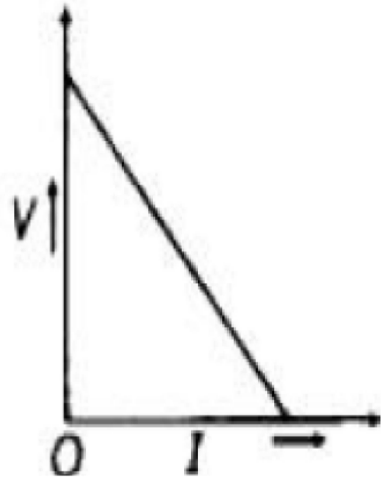
INDIAN SCHOOL ALWADI ALKABIR

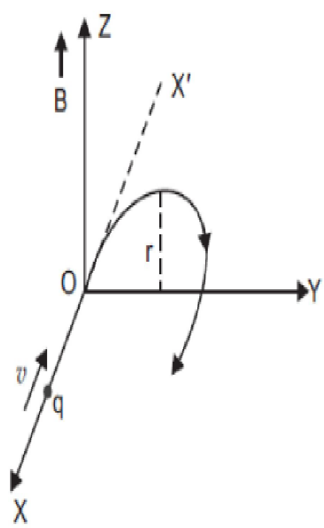
CLASS 12 PHYSICS SAMPLE PAPER

MARKING SCHEME

Q.No	Value point	Marks
1	Force will decrease. $F= F_0/K$	1
2	Drift velocity will be halved $V_d =(eE/m)\tau = =(eV/lm)\tau$	1
3	Infrared waves are produced by hot bodies and molecules, so are referred to as heat waves. **OR** $5x10^{14}$ Hz, visible region.	1
4	Focal length gets doubled. Power is halved.	1/2 1/2
5	Potentiometer 'Q' will be preferred potential gradient is less, sensitivity is more	1/2 1/2
6	$\varepsilon = \frac{\Delta\Phi}{\Delta t} = \frac{10^{-3}}{\sqrt{2}\times 0.7} = 1.0$ mV **OR** $\tan\Phi = (V_L - V_C) / V_R$, $\Phi = 0$	1
7	No. Energy carried by a wave depends on the amplitude of the wave, not on the speed of wave propagation **OR** The point will be a dark fringe. As it satisfies the condition for minima or destructive interference	1
8	$\lambda = \frac{h}{\sqrt{2mqV}}$ $\frac{\lambda_p}{\lambda_\alpha} = \frac{\sqrt{m_\alpha q_\alpha}}{\sqrt{m_p q_p}} = \sqrt{(4m_p * 2e)/(m_p * e)} = \sqrt{8}$	1
9	(i)solar cell (ii)Point P represents some positive voltage on solar cell with zero current through solar cell.	1/2 1/2
10	$\mu_{ge} = 1.5 / 1.3 = 1.15$ as μ decreases so δ m decrease	1/2 1/2
11	(a)	1
12	(c)	1
13	(a)	1

14	(b)	1
15	(i)c (ii)b (iii)b (iv)b (v)c	4
16	(i)c (ii)a (iii)c (iv)b (v)a	
17	A light emitting diode is simply a forward biased p-n junction which emits spontaneous light radiation. When forward bias is applied, the electron and holes at the junction recombine and energy released is emitted in the form of light. The advantages of LEDs are: (i) Low operational voltage and less power. (ii) Fast action with no warm up time. (iii) Emitted light is nearly monochromatic radiation. (iv) They have long life.	1+1
18	Suppose that the parts q and (Q - q) are placed at a distance r apart. Then, $F = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q(Q-q)}{r^2}$ Now, for force F to be maximum, $\frac{dF}{dq} = 0$ i.e. $\frac{d}{dq}\left[\frac{1}{4\pi\varepsilon_0} \cdot \frac{q(Q-q)}{r^2}\right] = 0$ $\frac{d}{dq}[q(Q-q)] = 0$ $1(Q-q) + q(0-1) = 0$ $Q - 2q = 0$ q/Q=1/2 **OR** Derivation(NCERT page 54)	1/2 1/2 1 2

19	Since $V = \varepsilon - Ir$  When I=0, emf $\varepsilon = V$ Maximum current is drawn from the cell when terminal voltage is 0. So , $0 = \varepsilon - I_{max}r$ Internal resistance, $r = \varepsilon / I_{max}$	1 1/2 1/2
20	(i)	1

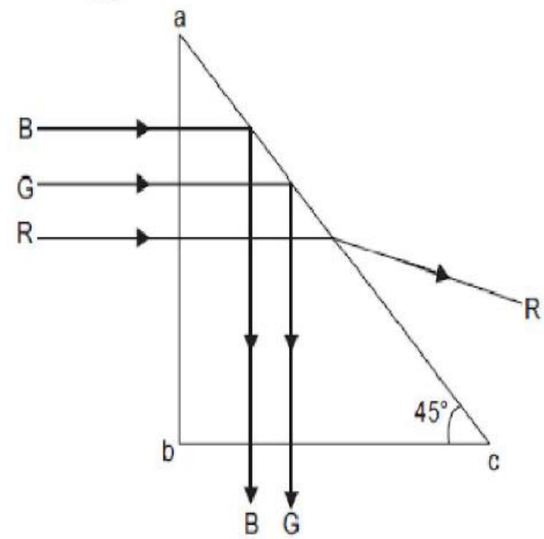
	 (i) (ii)Magnetic Lorentz Force is perpendicular to velocity , so work done by the magnetic force on charge is zero; so charge does not gain kinetic energy on entering the magnetic field.	1

