR - MAR - 2024

KEY ANSWERS FOR PHYSICS

PART-1

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.

a) Photovoltaic action

a) 900 Vm^{-1}

a) 480 W

a) 3

a) Polarisation

a) $Q/\sqrt{2}$

a) $\frac{\lambda}{2}$

a) its wavelength

b) $\lambda/4$

a) more than before

a) 6 MF

a) 3750 \AA

a) Plane Polarisation

a) Albert Einstein

a) 1.1 eV

a) ஒளிவளிர்வு செயல்பாடு

a) 900 Vm^{-1}

a) 480 W

a) 3

a) தளப்போலிசம்

a) $Q/\sqrt{2}$

a) $\frac{\lambda}{2}$

a) அதன் அலைநீளம்

b) $\lambda/4$

a) அதைவிட அதிகமாக

a) 6 MF

a) 3750 \AA

a) தளப்போலிசம் தளப்போலிசம்

a) அலைநீளம் அதிகமாக

a) 1.1 eV

PART-II

Qa No 24 is Compulsory:

16. Hysteresis:

Lagging of Magnetic induction behind the magnetising field.

17. Malus' Law: When a beam of Plane Polarised light of intensity I_0 is incident on an analyser the intensity of light I transmitted from the analyser varies directly as the square of cosine of angle θ b/w the transmission axis of Polariser & analyser.

$$I = I_0 \cos^2 \theta$$

18. Electrostatic Potential: Work done by an external force to bring a unit +ve charge with const. Velocity from infinity to that point.

$$V = \frac{q}{4\pi\epsilon_0 r}$$

19. $E = \frac{d\phi}{dt} = \frac{4 \times 10^3}{0.4} = 10 \times 10^3 \text{ V} \text{ (or) } 10 \text{ mV.}$

20. Application of Seebeck Effect:

- i) Thermoelectric generators
- ii) Automobiles
- iii) Thermocouples & Thermopiles.

21. $\lambda = \frac{0.6931}{T_{1/2}} = \frac{0.6931}{5.01 \times 24 \times 60 \times 60} = 1.6 \times 10^{-6} \text{ s}^{-1}$

22. Electromagnetic Wave: its non-mechanical wave which moves with speed equal to speed of light.

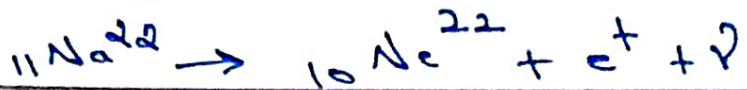
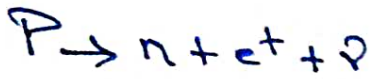
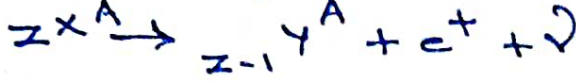
23) Biasing: It Provides external energy to charge carriers to overcome the barrier Potential & made them move in Particular direction. Types: i) Forward & (ii) Reverse

24) $P = \frac{1}{f} = \frac{1}{1.5 \text{ m}} = \underline{\underline{0.67 \text{ D}}}$

PART - III

Qn: No: 33 is Compulsory:

25. Atomic No: decreased by one & its mass number remains same.



$$26. v_d = \frac{I}{neA} = \frac{0.2}{8.4 \times 10^{28} \times 1.6 \times 10^{-19} \times 0.5 \times 10^{-6}} = 0.03 \times 10^3 \text{ ms}^{-1}$$

27. Lenses in Contact:-

Diagram

Explanation

$$\frac{1}{v} = \frac{1}{u} = \frac{1}{f} ; \frac{1}{v} - \frac{1}{v'} = \frac{1}{f_2} ; \frac{1}{v} - \frac{1}{u} = \frac{1}{f_1} + \frac{1}{f_2}$$

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \quad \boxed{\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2}}$$

28. Current Sensitivity:- Deflection Produced Per unit Current

(i) increasing No. of turns (ii) increasing B (iii) increasing Area
(iv) decreasing Spring couple per unit twist.

$$29. n = \frac{P_1}{hc} = \frac{50 \times 10^3 \times 64 \times 10^9}{1.626 \times 10^{24} \times 3 \times 10^8} = 1.61 \times 10^{17} \text{ s}^{-1}$$

