Sethu Bhaskara Matric Hr Sec School.

Quarterly Examination

XII - Physics

Marks : 70

Answer Key

Part - I.

I Choose the correct answer. 15 x 1 = 15

1.	(b) its wavelength	1
2.	(d) infrared rays	1
3.	(a) an accelerated charge	1
4.	(b) 2 μF	1
5.	(c) 480 W	1
6.	(a) 2×10^{20}	1
7.	(d) Energy density	1
8.	(a) $C^2 N^{-1} m^{-2}$	1
9.	(c) $q/2m$	1
10.	(b) Zero	1
11.	(a) decreases by 25%	1
12	(d) $\frac{1}{R}$	1
13	(c) 9I and I	1
14	(c) mechanical losses	1
15.	(b) 0.83	1
		15

II	Part - II Answer any 6 Qns. Qn No 24 is compulsory	6 x 2 = 18
16.	If the power consumed by the current is zero such current is wattless current Correct definition	2m.
17.	Formula $R_t = R_0[1+\alpha(T-T_0)]$ Substitution, $R_t = 10[1+0.004(100-0)]$ $= 10 \times 1.4 = 14$ Result with unit $R_t = 14\,\Omega$	1m. 1/2 m. 1/2m. } 2m
18.	Three methods (i) By increasing magnetic field (B) (ii) By changing area (A) (iii) By changing orientation (θ)	2m.
19.	Correct statement	2m.
20	Violet colour having shortest wavelength scattered more. Next scattered colour is blue Our eyes are more sensitive to blue colour	1m 1m } 2m
21.	Correct statement	2m.
22.	Any two uses	2m.
23.	Correct definition	2m.

24.	$V_{max} = E_{max} \times R$ Formula Substitution $V_{max} = 4 \times 10^6 \times 0.4 = 1.6 \times 10^6$ V Result with unit $V_{max} = 1.6 \times 10^6$ V	1m. 1m. 2m
	Part - III	
III.	Answer any 6 Qns. Qn: No: 33 is compulsory	6 x 3 = 18
25	Current rule – Correct Statement Voltage rule – Correct Statement	1½m 1½m. 3m
26	Any three differences	3 x 1 = 3m.
27	Any six features ½ m each	6 x ½ = 3m.
28	Core loss or Iron loss Copper loss Flux leakage If the name of losses alone written give 1m.	1m. 1m. 1m. 3m

29

diagram
Explanation
$S = \left(\frac{I_g R_g}{I - I_g}\right) R_g$
$R_{eff} = \frac{R_g S}{R_g + S}$
Ammeter low resistance in series & ideal ammeter zero resistance

½ m
½ m
½ m
½ m
3m

½ + ½ = 1m

30

Any six properties ½ mark each

3m.

31.

Formula $\Phi = \frac{2\pi}{\lambda} \times \delta$

Substitution $\Phi = \frac{2\pi}{450 \times 10^{-9}} \times 3 \times 10^{-3} = \frac{\pi}{75} \times 10^{6}$

Result $\Phi = 4.19 \times 10^{4}$ rad

1m
1m.
1m.
1m
3m

32

Diagram
$n_1 \sin i_c = n_2 \sin 90$ & $n_1 \sin i_c = n_2$
$n_2 = 1$, $n_1 = n$
$\sin i_c = \frac{1}{n}$ or $i_c = \sin^{-1}\left[\frac{1}{n}\right]$

½ m
1m.
½ m
1m.
3m

33

$V_{rms} = \sqrt{V_R^2 + (V_L - V_C)^2} = \sqrt{(40)^2 + (40-10)^2} = 50\,V$

$I_{rms} = \frac{I_0}{\sqrt{2}} = \frac{10\sqrt{2}}{\sqrt{2}} = 10\,A$

$Z = \frac{\sqrt{V_R^2 + (V_L - V_C)^2}}{I_{rms}} = \frac{50}{10} = 5\,\Omega$

1m
1m
1m
3m

Part - IV

IV Answer all the Qns: 5x5 = 25

34. a) diagram → ½ m
Explanation → ½ m
$V = \frac{1}{4\pi\varepsilon_0} q\left[\frac{1}{r_1} - \frac{1}{r_2}\right]$ → 1 m
up to $\frac{1}{r_1} = \frac{1}{r}\left[1 + a\frac{\cos\theta}{r}\right]$ → ½ m
up to $\frac{1}{r_2} = \frac{1}{r}\left[1 - a\frac{\cos\theta}{r}\right]$ → ½ m
up to $V = \frac{1}{4\pi\varepsilon_0}\frac{2aq\cos\theta}{r^2}$ → 1 m
$V = \frac{1}{4\pi\varepsilon_0}\left[\frac{P\cos\theta}{r^2}\right]$ → ½ m
or $V = \frac{\vec{P}\cdot\hat{r}}{4\pi\varepsilon_0 r^2}$
$P = 2aq$ → ½ m
5m

