

PURPOSE IS TO GET IDEA OF PAPER

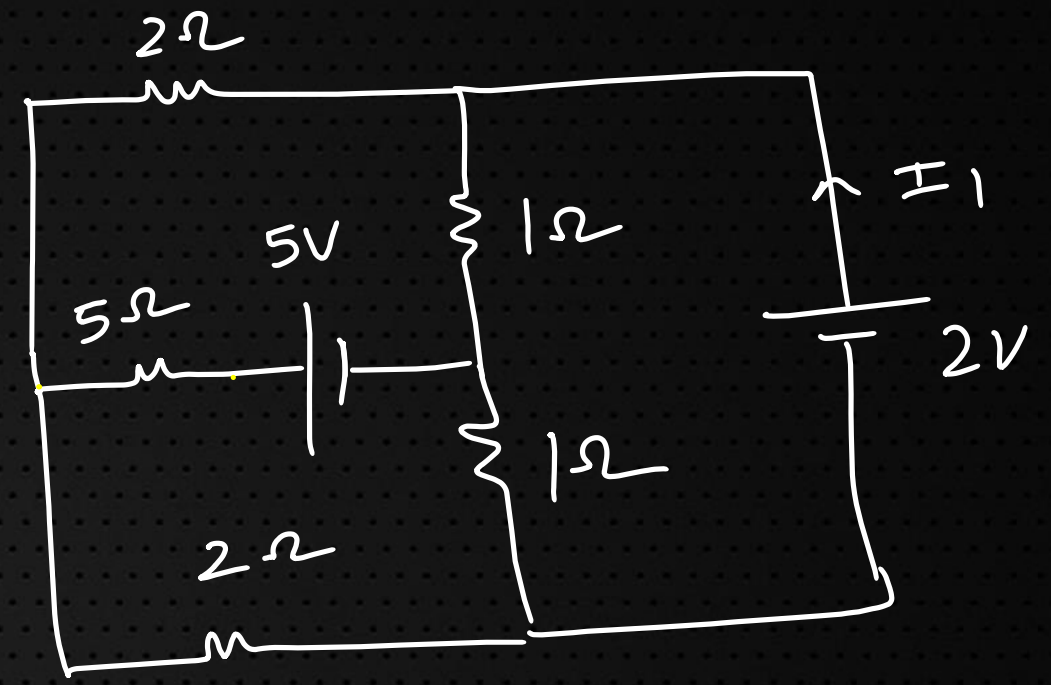
SHIFT 1



1. $E = -\frac{a}{r^3} \hat{i} + \frac{b}{r^2} \hat{j}$, find dim of a and b
→ electric field

2. I_1 is

- (a) 1.5 A
- (b) 2.5 A
- (c) 3.5 A
- (d) 4.5 A



3. A capacitor of $C = 600\mu\text{F}$ is charged by 100V . Now it is connected to another $600\mu\text{F}$ capacitor. Find loss in P.E.

