GCE A/L 2024 PHYSICS MCQ ELABORATION

PHYSICS BEAST

DECEMBER 27, 2024

AABIDH ALI PHYSICS FOUNDATION

00	10	20	30	40
5	2	4	4	3
1	4	2	2	1
5	5	2	2	1
1	4	3	3	1
5	4	2	3	4
3	1	1	4	1
3	5	1	2	4
2	2	3	3	2
3	4	2	5	4
5	3	5	1	5

GCE A/L Physics – 2024 (Dec).

Aabidh Ali

01) ශබ්දමානය මඟින් (β) = $10 \log_{10}\left(\frac{I}{I_0}\right)$ ⟶ dB.

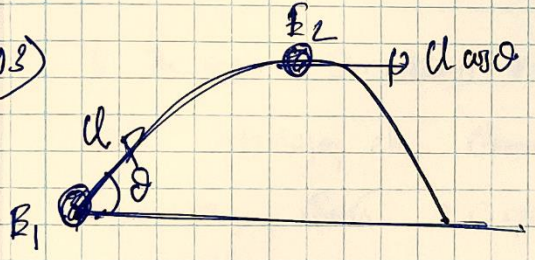
But, උපකල්පනය

∴ ——— 5th

02) 1 MD = $\frac{10}{20}$ mm = 0.5 mm.

∴ LC = $\frac{0.5}{20}$ = 0.025 mm ——— 1st

03)



$E_1 = \frac{1}{2}mu^2$

$E_2 = \frac{1}{2}mu^2\cos^2\theta$.

∴ $\frac{E_2}{E_1} = \frac{1}{4} = \cos^2\theta$

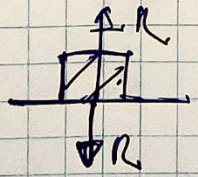
∴ $\cos\theta = \frac{1}{2}$

$\theta = 60^\circ$ ——— 5th

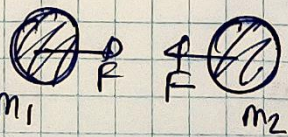
04) ඒකාක්ෂ – ලඝු ගැටීම් විශේෂ

- ඔබ්බට යන අවස්ථාවක් — (1)
- ඔබ්බට නොයන අවස්ථාවක් — (2)

(1) ⇒



(2) ⇒



ඒකාක්ෂ ලඝු ගැටීම් විශේෂයේ උපකල්පන ගැන, ගැටීමෙන් අදිසි, ඒ ගැටීම් වර්ග, වෙනස් වෙන වෙනම ඔබින්න අවශ්‍යයි. වෙනවා.

∴ ——— 1st

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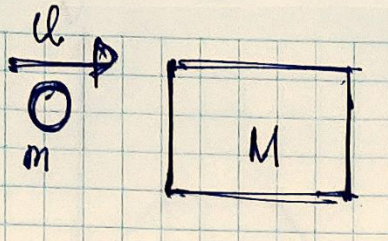
Date: / /

05)



இங்கே ஏற்படுகின்ற விளைவுள் விசை = 0

(A) ✓

∴ (B) ஒரும்பை வெளிக் கற்பு > அணு வெளிக் கற்பு

∴ பொருளைவு கற்பு குறைவாகும். ஆனால், வெளிக் கற்பு மாறுபடாது.

(C) ✓

ஒரு தனிமம் பொருளைவு கற்பினை பெற்றால், அது பொருளைவு கற்பு. ஒரும்பை 2ம் கோளை 2 ஆகும். மாறாமலும், எலக்ட்ரான் மாறாமல்; கோர் 2 ஷெல்களில் ஏதாவது ஒன்று வேலை செய்யலாம். ∴ ——— 3rd or 5th

06)

