HIGHER SECONDARY - SECOND YEAR - MAR-2024

KEY ANSWERS FOR PHYSICS

PART-I

1. a) Photovoltaic action
2. c) 900 Vm^{-1}
3. c) 480 W
4. a) 3
5. c) Polarisation
6. a) $Q/\sqrt{2}$
7. d) $\frac{3}{\pi} P_m$
8. d) its Wavelength
9. b) $\pi/4$
10. a) more than before
11. d) 6 μF
12. d) 3750 A°
13. a) Plane Polarasid
14. a) Albert Einstein
15. c) 1.1 eV

PART-II

Q.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 analyer varies directly as the square of cosine of angle θ b/w the transmission axes 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 Cnst. Velocity from infinity to that Point.

$$V = \frac{q}{4\pi\varepsilon_r}$$

A. $\varepsilon = \frac{d\phi}{dt} = \frac{4\times10^{-3}}{0.4} = 10\times10^{-3}\,V$ (or) 10mV.

20. **Application of Seebeck Effect:**

i) Thermoelectric Generators ii) Automobiles
iii) Thermocouples & Thermopiles.

21. $\lambda = \frac{0.6931}{T_{1/2}} = \frac{0.6931}{5.01\times24\times60\times60} = 1.6\times10^{-6}\,s^{-1}$

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) $P = \frac{1}{f} = \frac{1}{1.5\,m} = 0.67\,D$

PART - III

Qn: No: 33 is Compulsory:

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

$$ {}_{Z}X^{A} \rightarrow {}_{Z-1}Y^{A} + e^{+} + \nu $$

$$ P \rightarrow n + e^{+} + \nu $$

$$ {}_{11}Na^{22} \rightarrow {}_{10}Ne^{22} + e^{+} + \nu $$

26. $$ V_d = \frac{I}{neA} = \frac{0.2}{8.4\times10^{28}\times1.6\times10^{-19}\times0.5\times10^{-6}} = 0.03\times10^{3}\ ms^{-1} $$

27. Lenses in Contact:-

Diagram

Explanation

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

$$ \frac{1}{v} - \frac{1}{u} = \frac{1}{f} $$

$$ \boxed{\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2}} $$

28. Current Sensitivity:- Deflection Produced for unit Current (i) Increasing No. of turns (ii) increasing B (iii) increasing Area (iv) decreasing Small Couple Per unit twist.

29. $$ n = \frac{P_d}{hc} = \frac{50\times10^{-3}\times640\times10^{-9}}{6.626\times10^{-34}\times3\times10^{8}} = 1.61\times10^{17}\ s^{-1} $$

30. Diagram

Explanation

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

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

31. Any 3 difference.

32. Diagram, Explanation.

$$ \phi_E = \oint \vec{E}\cdot\vec{dA} = \oint E\,dA\cos\theta = \oint E\,dA $$

$$ \phi_E = E\cdot 4\pi r^2 = \frac{Q}{4\pi\varepsilon_0 r^2}\cdot 4\pi r^2 \; ; \; \boxed{\phi_E = Q/\varepsilon_0} $$

33. $$ \lambda = \frac{hc}{E_g} = \frac{6.6\times10^{-34}\times3\times10^{8}}{1.875\times1.6\times10^{-19}} = 660\,nm $$

RED Colour

PART-IV

34) a) **Simple Microscope:-**

Explanation

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

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

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

$m = D/f$

b) **Metre Bridge:-** Diagram Explanation

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

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

35) a) **Circular Coil:-** Diagram, Explanation

Upto $dB = \frac{\mu_0}{4\pi} \frac{i\,dl}{r^2} \; ;$ Upto $\vec{B} = \frac{\mu_0 N i}{2} \frac{R^2}{(R^2+z^2)^{3/2}} \hat{k}$

$$\boxed{\vec{B} = \frac{\mu_0 N i}{2R} \hat{k}}$$

b) **Angle of deviation:-** Diagram, Explanation

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

$d = i_1 + i_2 - A$

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

36) a) **Einsteins Photoelectric Equation:-**

Diagram, Explanation

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

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

b) **Pure inductor:-** Circuit diagram, Explanation

$V = V_m \sin\omega t \; ; \; \varepsilon = -L(di/dt) \; ; \; i = (V_m/L) \int \sin\omega t$

$i = (V_m/L\omega)(-\cos\omega t) \; ; \; i = I_m \sin(\omega t - \pi/2)$

I Current lags behind the Voltage by $\pi/2$

Phasor diagram, Wave diagram.

37) a) FM:- 3 - Advantages
3 - Limitations

b) Maxwell's Modifications of Ampere's Circuital law:
$\oint \vec{B} \cdot d\vec{l} = \mu_0 i_c$; $\oint \vec{B} \cdot d\vec{l} = 0$; $i_d = \varepsilon_0 \frac{d\phi_E}{dt}$
$\oint \vec{B} \cdot d\vec{l} = \mu_0 i_c + \mu_0 \varepsilon_0 \frac{d\phi_E}{dt}$; Diagram

38) a) Axial line:- Diagram, Explanation
$\vec{E}_+ = \frac{q}{4\pi\varepsilon_0 (r-a)^2} \hat{p}$; $\vec{E}_- = -\frac{q}{4\pi\varepsilon_0 (r+a)^2} \hat{p}$; $\vec{E} = \vec{E}_+ + \vec{E}_-$
$P = 2qa\hat{p}$ $\vec{E} = \frac{\vec{p}}{4\pi\varepsilon_0 r^3}$

b) Nuclear Reactor:- Nuclear Reaction takes place in Self- Sustained Controlled manner & energy produced is used either for research Purpose for Power generation
i) Moderator:- Explanation with Example
ii) Control rod:- Explanation with Example
iii) Cooling System:- Explanation with Example.

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