(a) 1.5J

(b) 4J

(c) 5J

(d) 7J



4. LR circuit, $X_L = R$, $P.f_1 = \cos \theta_1$

Now C is added in series ($X_L = X_C$), $P.f_2 = \cos \theta_2$

find $P.f_1 / P.f_2$

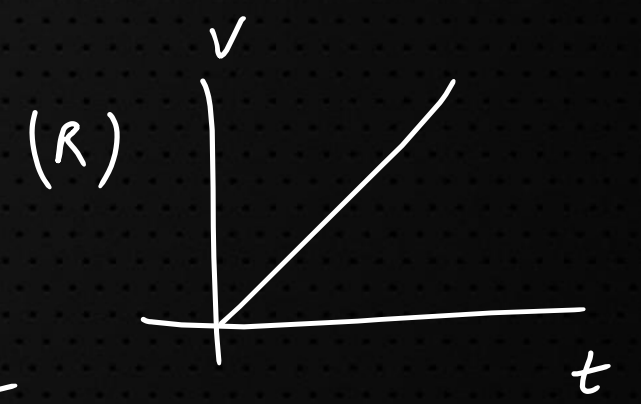
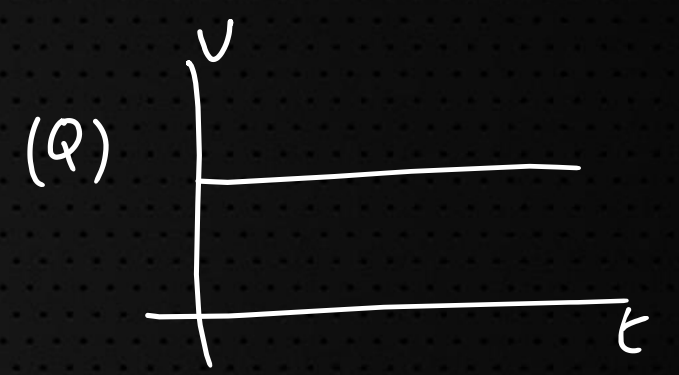
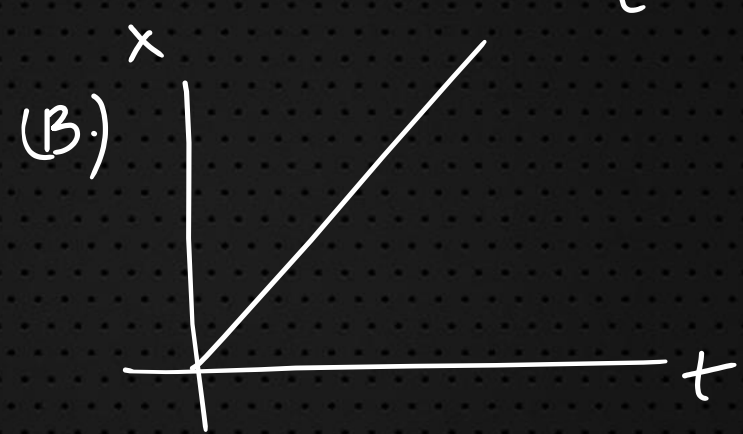
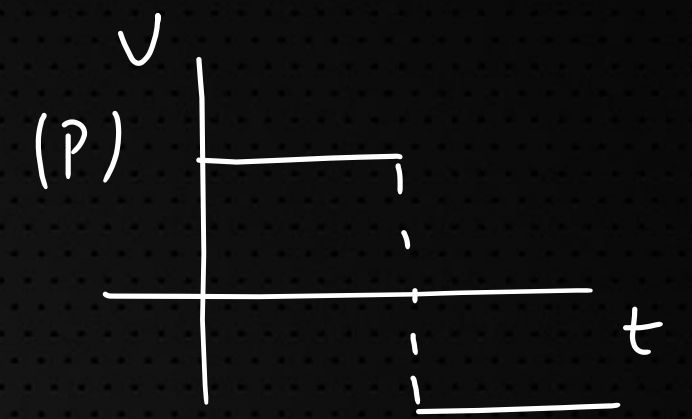
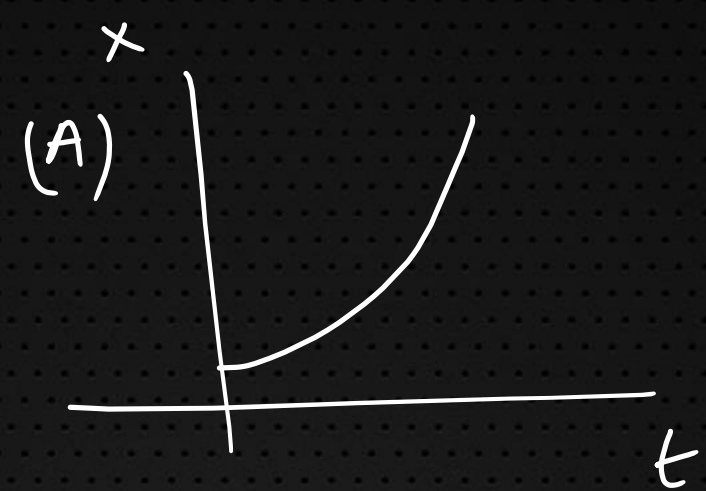
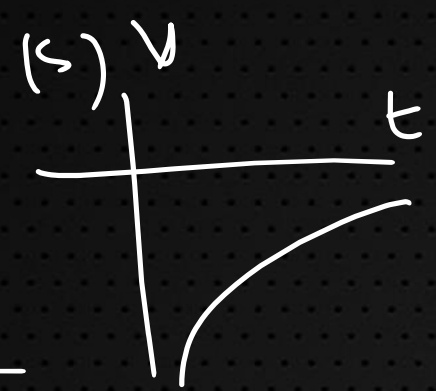
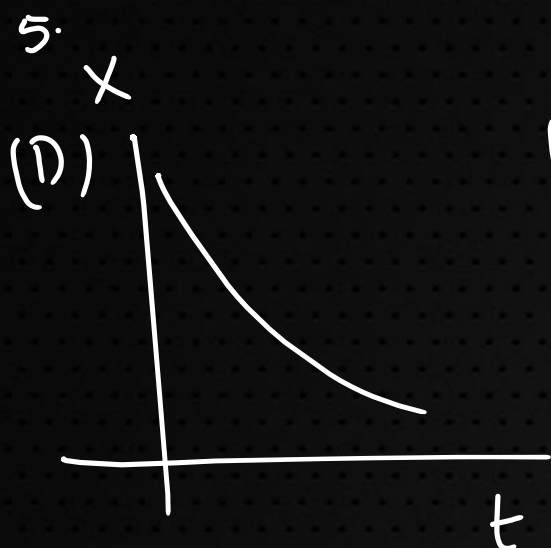
(a) $\sqrt{2}$

(b) $1/\sqrt{2}$

(c) 1

(d) 2





6. Capillary
Liquid A $\rightarrow h = 5\text{cm}, T, \rho$
Liquid B $\rightarrow h = ?, 2T, 2\rho$
Same Contact angle.
and γ .
- (a) 10cm (b) 5cm (c) 7cm (d) 3cm



7. $PT^2 = \text{Const}$, find Coeff of Volumetric Expansion

(a) $3T$

(b) $3/T^2$

(c) $3/T$

(d) $3/T^3$



8. Two metallic sphere of radius R and $2R$ have same σ C/m².

After connecting with wire, new charge density of bigger sphere is σ' . find σ'/σ .

- (a) $5/6$ (b) $2/3$ (c) $2/5$ (d) $1/2$



9. Coil A $\rightarrow R_A = 1m$, N_A : no. of turns, I_A
Coil B $\rightarrow R_B = 2m$, N_B , ' ', I_B
Both has same magnetic moment. Then,

(a) $I_A N_A = I_B N_B$ (b) $I_A N_A = 4 I_B N_B$

(c) $4 I_A N_A = I_B N_B$ (d) $I_A N_A = 2 I_B N_B$



10. $z(t) = \alpha t - \beta t^2 + \gamma t^3$, find i_{\min}

(a) $\alpha - 3\beta^2/\gamma$

(b) $\alpha - \beta^2/\gamma$

(c) $3\alpha - \beta^2/\gamma$

(d) $\alpha - \beta^2/3\gamma$



11. Bohr model, v of e^- in 7th orbit of H atom is 3.6×10^6 m/s. Find v in 3rd orbit

(a) 7.4×10^6 m/s

(b) 2.4×10^6 m/s

(c) 8.4×10^6 m/s

(d) 4.4×10^6 m/s



11. Bohr model, v of e^- in 7th orbit of H atom is 3.6×10^6 m/s. Find v in 3rd orbit

- (a) 7.4×10^6 m/s
- (b) 2.4×10^6 m/s
- (c) 8.4×10^6 m/s
- (d) 4.4×10^6 m/s

~~Soln:~~ $v \propto \frac{Z}{n}$ m/s



12. SHM, $x = A \sin \omega t$. P.E is max at $t = \frac{T}{\beta}$, find β

(a) 8

(b) 4

(c) 6

(d) 12



13. $A_{max} = 120 \text{ mV}$, $A_{min} = 80 \text{ mV}$, find side band Amplitude.