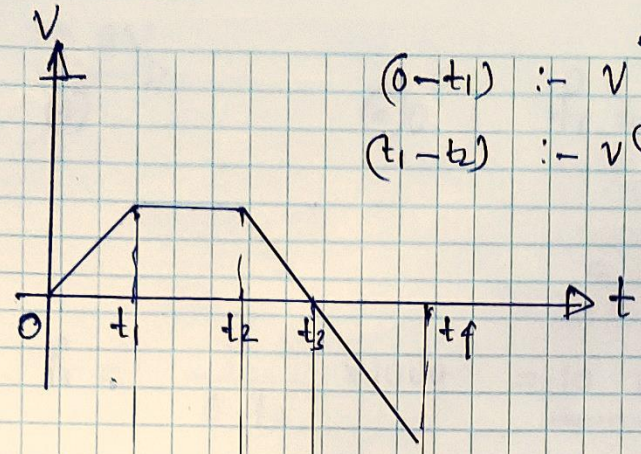
Leptons		Quarks	
(−1)	(பூச்சியம்)	$+\frac{2}{3}\|e\|$	$-\frac{1}{3}\|e\|$
e^-	ν_e	u	d
μ	ν_μ	c	s
τ	ν_τ	t	b.

Lepton அணு ஒரு அடிப்படை துகள்களாகும். ∴ (B) ✗. (A) ✓.

muon இன் குறியீடு e^- ஆகும் என்பதால் ∴ (C) ✓

——— 3rd.

07) (V−t) (S−t)

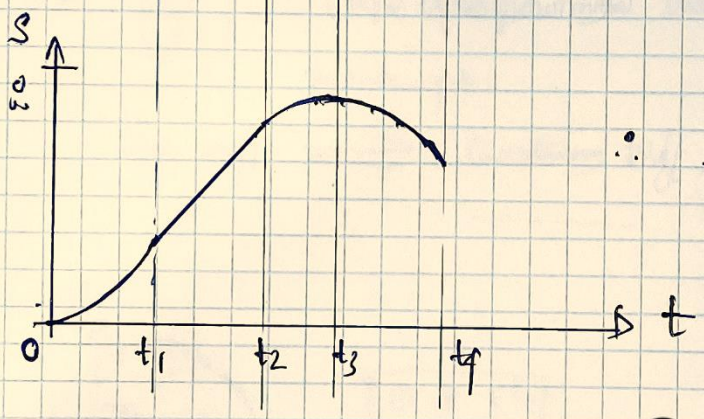


$(0-t_1)$:- V (+) දිශාවට ↑ ∴ ප්‍රවේගය (+) දිශාවට ↑

(t_1-t_2) :- V (+) නියතයි ∴ ප්‍රවේගය (+) දිශාවට නියතයි

(t_2-t_3) :- V (+) දිශාවට ↓ ∴ ප්‍රවේගය (+) දිශාවට ↓.

(t_3-t_4) :- V (−) දිශාවට ↑ ∴ ප්‍රවේගය (−) දිශාවට ↑.



∴ ——— [3 ලකුණු]

08) සූත්‍රයෙන්ම $\tau t = \Delta I\omega$

$|\tau| \times 10 = 8\,(40-20)$.

$|\tau| = 8 \times \frac{20}{10} = \underline{16\ Nm}$

∟ [2 ලකුණු].

09) $M = \frac{f_o}{f_e}$ ∴ $20 = \frac{80}{f_e}$ ∴ $d = (f_o + f_e)$

$(f_o > f_e)$ ∴ $f_e = 4$ cm. $= 80 + 4 = \underline{84\ cm}$

∟ [3 ලකුණු]

10) $0.9v$ → S ⊙ ⊙ O

$$f_r = \left(\frac{v}{v - v_s}\right) \times f_0$$

$$= \left(\frac{v}{v - 0.9v}\right) \times 1000.$$

$$\therefore f_r = \frac{1}{0.1} \times 1000 = 10\ 000\ Hz$$

5th

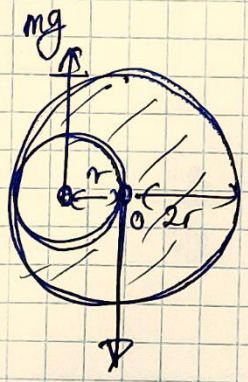
11) $e = -\left(\frac{d\phi}{dt}\right)$. ஒரு ஆரோகுதியொன்றில் ஏற்படும் தூண்டல் தடையாகவே இருக்கும்.

மின் தடுப்பி ⟹ ஏற்படுத்தும் தடுப்பி.

∴

2nd

12)



$m \propto r^2$

O பிழை (G) $mg \times r = 3mg \times x$

$$x = \frac{r}{3}.$$

∴ O இலிருந்து வலப்புறம் $\frac{r}{3}$ தூரத்தில்.

