

MARCH-2024 physics

I. ONE mark answer key

1. c) 1.1 eV

2. c) 480 W

$$P = VI \Rightarrow P = \frac{V \times V}{R} \Rightarrow P = \frac{240 \times 240}{120}$$

$$P = 480 \text{ W}$$

3. (a)  $\frac{Q}{\sqrt{2}}$

$$\text{T.E} = \frac{Q^2}{2C} \Rightarrow \frac{1}{2} \frac{Q^2}{C} = \frac{Q^2}{2C} + \frac{LI^2}{2}$$

$$\therefore \frac{q^2}{2C} = \frac{LI^2}{2}$$

$$\frac{Q^2}{2C} = \frac{q^2}{2C} + \frac{q^2}{2C}$$

$$\frac{Q^2}{2C} = \frac{2q^2}{2C} \Rightarrow q^2 = \frac{Q^2}{2}$$

$$\boxed{q = \frac{Q}{\sqrt{2}}}$$

4. (d) 3750 Å

$$\phi = \frac{hc}{\lambda_0} \Rightarrow \phi = \frac{6.62 \times 10^{-34} \times 3 \times 10^8}{3.313 \times 10^{-19}}$$

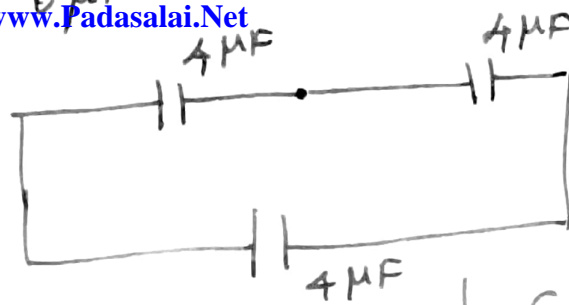
$$\phi = 3.750 \times 10^{-7} \text{ m}$$

(or)  
 $\phi = 3750 \text{ Å}$

5. (d)  $6 \mu\text{F}$

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$$\frac{1}{C_s} = \frac{1}{4} + \frac{1}{4} = \frac{2}{4}$$

$$C_s = 2 \mu\text{F}$$

$$C_p = 2 + 4$$

$$C_p = 6 \mu\text{F}$$

6. (a) photo voltaic action

7. (d) its wavelength

8. (c)  $900 \text{ Vm}^{-1}$

$$v = \frac{E}{B} \Rightarrow E = v \cdot B$$

$$E = 3 \times 10^8 \times 3 \times 10^{-6} \Rightarrow E = 9 \times 10^2 \text{ Vm}^{-1}$$

(or)

$$E = 900 \text{ Vm}^{-1}$$

9. (d)  $\frac{3}{\pi} P_m$

$$\theta = 60^\circ = \frac{\pi}{3} \text{ rad}$$

$$l' = r \quad m = P_m$$

$$m = m \cdot l \quad m' = m \cdot l'$$

$$\frac{m}{m'} = \frac{l}{l'} \Rightarrow \frac{\pi}{3} = \frac{l}{r} \Rightarrow l = \frac{\pi r}{3}$$

$$\frac{m}{m'} = \frac{\frac{\pi r}{3}}{r} \Rightarrow \frac{m}{m'} = \frac{\pi r}{3} \times \frac{1}{r}$$

$$\frac{m}{m'} = \frac{\pi}{3} \Rightarrow m' = \frac{3m}{\pi} \quad (\text{or}) \quad m' = \frac{3}{\pi} P_m$$

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10). (b)  $\frac{\pi}{4}$

$$R = X_L \quad \tan \phi = \frac{X_L}{R} = 1$$

$$\tan \theta = 1 \Rightarrow \theta = \tan^{-1}(1)$$

$$\theta = 45^\circ \text{ (or) } \frac{\pi}{4}$$

11. (a) more than before

12. (a) 3

$$I \cdot E = 122.4 \text{ V} \quad n = 1$$

$$Z = ?$$

$$I \cdot E = \frac{13.6 Z^2}{n^2}$$

$$Z^2 = \frac{I \cdot E \times n^2}{13.6}$$

$$\Rightarrow Z^2 = \frac{122.4 \times 1^2}{13.6}$$

$$Z^2 = 9 \Rightarrow \boxed{Z = 3}$$

13. (c) polarisation

14. (a) plane polarised

15. (a) Albert Einstein

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