(a) 5 mV

(b) 15 mV

(c) 10 mV

(d) 20 mV



14. Gravitational field varies as $g = -\frac{K}{r^3}$, $K = 6 \text{ Nm}^3/\text{Kg}$
 $r = 2$ as reference.

If potential at $r = 2$ is 10 V ,
then V at $r = 3$ is

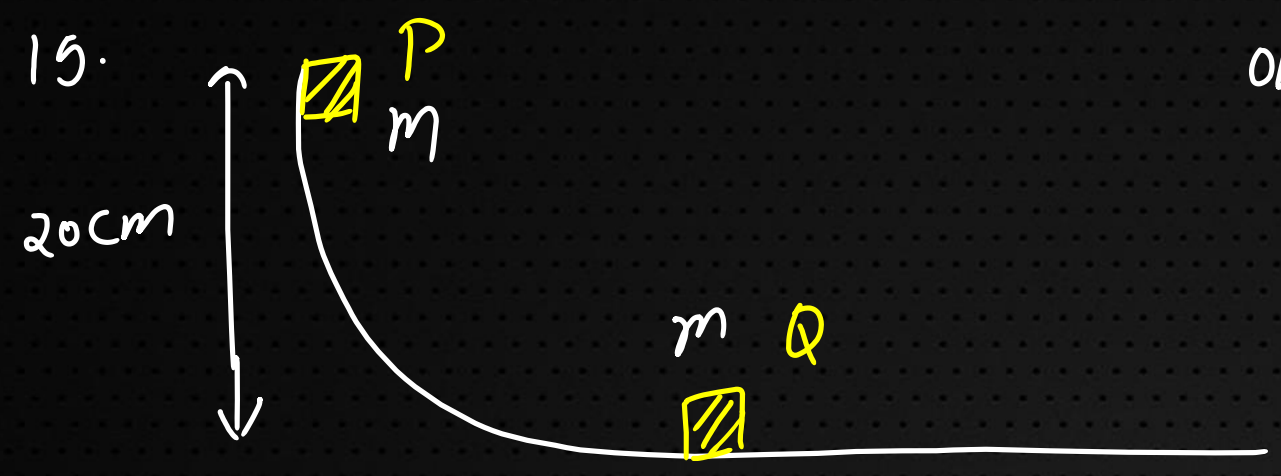
(a) $\frac{100}{12}$

(b) $\frac{120}{10}$

(c) $\frac{125}{12}$

(d) $\frac{110}{10}$





Obj P slides and collides elastically. Find speed of Q.

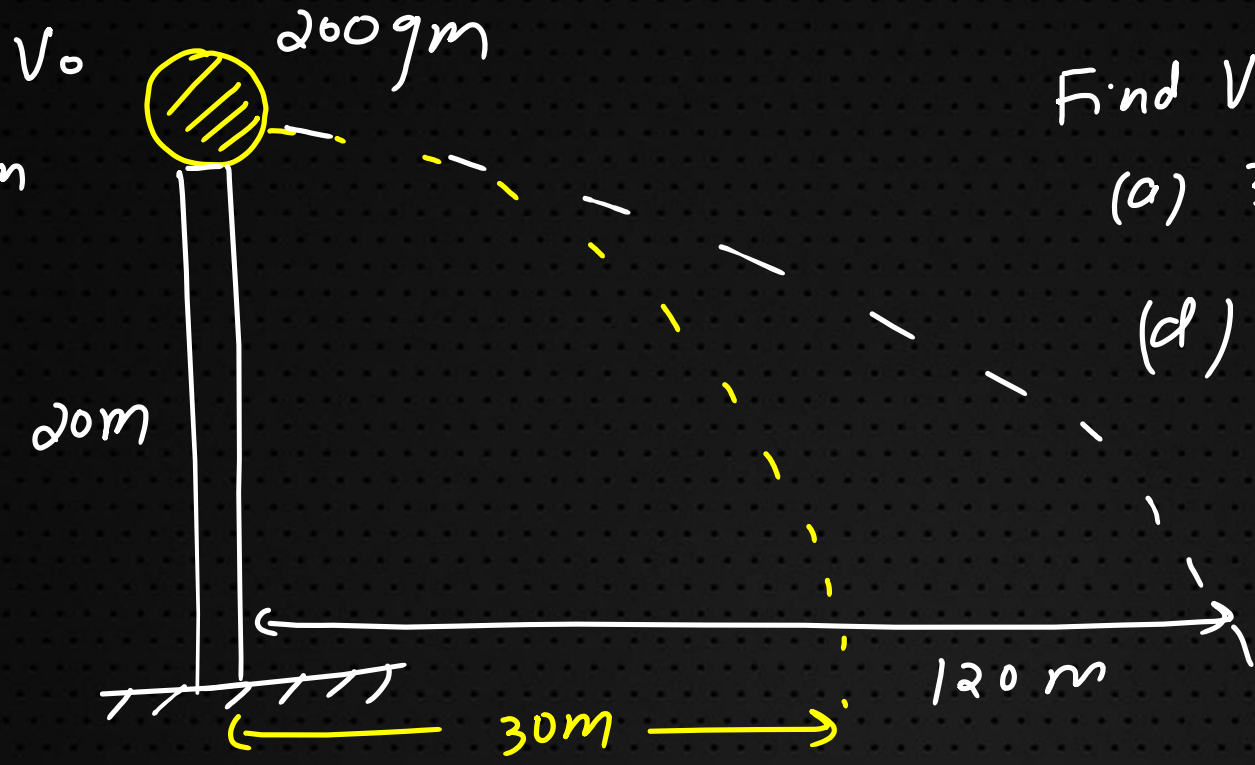
- (a) 2 m/s (b) 1 m/s (c) 3 m/s (d) 4 m/s

16. Power of em beam is 20 mW is incident on perfectly absorbing body for 300 ns . Total momentum transferred is

- (a) $2 \times 10^{-7}\text{ N s}$
- (b) $4 \times 10^{-7}\text{ N s}$
- (c) $3.5 \times 10^{-7}\text{ N s}$
- (d) $3.5 \times 10^{-4}\text{ N s}$