∴ 2r தூரத்தில் G ஆக அதிகரித்து அதே பலம் தருகின்றது.

∴ D

4th

No :

Date: / /

13) $\Delta\beta = 10\log_{10}\left(\frac{I_2}{I_1}\right)$ $I_2 > I_1$ ∴ $(\Delta\beta > 0)$.

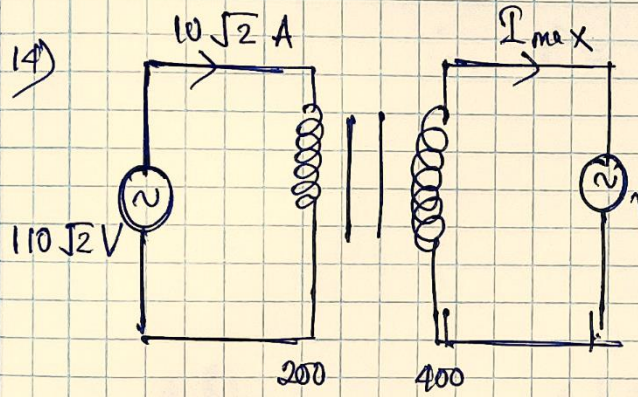
$\therefore (92-72) = 10\log_{10}\left(\frac{I_2}{I}\right)$.

$\therefore \log_{10}\left(\frac{I_2}{I_1}\right) = 2$ $\therefore \frac{I_2}{I_1} = 10^2 = 100$

$\therefore I_2 = 100I$

5th.

14)



$V_{rms} = \frac{V_{max}}{\sqrt{2}}$

$I_{rms} = \frac{I_{max}}{\sqrt{2}}$

$\frac{N_1}{N_2} = \frac{V_1}{V_2}$ $\therefore \frac{200}{400} = \frac{110\sqrt{2}}{V_{max}}$

$\therefore V_{max} = 220\sqrt{2}\ V$.

$\eta = 100\ \%$

$\therefore V_1 I_1 = V_2 I_2$.

$110\sqrt{2} \times 10\sqrt{2} = 220\sqrt{2} \times I_{max}$.

$\therefore I_{max} = 5\sqrt{2}\ A$

$\therefore V_{rms} = 220\ V$ $I_{rms} = 5\ A$

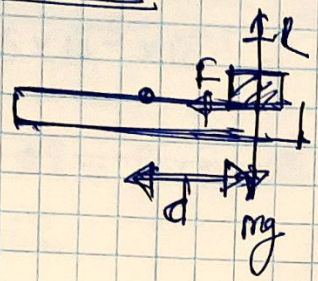
4th

Atlas

No :

Date: ___/___/_____

15) Side view



$\leftarrow$ $R = mg$.

Normal Reaction;

$\mu R = mg = mr\omega^2$

$r = \frac{\mu g}{\omega^2}$

But; $f = \frac{30}{60}$ Hz $= 0.5$ Hz $\quad \therefore \omega = 2\pi \times 0.5 = 3$ rad s^{-1}.

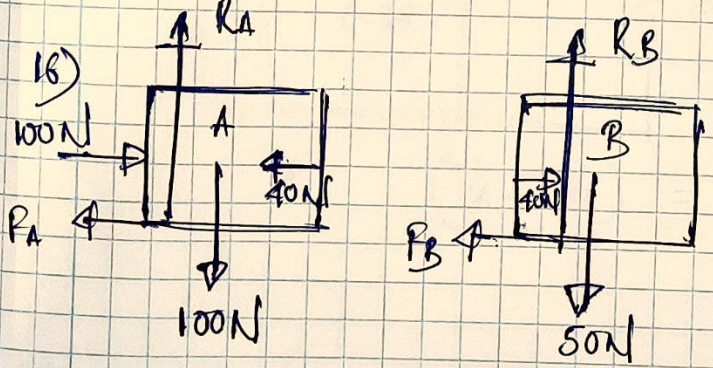
$\therefore r = \frac{0.36 \times 10}{9} = \frac{3.6}{9}$ m

$= \frac{360}{9}$ cm

$= 40$ cm

4th

16)



$F = \mu R$ eqn

$F_A = 0.5 \times 100 = 50$ N.