(OR)

b) diagram → 1m
diagram explanation → ½ m
up to $d\vec{F} = -\frac{\mu_0 I_1 I_2 dl}{2\pi r}\hat{r}$ → 1m.
$\frac{\vec{F}}{l} = -\frac{\mu_0 I_1 I_2}{2\pi r}\hat{r}$ → ½ m
up to $d\vec{F} = \frac{\mu_0 I_1 I_2 dl}{2\pi r}\hat{r}$ → 1m
$\frac{\vec{F}}{l} = \frac{\mu_0 I_1 I_2}{2\pi r}\hat{r}$ → ½ m
Force is attractive if current in same dir and repulsive if current is in opposite direction → ½ m
5m

35 a) diagram → 1m.
diagram explanation → ½ m
$I_1 - I_G - I_3 = 0$
$I_2 + I_G - I_4 = 0$
$I_1 P + I_G G - I_2 R = 0$
$I_1 P + I_3 Q - I_4 S - I_2 R = 0$
→ 1m.
$I_G = 0$ → ½ m.
$I_1 = I_3,\ I_2 = I_4$
$I_1 P = I_2 R$
$I_3 Q = I_4 S$
→ 1m
$\frac{P}{Q} = \frac{R}{S}$ → 1m
5m.

(OR)

b) diagram → ½ m
diagram explanation → ½ m.
up to $\beta = \frac{dy}{D}$ → 1m
Condition for bright fringe → 1m
Condition for dark fringe → 1m
up to $\beta = \frac{\lambda D}{d}$ → 1m.
5m.

36 a) diagram → 1m.
Explanation of diagram → 1m

upto $\mathcal{E}_1 = I r l_1$ → 1m

upto $\mathcal{E}_2 = I r l_2$ → 1m

$\frac{\mathcal{E}_1}{\mathcal{E}_2} = \frac{l_1}{l_2}$ → 1m. 5m

(OR)

b) diagram → 1m
Diagram explanation → ½ m. $m = \frac{h'}{h} = \frac{V}{u}$
Deriving upto $\frac{PA'}{PA} = \frac{PA'-PF}{PF}$ → 1m
$PA = -u$, $PA' = -v$, $PF = -f$ → ½ m
$m = \frac{h'}{h} = \frac{f-v}{f} = \frac{f}{f-u}$ → 1m. 5m.
upto $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ → 1m

37 a) Circuit diagram → ½ m. $\tan\phi = \frac{V_L - V_C}{V_R} = \frac{X_L - X_C}{R}$
Phasor diagram → ½ m. → 1m
Voltage & impedence triangle → ½ m.
diagram explanation → ½ m 5m

$I_m = \frac{V_m}{\sqrt{R^2 + (X_L - X_C)^2}}$ → 2m

(OR)

b) First equation with explanation → 1½ m.
Second Equation with explanation → 1½ m. 5m
Third equation with explanation → 1m
Fourth equation with explanation → 1m
Equation alone is written 2 marks combe given.

38) a) Emission spectrum definition → ½m

Continuous Emission spectrum → 1½m
Line emission spectrum → 1½m
Band Emission spectrum → 1½m
If types of spectrum alone written → 1½m

5m

(OR)

b) Principle → ½m
Labelled diagram → 1m

$\mathcal{E}_p = -N_p \frac{d\phi_B}{dt}$ or $V_p = -N_p \frac{d\phi_B}{dt}$
$\mathcal{E}_s = -N_s \frac{d\phi_B}{dt}$ or $V_s = -N_s \frac{d\phi_B}{dt}$
→ 1m

$V_p I_p = V_s I_s$ → ½m

5m

$\frac{V_s}{V_p} = \frac{N_s}{N_p} = \frac{I_p}{I_s} = k$ → 1m

Step up $k > 1$, $V_s > V_p$, $N_s > N_p$, $I_s < I_p$
Stepdown $k < 1$, $V_s < V_p$, $N_s < N_p$, $I_s > I_p$
→ 1m

Teachers Handling

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