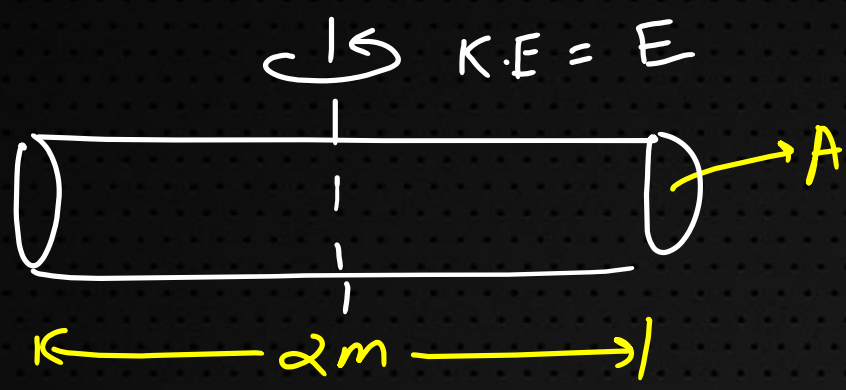
17. $\rightarrow V_0$
109m



Find V_0

- (a) 320
- (b) 300
- (c) 360
- (d) 180

18.



$$I \neq \omega = \sqrt{\frac{\alpha E}{A d}}, \alpha = ?$$

density = d

(a) 3

(b) 1

(c) 5

(d) 6

19. A man on horse covered 1st half of total distance with 5 m/s. In 2nd half it goes with 10 m/s & 15 m/s for equal time. $V_{avg} = \frac{x}{7}$, find x .

(a) 50

(c) 30

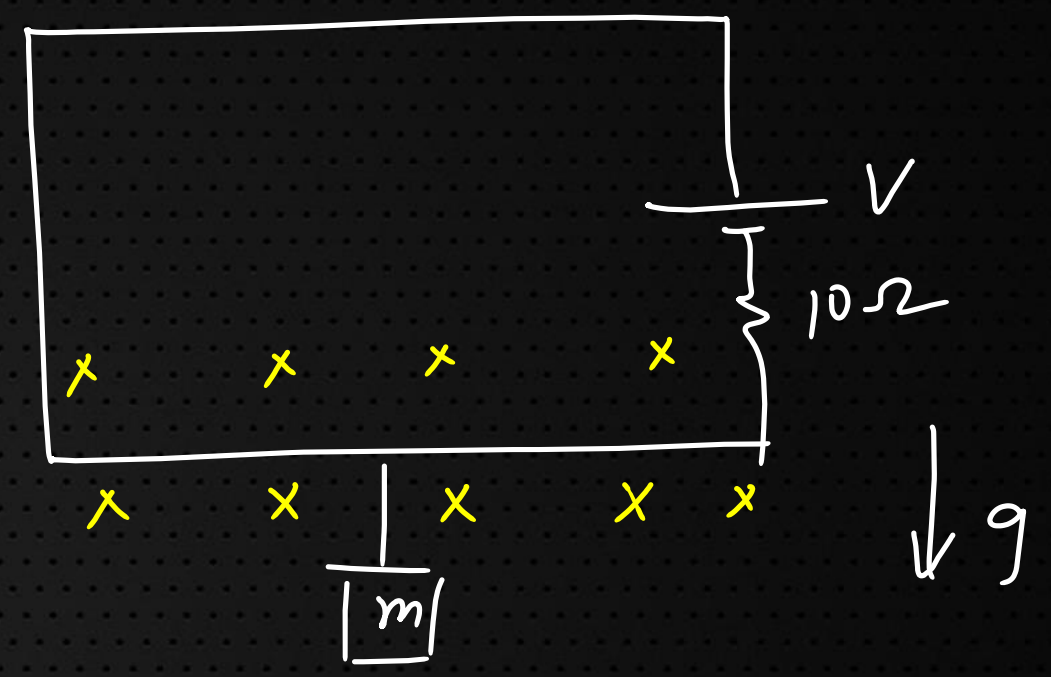
(b) 70

(d) 80

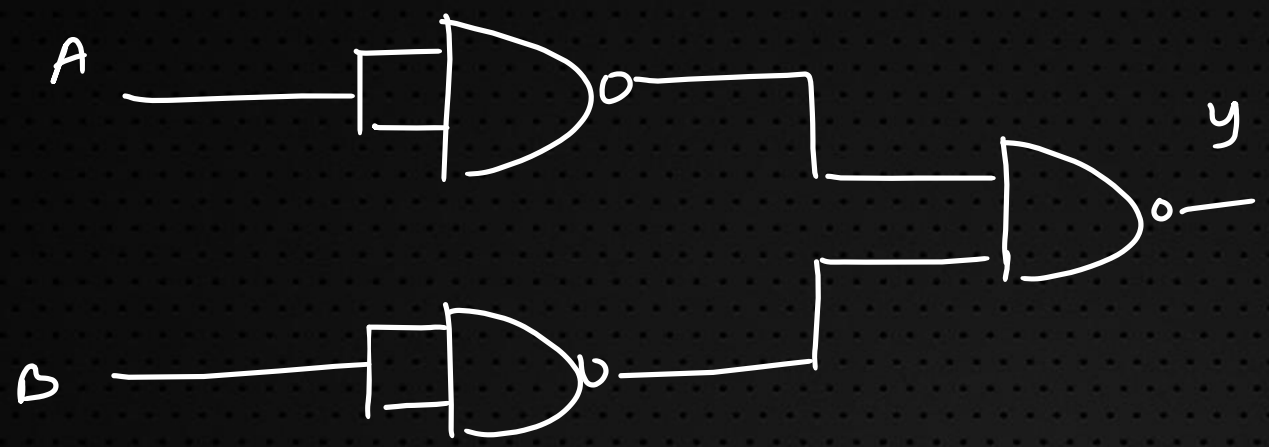


20. side = 10cm, $B = 10^3 \text{ G}$
 $m = 1 \text{ gm}$, $V = ?$ for
 m in equilibrium

- (a) 20V (b) 30V
- (c) 25V (d) 10V



21.