$F = mg$ eqn :- (A) $\rightarrow$ $100 - (50+40) = 10 \times a$.

$\therefore a = 1$ ms^{-2}.

(B) $\rightarrow$ $40 - F_B = 5 \times 1$

$\therefore F_B = 35$ N.

$\therefore \mu = \frac{35}{50} = 0.7$

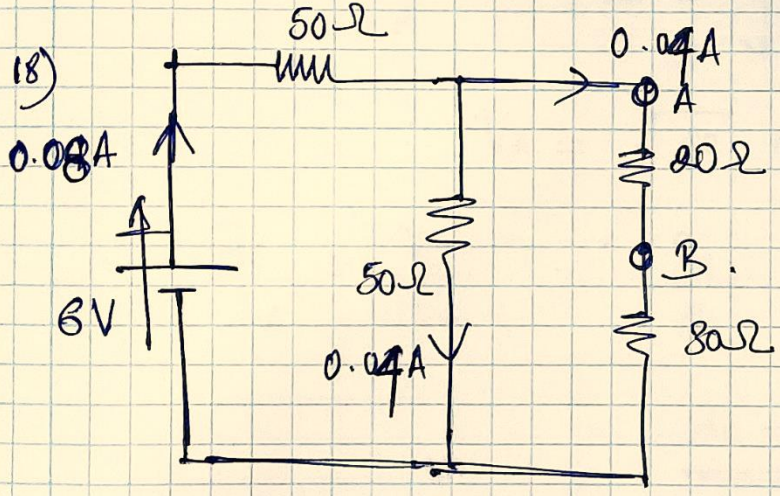
1st

17) $\Delta l = l \alpha \theta$

$5 \times 10^{-5} = 1 \times 1 \times 10^{-5} \times \theta \quad \therefore \theta = 5°C$

5th

18)



Resultant R = 75Ω.

$\therefore I = \frac{6}{75} = 0.08A$

$\therefore (V_A - V_B) = 0.04 \times 20 = 0.8\,V$

2nd

No :

Date: __/__/____

19)

$T_A = 20N$

$T_C = (20 + 25) = 45N$.

$T_B = (20 + 12.5) = 32.5N$.

$V = \sqrt{\frac{T}{m}}$.

කම්බි ඒකක දිගක ස්කන්ධය $(m) = \frac{M}{L} = \frac{2.5}{5} = 0.5$ kg m^{-1}.

20N $\therefore$ $V = f\lambda$ ⊗ f නියතයි.

$\therefore$ $\boxed{V \propto \lambda}$ $\therefore$ $V_A = \sqrt{\frac{20}{0.5}}$, $V_C = \sqrt{\frac{45}{0.5}}$.

$\therefore$ $V_A = \sqrt{40}$ ms^{-1} , $V_C = \sqrt{90}$ ms^{-1}.

$\therefore$ $\frac{\lambda_C}{\lambda_A} = \frac{V_C}{V_A}$ $\therefore$ $\frac{\lambda_C}{2} = \frac{\sqrt{90}}{\sqrt{40}} = \frac{3}{2}$

$\lambda_C = 3$ cm

4th

20) $Y = \frac{FL}{Ae}$ $\therefore$ $e = \frac{FL}{AY}$ $\therefore$ $e \propto \frac{1}{AY}$ $(A = \pi r^2)$

(A) $\Rightarrow$ $AY \propto 2$

(B) $\Rightarrow$ $AY \propto 8$ $\therefore$ (C) කම්බි දිගට අඩුම

(C) $\Rightarrow$ $AY \propto 1$ (B) කම්බි දිගට වැඩිම.

(D) $\Rightarrow$ $AY \propto 4$.

Atlas

3rd

No :

Date: __/__/____

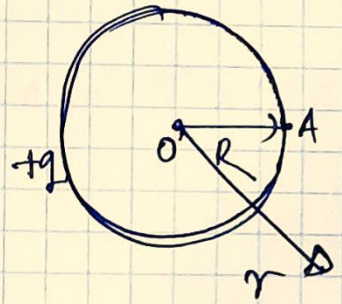
21) $F = T \times L$

$0.04 = T \times (2\pi \times 2 \times 10^{-2}) \times 2$ — 2 இருமடங்கு வேறுபடும்.

