Sethu Bhaskara Matric Hr secondary School

Quarterly Common Examination

Std: XII Subject: Physics

ANSWER AND SCORING KEY

SECTION - I

1. (c) inside the sphere
2. (a) $\eta = 1$
3. (c) 1 kV voltmeter
4. (c) ms^{-1}
5. (b) room heater
6. (a) π
7. (b) increases.
8. (a) Phenomenon of conversion of kinetic energy into radiation
9. (b) $V_A > V_B > V_C > V_D$.
10. (c) Frequency
11. (a) 2·5 Ω
12. (d) 1.129×10^5
13. (a) contracts
14. (d) both (a) and (b)
15. (d) 1·7 A

SECTION - II

16. Correct definition → 2m.
17. Correct Statement → 2m.

Writing mere formula give 1 mark

18. Correct definition → 2m

19. $e = -N A \frac{dB}{dt}$ Formula → 1 mark

$e = -400 \times 0.08 \times \frac{-0.04}{0.02}$ Substitution → ½m.

$= 96\ V$ Result with unit → ½m.

20. Correct explanation → 2 mark

21. Faraday's first law → 1 mark
Faraday's second law → 1 mark

22. Uses of Mosley's law
Any two points → 2 mark

23. Correct statement - 2 mark

24. Mass of electron = $\frac{\text{Charge of electron}}{\text{Specific charge}}$ Formula → 1 mark

$m = \frac{e}{(e/m)} = \frac{1.602 \times 10^{-19}}{1.7592 \times 10^{11}} = 9.11 \times 10^{-31}$ kg Substitution + result → 1 mark

SECTION - III

25. diagram with introduction ½ + ½ = 1m.
up to $V = q\left[\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}\right]$ → 1m.
Deriving up to $\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$ → 1m.

26. diagram → 1m.
Construction → 1m.
$E = Irl$ → 1m.
$E \propto l$

27. Any six points → 3 marks.

28. 3 diagrams ½ + ½ + ½ = 1½ mark

Drawing up to $i = I_0 \sin\omega t$ → 1m.

Voltage and Current are in phase → ½ m.

29. Any six points → 3 marks.

30. Formula $F = Bqv\sin\theta = B\,2e\,v\sin\theta$ → 1m.

$F = 10^{-4} \times 2 \times 1.6 \times 10^{-19} \times 5 \times 10^{5} \times \frac{1}{2}$ → 1m.

$F = 8 \times 10^{-18}\ N$ → 1m

31. Transition temperature definition → 1½ m.

Changes at transition temperature 3 points → 1½ m.

32. $\beta' = \frac{D\lambda'}{Dd} = \frac{\lambda D}{\mu d} = \frac{\beta}{\mu} = \frac{2\times10^{-3}}{1.33} = 1.5\times10^{-3}\,m.$

Formula → 1m.

Substitution → 1m

Result + unit → 1m.

33. Diagram → 1m

Explanation → ½ m.

μ = two ways → 1m.

Statement → ½ m.

SECTION - IV

34 (a) diagram → 1 mark

Introduction → 1 m.

$\Phi = E \times 2\pi r l$ → 1m.

$q = \lambda l$ → ½m

$E = \frac{\lambda}{2\pi\varepsilon_0 r}$ → 1m

Direction of E → ½ m

(i) Diagram + Construction → 1m.

Applying current law & voltage law → ½ m.

$I_1 = I_3$

$I_2 = I_4$

$I_1 P = I_2 R$

$I_1(P+Q) = I_2(R+S)$ ⇒ ½ mark

Deriving $\frac{P}{Q} = \frac{R}{S}$ → 1m

(ii) $r = \left[\frac{E-V}{V}\right] R$ → 1mark

$r = \left[\frac{10-9.9}{9.9}\right] 10$

$r = 0.101\ \Omega$ → 1mark

35. (a) (i) Explanation → 1m

$dW = \frac{q}{c} dq$ → 1m

$W = \frac{q^2}{2C}$ → 1m

(ii) $\tau = PE \sin\theta$ → 1m

$\tau = 2.5 \times 10^{4} \times 3.4 \times 10^{-30} \times 1$ → ½m

$\tau = 8.5 \times 10^{-26}$ Nm → ½ m

(b) diagram with construction → 1m.

Principle → 1m

Working → 1m.

Deriving upto $v = \frac{Bq}{2\pi m}$ → 2m.

36. (a) Principle → ½ m.

Essential parts → 1m

Diagram → 1m

Fleming's right hand rule - ½ m

1st half rotation - ½ m

2nd half rotation - ½ m

Graph → ½ m.

e = E₀ sin ωt → ½ m.

(ii) (a) Four points → 2 marks

(b) diagram → 1 mark

Construction → 1 mark

Working → 1 mark

37. (a) Explanation of Raman spectrum → 1m.

Explanation for Rayleigh and Raman lines → 1½ m

Three diagrams → 1½ m

Raman shift → ½ m

Virtual state → ½ m.

(b) Introduction - ½ m

$$\frac{1}{4\pi\varepsilon_0}\frac{Ze^2}{r_n^2} = \frac{mv_n^2}{r_n} \longrightarrow 1m$$

$$\omega_n = \frac{nh}{2\pi m r_n^2} \longrightarrow 1m$$

$$r_n = \frac{n^2h^2\varepsilon_0}{\pi m Z e^2} \longrightarrow 1m$$

$$r_n = \frac{n^2h^2\varepsilon_0}{\pi m e^2} \longrightarrow 1m.$$

$$r_1 = 0.53\,\text{Å} \longrightarrow ½ m$$

38. (a) diagram → ½ mark

Energy level diagram → 1m.

Construction → 1 mark

Working → 2½ m

(b) Three diagrams → 1 marks.

V_R, V_L, V_C expressions with phase relationships } → 1½ marks

$V = I\sqrt{R^2 + (X_L - X_C)^2}$ → 1m

$\phi = \pm \tan^{-1}\left[\frac{X_L - X_C}{R}\right]$ → 1 m

$I = I_0 \sin(\omega t \pm \phi)$ → ½ m.

Handling teachers

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