22. Relⁿ betⁿ γ , G , K , σ is

9. Relation among γ , G & β

$$(a) \beta = \frac{\gamma}{3(1-2\sigma)}$$

$$(b) G = \frac{\gamma}{2(1+\sigma)}$$

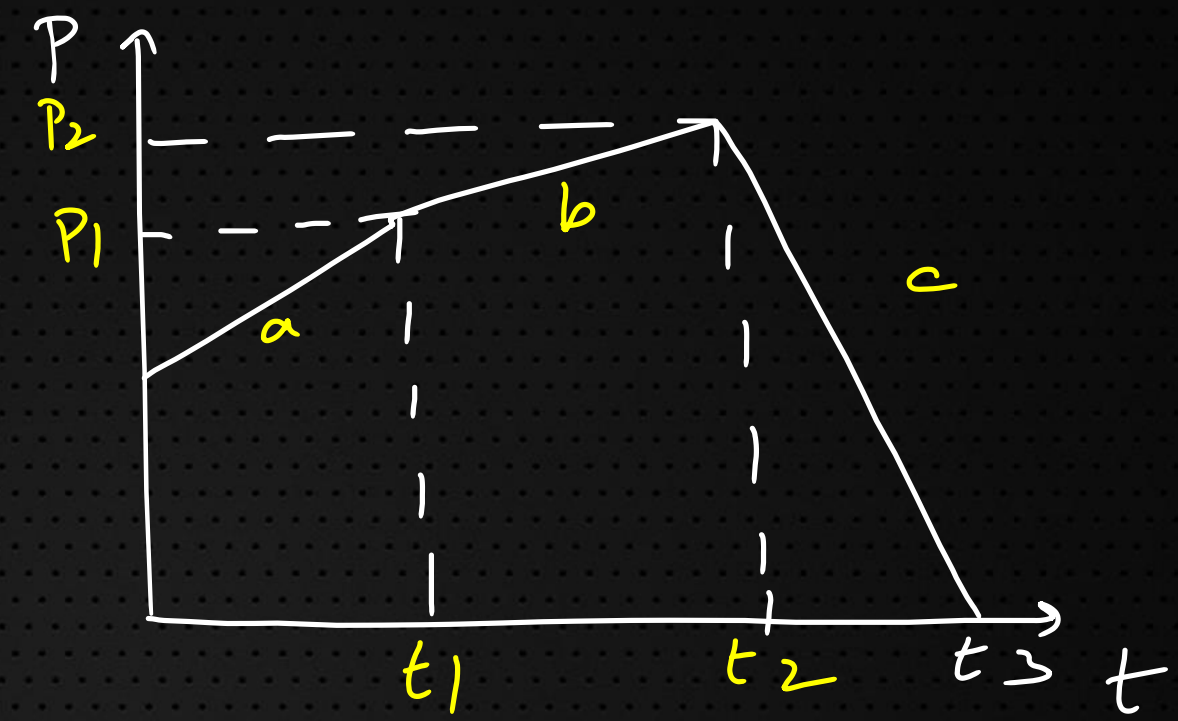
from (a) & (b) \rightarrow (c)
$$\beta = \frac{\gamma G}{9G - 3\gamma}$$