30. Diagram
Explanation

$$B = \mu_0 n i ; \phi_B = \mu_0 n i A ; N \phi_B = \mu_0 n^2 A i l ; N \phi_B = L i$$

$$\boxed{L = \mu_0 n^2 A l}$$

31. Any 3 difference.

32. Diagram, Explanation.

$$\phi_E = \int \vec{E} \cdot d\vec{A} = \int E dA \cos \theta = \int E dA$$

$$\phi_E = E \cdot 4\pi r^2 = \frac{Q}{4\pi \epsilon_0 r^2} \cdot 4\pi r^2 ; \quad \boxed{\phi_E = \frac{Q}{\epsilon_0}}$$

$$33. \lambda = \frac{hc}{E_g} = \frac{6.6 \times 10^{-34} \times 3 \times 10^8}{1.875 \times 1.6 \times 10^{-19}} = 660 \text{ nm}$$

RED Colour

PART-IV

34) a) Simple Microscope:-

Explanation

Near Pt:- focussing:- Diagram, $m = \frac{v}{u} = \frac{D}{u}$

$$m = \frac{v}{u} = 1 - \frac{v}{f} = 1 + \frac{D}{f}$$

Normal focussing:- Diagram, $m = \theta_i / \theta_o = \frac{h/f}{h/D}$

$$m = D/f$$

b) Metre Bridge:- Diagram

Explanation

$$\frac{P}{Q} = \frac{R}{S} = \frac{r \cdot AJ}{r \cdot JB} = \frac{l_1}{l_2} ; P = Q \cdot \frac{l_1}{l_2}$$

End Resistance:- $P = \frac{\rho l}{A} ; \rho = \frac{PA}{l} = \frac{P \pi r^2}{l}$

35) a) Circular Coil:- Diagram, Explanation

Upto $\vec{dB} = \frac{\mu_0}{4\pi} \frac{id\vec{l} \times \vec{r}}{r^2} ;$ upto $\vec{B} = \frac{\mu_0 n i}{z} \frac{A^2}{(R^2 + z^2)^{3/2}} \hat{k}$

$$\vec{B} = \frac{\mu_0 n i}{z} \hat{k}$$

b) Angle of deviation:- Diagram, Explanation

Upto $d = (i_1 + i_2) - (r_1 + r_2)$

$$d = i_1 + i_2 - A$$

$$n = \frac{\sin(A + D/2)}{\sin A/2}$$

36) a) Einstein's Photoelectric Equation:-

Diagram, Explanation

$$h\nu = \phi_0 + \frac{1}{2} m v^2 ; h\nu_0 = \phi_0 ; h\nu = h\nu_0 + \frac{1}{2} m v^2 ; K_{max} = \frac{1}{2} m v_{max}^2$$

$$K_{max} = h\nu - \phi_0$$

b) Pure inductor:- Circuit diagram, Explanation

$$V = V_m \sin \omega t ; \varepsilon = -L \left(\frac{di}{dt} \right) ; i = \left(\frac{V_m}{L} \right) \int \sin \omega t$$

$$i = \left(\frac{V_m}{L\omega} \right) (-\cos \omega t) ; i = \hat{I}_m \sin(\omega t - \pi/2)$$

\hat{I} current lags behind the Voltage by $\pi/2$

Phasor diagram, Wave diagram.

Q) F.M.:
 3 - Advantages
 3 - Limitations

b) Maxwell's Modifications of Ampere's Circuital law:
 $\oint \vec{B} \cdot d\vec{l} = \mu_0 i_c$; $\oint \vec{B} \cdot d\vec{l} = 0$; $i_d = \epsilon_0 \frac{d\phi_E}{dt}$
 $\oint \vec{B} \cdot d\vec{l} = \mu_0 i_c + \mu_0 \epsilon_0 \frac{d\phi_E}{dt}$; Diagram

38) a) Axial line:- Diagram, Explanation
 $E_+ = \frac{q}{4\pi\epsilon_0(r-a)^2}$; $E_- = -\frac{q}{4\pi\epsilon_0(r+a)^2}$; $E = E_+ + E_-$
 $P = 2qaq$
 $E = \frac{2qa}{4\pi\epsilon_0 r^3}$

b) Nuclear Reactor:- Nuclear Reaction takes place in self-sustained controlled manner & energy produced is used either for research purpose or power generation.
 i) Moderator:- Explanation with Example
 ii) Control rod:- Explanation with Example
 iii) Cooling System:- Explanation with Example.

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