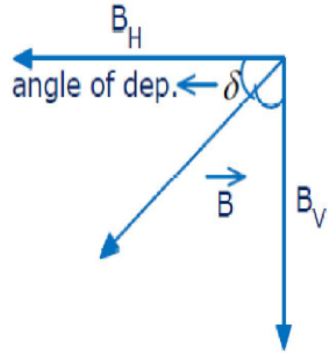
21	(i) $\omega = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{4\times100\times10^{-6}}} = 50\text{ rad/s}$ (ii) $I = \frac{\varepsilon}{R} = \frac{240}{60} = 4\text{A}$ OR (1) Radius = 10cm, B = 0.2T w = 2π rad/s $\in = \frac{1}{2}Bwr^2$ $\in = \frac{1}{2}\times0.2\times2\pi\times(0.1)^2$ $\in = 0.00628\ volts$ $I = \frac{\in}{R} = \frac{0.0628}{2}$ $\boxed{I = 0.0314\text{ A}}$	1+1
22	$\frac{W}{l} = \frac{F}{l} = \frac{\mu_0 i_1 i_2}{2\pi d} = \frac{2\times10^{-7}\times12\times5}{10^{-3}} = 1.2\times10^{-2}N/m$ Direction of current in CD is opposite to that of in AB and Nature of force is repulsive.	1 1

23	(i)Metal A has higher work function as it has higher threshold frequency (ii) In interaction of radiation with matter, radiation behaves as if it is made up of particles called photons. (ii) Each photon has energy E (=h ν) and momentum p (= h ν /c), and speed c, the speed of light.	1+1
24	(i) The polarity of induced emf is such that it tends to produce a current which opposes the change in magnetic flux that produced it. (ii) The induced emf is expected to be constant only in the case of the rectangular loop. In the case of circular loop, the rate of change of area of the loop during its passage out of the field region is not constant, hence induced emf will vary accordingly **OR** (i)Mutual inductance is numerically equal to the emf induced in secondary coil if the rate of change of current in the primary coil is 1A/s. (ii)(a)decrease (b)increase	1 1 1 1/2 1/2
25	(i) X -Rays	1

	(ii) (ii) Microwaves	1
26	a)Circuit diagram b) Applying correct formula And caluation of p.d=11.5V c) Series resistor limits the current drawn from source	1 1/2 1/2 1

27	From the theory of diffraction we know that minima condition is given by $n\lambda = a\sin\theta$ for the minima n = 1 $\Rightarrow \lambda = a \sin\theta$ As because is small we have $\sin\theta \approx \theta$ $\Rightarrow \lambda = a\theta$ $\Rightarrow \theta = \frac{\lambda}{a}$ Thus in single slit the first minima occurs at angle. But when we consider interference of two slits separated by a distance a and distance screen from the slit = D, the position of the first maxima is given by $y = \frac{\lambda D}{a}$ Again, y being small compared to D. $y = D\theta$ $\Rightarrow \frac{\lambda D}{a} = D\theta$ $\Rightarrow \theta = \frac{\lambda}{}$	1/2 1 1/2 1

	OR Angle of incidence at face *ac* for all three colours, $$i = 45^\circ$$ Refractive index corresponding to critical angle 45° is $$\mu = \frac{1}{\sin 45^\circ} = \sqrt{2} = 1 \cdot 414$$ The ray will be transmitted through face '*ac*' if $i < i_c$. This condition is satisfied for red colour $(\mu = 1 \cdot 39)$. So only red ray will be transmitted, Blue and Green rays will be totally reflected.  	1/2 1 1.5
28	(i) The difference in these binding energies appears as energy released or absorbed in a nuclear reaction Nuclear radius, $R = R_0 A^{1/3}$ $$\therefore \quad \frac{R_1}{R_2} = \left(\frac{A_1}{A_2}\right)^{1/3} = \left(\frac{1}{8}\right)^{1/3} = \frac{1}{2}$$ (ii) (iii)page 445(NCERT)	1 1 1
29	Definition	1+1

	$\frac{BH}{B} = \cos\delta$ $\frac{BV}{B} = \sin\delta$ $\Rightarrow \frac{\sin\delta}{\cos\delta} = \frac{BV}{B} \times \frac{B}{BH}$ $\boxed{Tan\delta = \frac{BV}{BH}}$  	2
30	Diagram Advantages : (i) It is free from chromatic aberration. (ii) Its resolving power is greater than refracting telescope due to larger aperture of mirror.	2 1
31	Diagram Refraction at both surfaces Derivation **OR** Diagram Positions of maxima and minima Bandwidth derivation In water, bandwidth reduces to 1/n times	2 1 2 1 1.5 1.5 1
32	(i)Definition and unit (ii)Statement of Gauss's law Derivation **OR** **(i)definition ,unit** **(ii)** $K = \frac{1}{2}(K_1 + K_2)$	1.5 1 2.5 1.5 3.5
33	(i)Statement Expressions for flux and induced emf Graph **OR** Diagram Principle Derivation Use of transformer	1 2 2 1 1 2 1