this question asked in JEE 2021, Feb



23. Find location of F_{max} or F_{min}

1. c, b
2. a, b
3. a, c
4. b, a



24. When heat is absorbed in an $T = \text{const}$ process,

S1 \rightarrow W_g is -ve

S2 \rightarrow W_g is +ve

S3 \rightarrow U is const

S4 \rightarrow $U \uparrow$

S5 \rightarrow $U \downarrow$

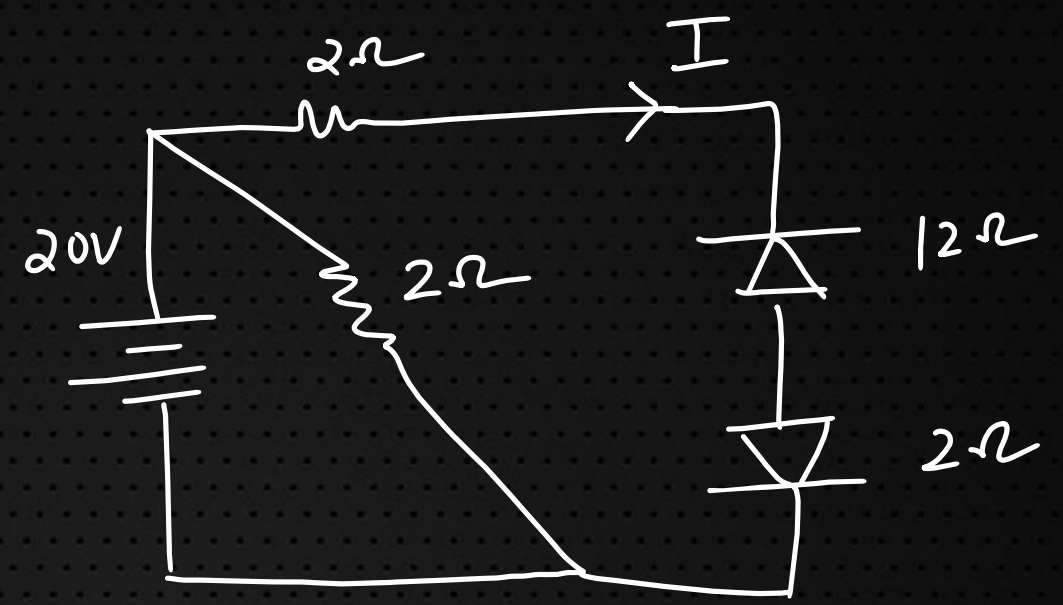


PURPOSE IS TO GET IDEA OF PAPER

SHIFT 2



1. find I



2. Dispersion without deviation, $\delta_{net} = 0$

Prism A : $A_1 = 6^\circ$, $\mu_1 = 1.54$

Prism B : $A_2 = ?$, $\mu_2 = 1.72$

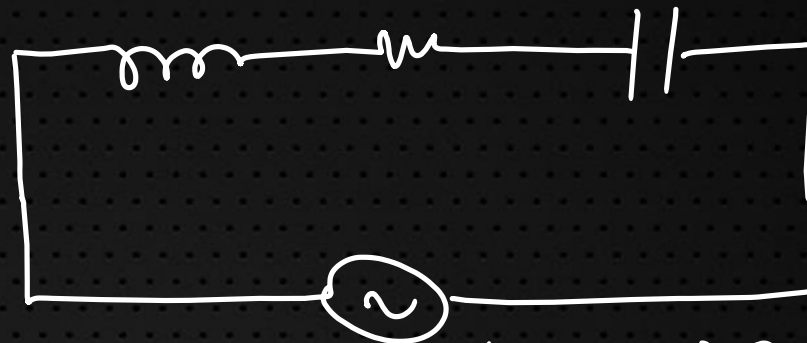
find A_2

- (a) 3.5 (b) 4.5 (c) 4 (d) 3



3. find I_{rms}

$$X_L = 400 \Omega \quad 100 \Omega \quad 300 \Omega = X_C$$



$$V_{rms} = 200\sqrt{2}$$



4. S1: In reversible process, η_{\max} at $-273^\circ\text{C} = T_1$
S2: η depends on T_1 & T_2



5. Dimensional

A. Impulse

B. Pressure Grad

(c) Energy density

(d) Torque



6. Simultaneous decay.

$\lambda_1 \rightarrow T_{1/2} = 5 \text{ min}$

$\lambda_2 \rightarrow T_{1/2} = 60 \text{ Sec}$

Find $T_{\text{effective}}$



7. debroglies wave length is \uparrow by 50%. find ratio of $\frac{V_1}{V_2}$
{ V_1 & V_2 is p.d. through which e^- is
acc).



8. Find B at centroid.

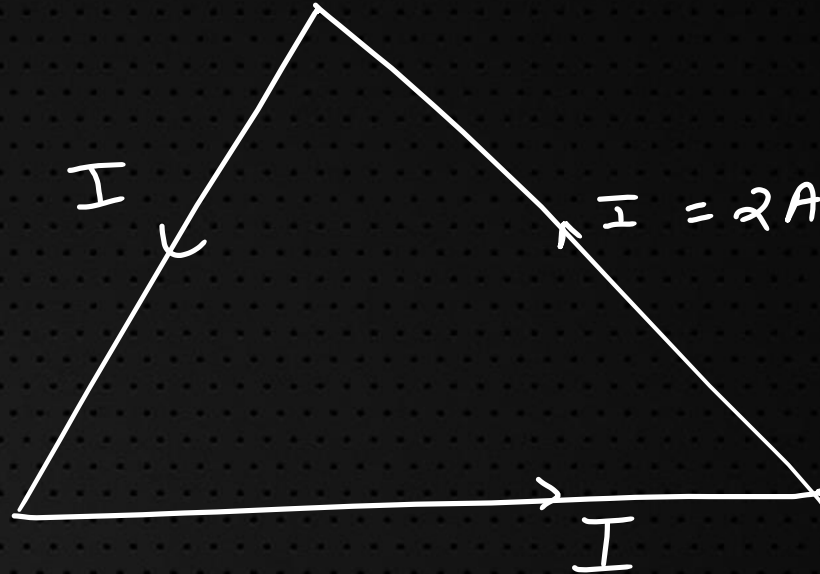
$$l = 4\sqrt{3}\text{ cm}, \quad i = 2\text{ A}$$