$\therefore T = \frac{1}{2\pi}$ N m^{-1}

4th

22)



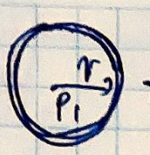
$(O \rightarrow A)$ $V = \frac{1}{4\pi\varepsilon_0} \cdot \left(\frac{q}{R}\right)$.

$(A \rightarrow \infty)$ $V = \frac{1}{4\pi\varepsilon_0} \cdot \left(\frac{q}{r}\right)$.

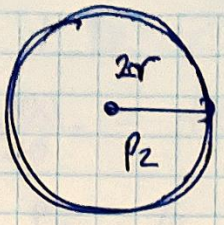
2nd

No: Date: / /

28)



π



π

$P_1 - \pi = \frac{4T}{r}$ $\quad\quad$ $P_2 - \pi = \frac{4T}{2r}$.

$\therefore \quad P_1 = \pi + \frac{4T}{r}$ $\quad\quad$ $P_2 = \pi + \frac{2T}{r}$.

$\therefore \quad (P_1 > P_2)$ $\quad\quad$ $\therefore$ (A) X.

$E_A = T \times (4\pi r^2) \times 2$ $\quad\quad$ $E_B = T \times (4\pi \cdot 4r^2) \times 2$

$\therefore \quad \frac{E_B}{E_A} = 4.$ $\quad\quad$ $E_B = 4E_A$

$\therefore$ (B) ✓.

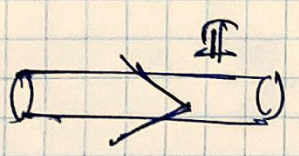
$V_A = \frac{4}{3}\pi r^3$, $\quad V_B = \frac{4}{3}\pi \times (8r^3)$.

$\frac{V_B}{V_A} = 8$ $\quad\quad$ $\therefore V_B = 8V_A$

$\therefore$ (C) X.

2nd

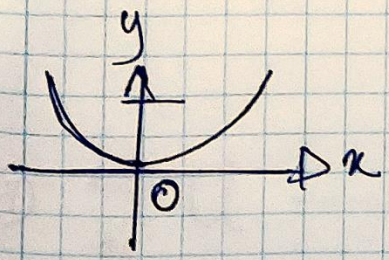
29)



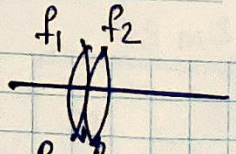
$P = I^2 R.$ $\quad$ (R constant).

$\uparrow$

$Y = Q x^2.$ $\quad \begin{pmatrix} Y \to P \\ x \to I \end{pmatrix}$,



3rd.

25) 

$P_1 + P_2 = P_0$.

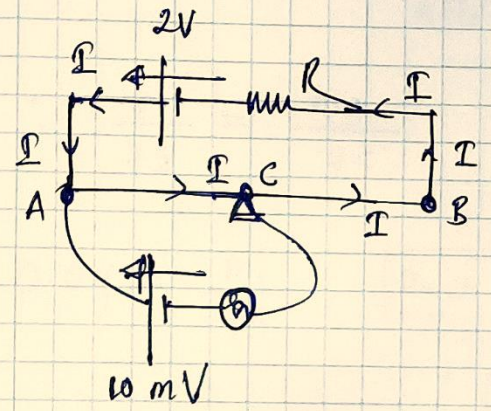
$P_1 = \frac{100}{20} = +5\,D$.

$\therefore P_2 = (3-5) = -2\,D$.

$\therefore$ Diverging.

$\therefore f_2 = \frac{100}{2} = +50\,cm$

2nd

26) 

$V_{AB} = \left(\frac{2}{R+10}\right) \times 10$ —— (1)

$V_{AC} = 10 \times 10^{-3}$ —— (2).

