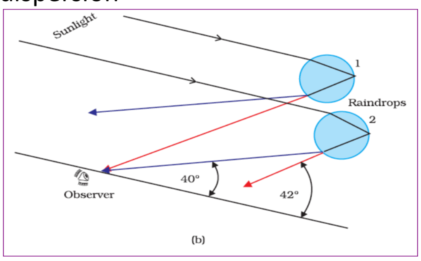
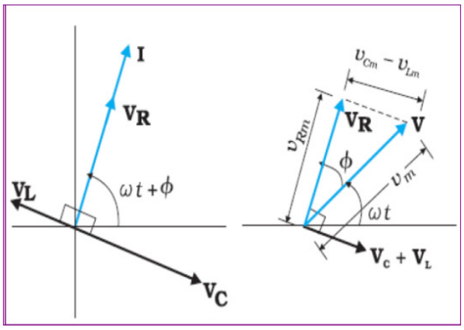
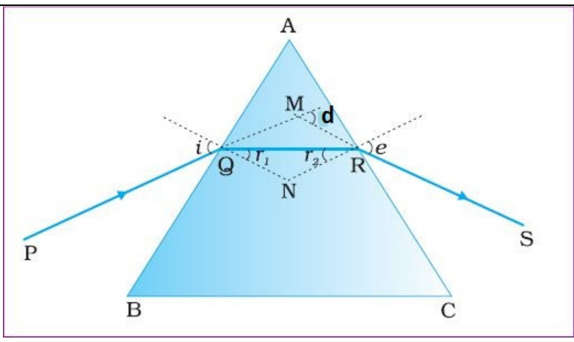
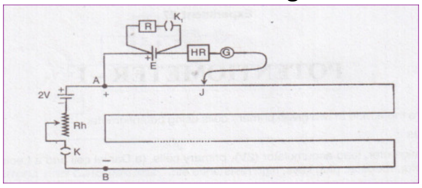
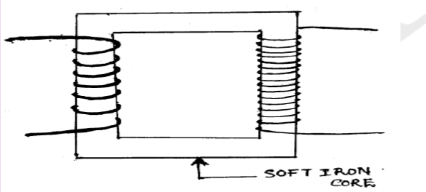
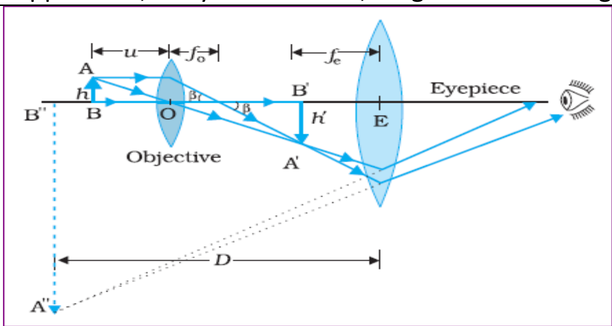
SECOND TERMINAL EXAMINATION- DEC 2018 (SSE 24)

PLUS TWO PHYSICS – ANSWER KEY(Prepared By Ayyappan C, HSST, GHSS Udma)

Qn No	Value points	Score
1	increases	1
2	Circle	1
3	Focal length increases	1
4	Diffraction	1
5	If E were not normal to the surface, it would have some non-zero component along the surface. Free charges on the surface of the conductor would then experience force and move	2
6	a) Fig 2 b) Current	1 1
7	a) $dB = \frac{\mu_0}{4\pi} \frac{Idl\sin\theta}{r^2}$ b) Electric field is due to scalar source , magnetic field is due to vector source or any other difference	1 1
8	a) gets strongly magnetised when placed in an external magnetic field b) retentivity – A, coercivity - C	1 1
9	a) Angle of declination (D) Angle of Dip or inclination (I) ,Horizontal component of earth's magnetic field (B_H) b) zero	1 ½ ½
10	a) eddy current b) magnetic braking, induction furnace or any other two	1 1
11	a) dispersion b) 	1 1
12	a) Gauss's law b) $\frac{\phi_1}{\phi_2} = \frac{Q/\varepsilon_0}{4Q/\varepsilon_0} = \frac{1}{4}$	1 2
13	a) $B = \frac{\mu_0 I}{2\pi r}$ b) I = 20 A, r = 5 cm= 0,05 m, $B = \frac{\mu_0 I}{2\pi r} = \frac{4\pi \times 10^{-7} \times 20}{2 \times \pi \times 0.05} = 800 \times 10^{-7} T$	1 2
14	a) $N\phi_B = NBA = (nl)\mu_0 nIA = \mu_0 n^2 IAl$,but $N\phi_B = LI$ Thus comparing $L = \mu_0 n^2 Al$ b) When number of turn is doubled , self inductance becomes 4 times	2 1
15	a) The ratio of resonance frequency to the band width, $Q = \frac{\omega_0 L}{R} = \frac{1}{\omega_0 CR}$ b) Q is proportional to sharpness	2 1

16	a) Current due to changing electric field b) $I_d = \varepsilon_0 \frac{d\phi_E}{dt}$	1 2
17	a) Double slit b) Constructive, path difference = nλ, destructive , path difference $= (n + \frac{1}{2})\lambda$	1 2
18	a) $\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$ b) 2||4 = 6, 6 series 3 =2 micro farad	1 3
19	a) $\varepsilon = Blv$ b) $I = \frac{\varepsilon}{R} = \frac{Blv}{R}$ c) $F = IlB = \frac{B^2 l^2 v}{R}$ $a = \frac{F}{m} = \frac{B^2 l^2 v}{mR}$	1 1 2
20	a) LCR circuit, $v = v_m \sin \omega t$ b)  c) $Z = \sqrt{(R^2 + (X_L - X_C)^2}$, $\phi = \tan^{-1} \frac{(X_L - X_c)}{R}$	1 2 2
21	a) $B_0 = E_0/c = 36/(3x10^8) = 12x10^{-8}$T b) $K = 1.2x10^7 = 2x\ 3.14/\lambda$, f= c/ λ c) $B = 12x10^{-8}\sin(1.2x10^7 z - 3.60x10^{15} t)$	1 2 1
22	 a) b) . c) $\angle A + \angle QNR = 180°$ $r_1 + r_2 + \angle QNR = 180°$ $r_1 + r_2 = A$ We know ,exterior angle = sum of interior angles, thus **d = (i - r_1) + (e - r_2)** **d = (i + e - A)**	1 1 2
23	a) Spherical b) Proof	1 3

24	a) When a steady current (I) flows through a wire of uniform area of cross section, the potential difference between any two points of the wire is directly proportional to the length of the wire between the two points. b) Potential difference along R1 decreases and hence balancing length decreases c)  $r = \frac{R(l_1 - l_2)}{l_2}$	1 2 2
25	**step up transformer**  a) $N_s > N_p$, $V_s > V_p$ and $i_s < i_p$ b) Ns/Np =Vs/Vp, substitution, calculation c) Copper loss , eddy current loss , magnetic flux leakage. Hysteresis loss	1 2 2
26	a)  b) $m = \left(\frac{L}{f_o}\right)\left(\frac{D}{f_e}\right)$ c) For large magnification	2 2 1