(a) 3×10^{-5}

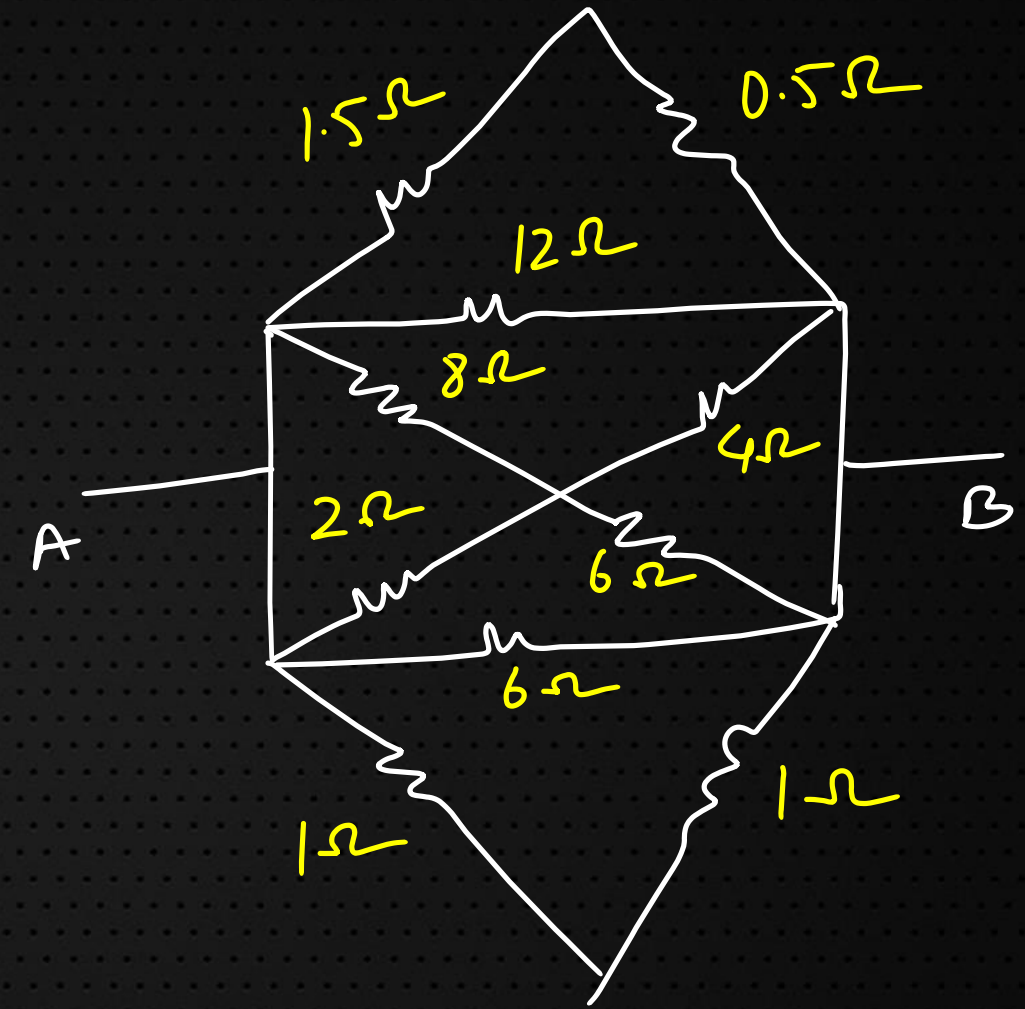
(b) $3\sqrt{3} \times 10^{-5}$

(c) $4\sqrt{3} \times 10^{-5}$

(d) 4×10^{-5}



9. Req across AB



10. In a faulty thermometer reading shows 5°C and 95°C for melting & boiling pt. Temp in K is _____ if it is 41°C .



11. A force F is applied on a rod (one end attached) change in length is 0.2 mm . Now same F applied on another rod of double length and diameter 2.1 times, find change in length



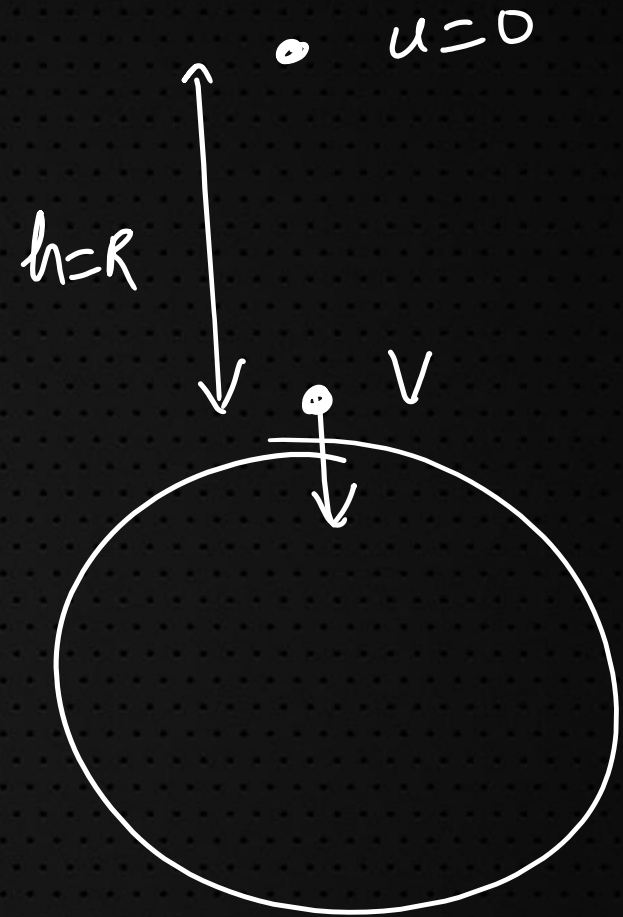
12. find v

(a) $\sqrt{2gR}$

(b) $\sqrt{gR/2}$

(c) \sqrt{gR}

(d) $2\sqrt{gR}$



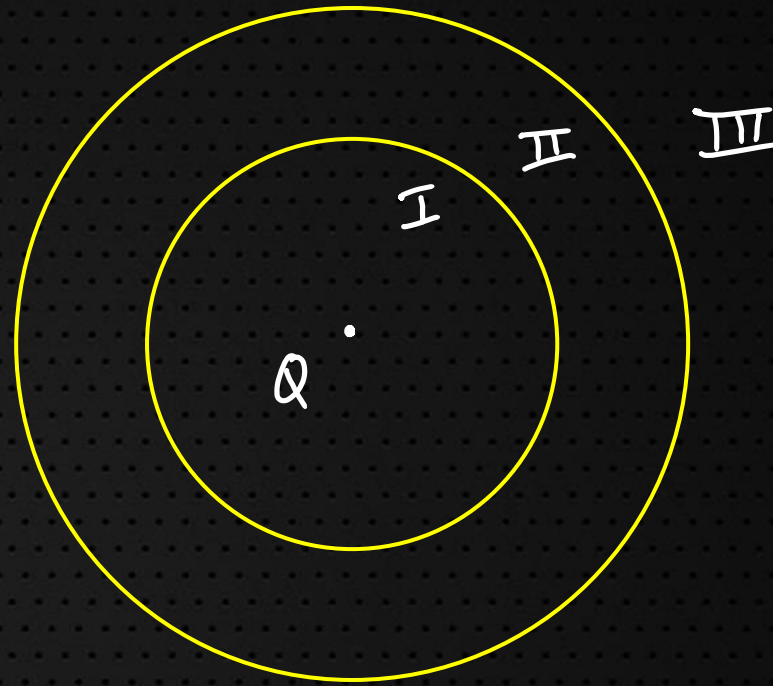
13. $x = A \sin(\omega t + \frac{\pi}{3})$, If time period is T ,
 v_{\max} occurs for 7th time at $t = \frac{T}{\beta}$, find β



14. An object moves 4km in 3km/hr and 4km in 5km/hr..what is average velocity?



15. Comment on E.F due to Q in I, II & III



16. Spring-block system in SHM.
 $\frac{\omega_2}{\omega_1} = ?$ and $m_1 = 1 \text{ Kg}$, $m_2 = 2 \text{ Kg}$



17. (A) Demodulator

(B) Transducer

(C) Repeater

(D) Attenuation (b) ATTENUATION : Loss of signal strength during propagation in channel.