Ans; $V \propto l$

$\therefore \frac{20}{R+10} \propto 100$ —— (3)

$10 \times 10^{-3} \propto 40$ —— (4)

$\therefore \frac{(4)}{(3)} \Rightarrow \frac{2}{5} = \frac{1 \times 10^{-2}(R+10)}{4}$

$\therefore 800 = R+10 \quad R = 790\,\Omega$

187

27) $^{235}_{92}U \longrightarrow ^{231}_{91}Pa + ^{4}_{+2}\alpha + ^{0}_{-1}e^{n}$

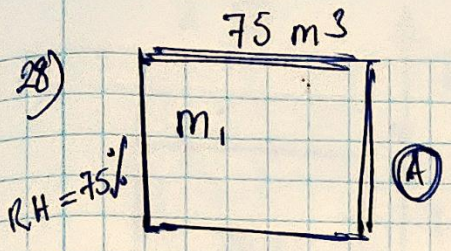
$\therefore$ ——

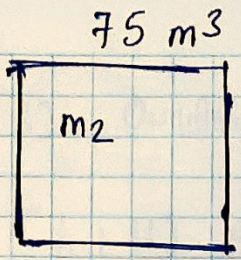
187

No :

Date: / /

28)





$AH = 0.04 \text{ kg m}^{-3}$ $\qquad AH = AH_0$ $\qquad RH = \frac{AH}{AH_0} \times 100\%$

(A) $\Rightarrow \quad 0.75 = \frac{0.04}{AH_0}$

$\therefore \quad AH_0 = \frac{4}{75} \text{ kg m}^{-3}$.

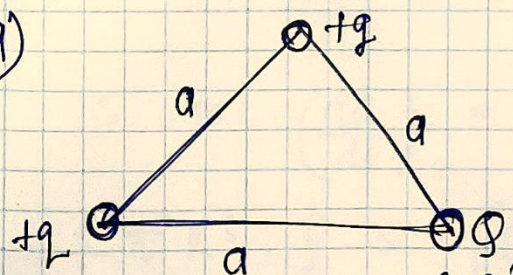
$\therefore \quad \frac{4}{75} = \frac{m_2}{75}$ $\qquad \boxed{m_2 = 4 \text{ kg}}$

But;

$0.04 = \frac{m_1}{75}$ $\qquad \boxed{m_1 = 3 \text{ kg}}$

$\therefore (m_2 - m_1) = 1 \text{ kg}$ ——— 3rd

29)



ඇවිල්ලක් ඇතිවෙද්දී ඇතිවෙන විදුලි ආරෝපණ ප්‍රමාණය = 0

$\therefore \quad \frac{1}{4\pi\varepsilon_0} \cdot \left(\frac{q^2}{a} + \frac{q \cdot Q}{a} + \frac{q \cdot Q}{a} \right) = 0$

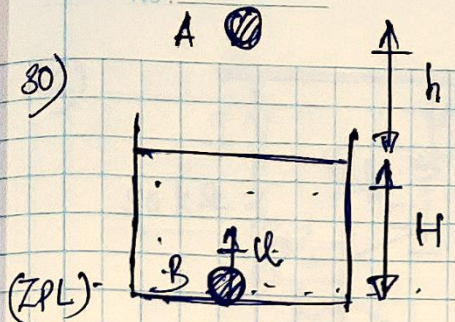
$\therefore \quad 2Q = -q$

$Q = \frac{-q}{2}$ ——— 2nd

No :

Date: __/__/____

30)



(A, B) ඔප්පු කිරීමට ගනිමු.,

$mg(h+H) = U \times H$.

$\rho \cdot V g (h+H) = \rho \cdot V g \times H$.

$h = \frac{\rho H}{\rho} - H = \left(\frac{\rho}{\rho} - 1\right) \cdot H$

5th

31) විකිරණ සීඝ්‍රතාව $= \left(\frac{dQ}{dt}\right)$.

$\frac{dQ}{dt} \propto (\theta - \theta_R)$ (NCL).

$\therefore \frac{dQ}{dt} = k \cdot A \cdot (\theta - \theta_R)$.

$\therefore ms \cdot \left(\frac{d\theta}{dt}\right) = kA \cdot (\theta - \theta_R)$.

$\frac{4}{3}\pi R^3 \cdot \rho \cdot s \times \left(\frac{d\theta}{dt}\right) = k \cdot (4\pi R^2)(\theta - \theta_R)$.

$\therefore \left[\left(\frac{d\theta}{dt}\right) \propto \frac{1}{R}\right]$ R ට ප්‍රතිලෝමව සමානුපාතික වේ.

