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Class-XII **Common Pre-Board Examination**

Physics(Theory)-Marking Scheme

1. Potentiometer because it has infinite resistance. ie, it does not draw any current from the cell at null point (1)
2. As r = $\frac{mv}{qB} = \frac{p}{qB}$

   r α p (as q and B are have same values for both the particles (1/2)

   Thus $r_e : r_p = 1:1$ (1/2)
3. Short wave band means higher frequency of transmission. Higher the frequency longer is the distance (1)
4. No influence (1)
5. No (1/2)

   Energy depends on amplitude and frequency and not on speed (1/2)
6. (a) Since Q = CV, It doubles (1/2)

   (b) Since $U_E = ½ CV^2$, it quadruples (1/2)
7. Correct diagram (1)
8. (a) Which draw $I_{rms} = 10A$, costs more to operate as it consumes more power. Since I_{rms} for 12A is $\frac{12}{\sqrt{2}} = 8.5$ A. (1)
9. K.E = h ϒ – hϒ$_0$ (1)

   (i) Correct definition (1/2)

   (ii) Correct definition (1/2)
10. Refer NCERT text book Vol – II Page No.322 fig b & c (1 + 1)
11. Definition (1)

    Energy stored in the Inductor u = ½ LI^2 (1)
12. Let x be the capacitance of each capacitors.

    In series $\frac{1}{c} = \frac{1}{x} + \frac{1}{x}$ + …… +n (terms) (1)

    $\frac{1}{c} = n.\ \frac{1}{x}$ x = nc

    In parallel y=ne + nc + ---------- +n (terms)

    $=n^2c$ (1)

13. Power due to the force p = $\overrightarrow{F} . \vec{V}$ (1/2)

p = F.V. $\cos 90^0$ (1/2)

$= 0$ (1)

(or)

$\lambda = \frac{h}{\sqrt{2mev}}$ (with proper substitution of values) (1)

$\frac{\lambda_1}{\lambda_2} = \sqrt{\frac{4m_p V2}{m_p V1}} = \sqrt{8} = \frac{2\sqrt{2}}{1}$

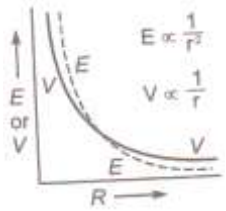
(1)

14. $r^1 = (\frac{E-V}{V})R = (\frac{1.5-1.4}{1.4})8.5$ (1 ½)

$r^1 = 0.61\,\Omega$ (½)

$r = 2\ r^1 = 2 \times 0.61 = 1.22\,\Omega$ (1/2)

15.



16. Current gain β = 25 (1)

Voltage gain $A_v = \beta \frac{R_L}{R_i}$

R_L = 6kΩ (1)

17.

Binding energy per nucleon of $_1H^2$ = 1.1 MeV

Total B.E of two $_1H^2$ = 2.2 MeV

Total B.E of two deutron nuclei = 2 x 2.2 = 4.4 MeV (1)

B.E per nucleon of $_2He^4$ = 7MeV

Total B.E. of helium $_2He^4$ = 4 x 7 = 28 MeV (1)

Energy released in fission = 28 – 4.4

= 23.6 MeV (1)

18. For the objective

$$\frac{1}{f_0} = \frac{1}{v_0} - \frac{1}{u_0}$$ (1/2)

v_0 = 7.2 cm (1/2)

$for\ the\ eyepiece$

$$\frac{1}{f_e} = \frac{1}{v_e} - \frac{1}{u_e}$$ (1/2)

$u_e = 2.27\ cm$ (1/2)

Separation between objective and the eyepiece = $V_0 + (u_e) = 9.47$ cm

M.P = $\frac{v_o}{u_o}\ [\ 1 + \frac{D}{f_e}\ ] = 88$ (1)

19. For correct definition (1)

For correct unit (1/2)

Mass number of D, A = 180

Atomic number of D, Z = 72 (1 ½)

20. For Correct Definition (1)

$\mu = \frac{A_m}{A_c}$ (1)

$\mu = \frac{a-b}{a+b}$ (1)

OR

For correct Definition of Space wave propagation (1)

Used in TV, RADAR, Microwave communication (1)

The range is maximum when the two antenna have a height h/2 each (1)

21. For correct Principle (1)

For Correct diagram (1)

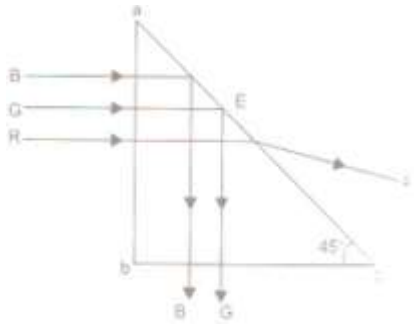
$\frac{E_1}{E_2} = \frac{l_1}{l_2}$ (1)

22. For correct Principle (1)

For Correct diagram (1)

Working (1)

23. The rays will emerge out of the face ac for which i < C where C is the critical angle (1/2)



(1 ½)

$^{a}\mu_{g} = \frac{1}{sinc}$

here i=45^{0} $^{a}\mu_{g} = \sqrt{2} = 1.41$ (1/2)

Thus the condition is $^{a}\mu_{g} < 1.41$

only Red Ray will emerge out. (1/2)

24. (a) Magnetic field $\vec{B}$ must oscillate along

$\hat{K}$ ie (Z – axis) because $\hat{\imath} = (\hat{\jmath} \times \hat{k})$ (1 ½)

(b) $\frac{E_0}{B_0}$ = c (speed of light in vacuum) (1 ½)

25. Biot – savart's law (1)

Diagram (1/2)

For correct derivation (1 ½)

26. (a) Electromagnetic Induction (1)

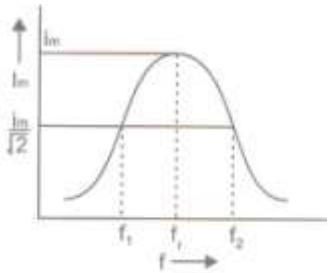
(b)No. Because refrigerator is a heat liberating agent (1)

(i) Creating awareness, presence of mind covrage (1)

27. Circuit Diagram (1/2)

Phasor diagram (1/2)

For derivation of Impedance (2)



(1)

Resonance in the circuit (1)

(or)

For correct labelled diagram (1)

Principle (1)

Construction (1)

Workings (2)

28. Assumptions (1/2)

Sign conventions (1)

Diagram (1/2)

Correct derivation and lens maker's formula (3)

(or)

Correct answers of wave front and ray (1/2)

(i) Correct diagram (1/2)

(ii) Correct diagram (1/2)

Principle (1)

Diagram (1)

For proving (1 ½)

29. (a) Correct circuit diagram (2)

Input wave form (1/2)

Output wave form (1/2)

$\beta = \frac{\Delta I_c}{\Delta I_B}$, $I_E = I_B + I_C$

$I_c = \beta I_b$

$I_B = \frac{IE}{1+\beta} = 0.1$ mA (1)

Ic = 59 x 0.1 = 5.9 mA (1)

(or)

(a) Correct diagram

Metals (1)

Insulators (1)

Semiconductors (1)

(b) Correct answer (1)

No it cannot detect (1)

[hϒ has to be greater than E_g]