(a) Transducer

Converts information into electrical signal

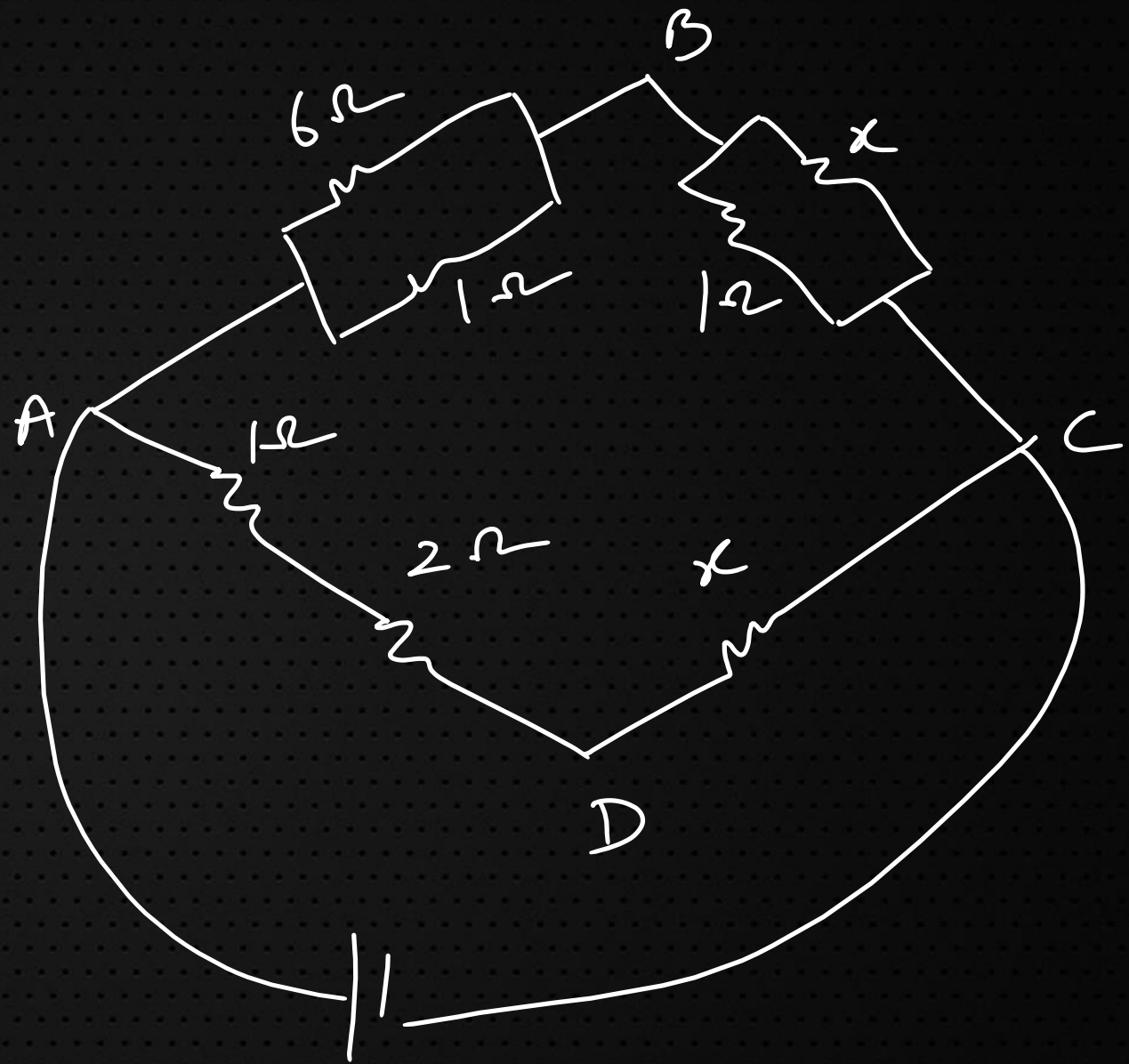
(b) Demodulator

Extracts information from carrier wave.

18. A stone of mass = 1 kg tied to string of $L = 180$ cm is whirled in horizontal circle. $\omega = 28$ rev/min find Centripetal force = $\frac{1936}{x}$, find x .



19. Find x so that $V_B = V_D$



20. If $4v^2 = 50 - x^2$ in SHM, find T

(a) 4π s

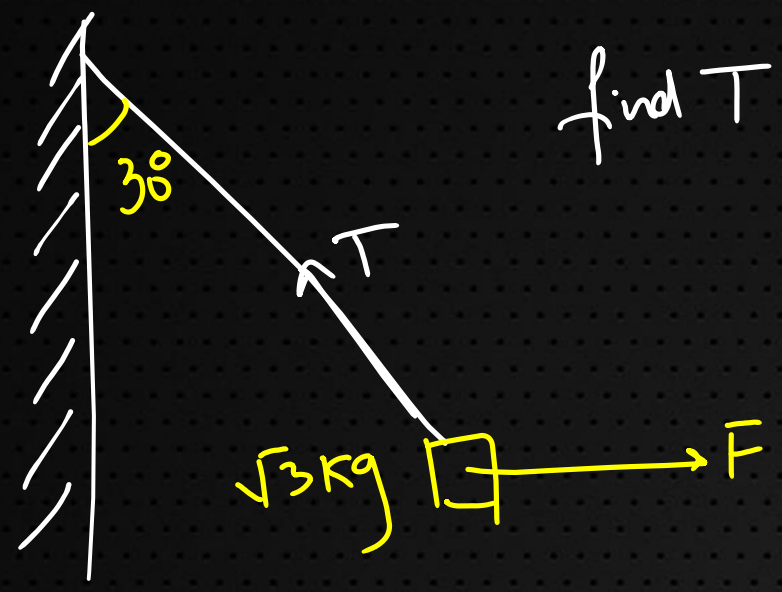
(b) 2π s

(c) π s

(d) 3π s



21.



22. Circular coil of $N=100$ turns, $A = 14 \times 10^{-2} \text{ m}^2$,
 $\omega = 28 \text{ rev/min}$ in B . Find $E_{\text{ind, max}}$
 $B = 2 \text{ T}$



23. Two wave of same intensity interferes for $\Delta\phi=0$ and $I_{max}=I_0$.

$$I_1 \quad \Delta a = \frac{\lambda}{2}, \quad I = I_1, \quad \Delta x = \frac{\lambda}{4}, \quad I = I_2,$$

find $\frac{I_1 + I_2}{I}$.