$\therefore \dot{\theta}_A \propto \frac{1}{r}$ ——— (1)

$\dot{\theta}_B \propto \frac{1}{2r}$ ——— (2). $\therefore \frac{\dot{\theta}_A}{\dot{\theta}_B} = 2$.

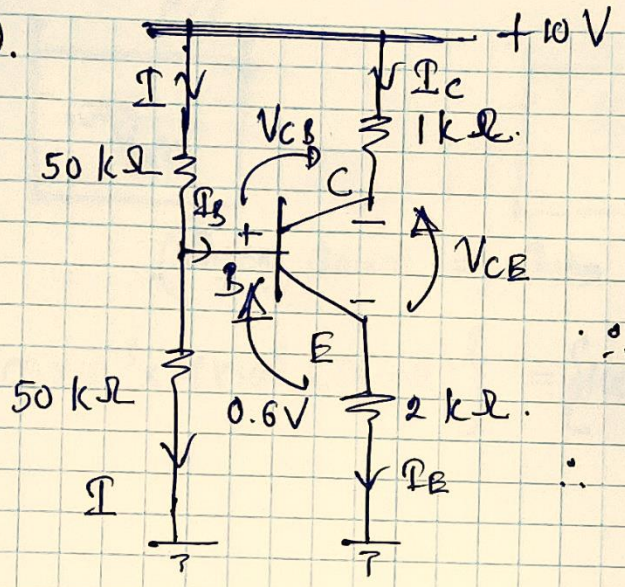
$\therefore \dot{\theta}_A = 2\dot{\theta}_B$

4th

No :

Date: ___/___/_____

32).



$I_B \simeq 0 \quad (I_B \neq 0)$.

$\therefore (I_C \simeq I_E)$

$\therefore V_B = +5V$.

$\therefore V_E + 0.6 = V_B$.

$\therefore V_E = 4.4V$.

$\therefore I_E = \left(\frac{4.4 - 0}{2}\right) = 2.2\ mA$.

$\therefore I_C \simeq 2.2\ mA$

$\therefore 10 - (2.2 \times 1) - V_{CE} = 4.4$.

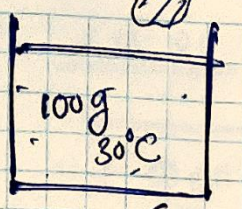
$\therefore V_{CE} = 10 - 6.6 = \underline{\underline{3.4\ V}}$

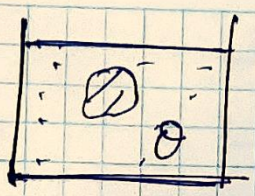
2nd

No:

Date: __/__/____

33) $-10^\circ C$ 100g





(இழந்த வெப்பம் = பெற்ற வெப்பம்)

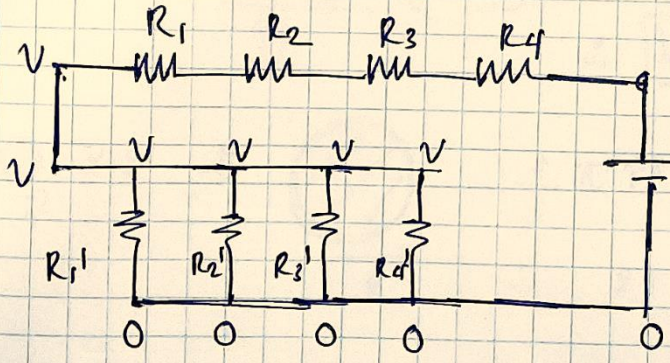
$\therefore \{100\times10^{-3}\times4\times10^{3}(30-\theta)\} = \{100\times10^{-3}\times2\times10^{3}(0+10)\}$
$+\{100\times10^{-3}\times(3\times10^{5})\}$
$+\{100\times10^{-3}\times4\times10^{3}\theta\}$

$\therefore \quad \theta = -25^\circ C$ ※ since, $(-25^\circ C < -10^\circ C)$

இதில் பனிக்கட்டி அனைத்தும் கரைந்து முடிவடையவில்லை

$\therefore \quad \underline{\underline{\theta = 0^\circ C}}$ ——— 2nd

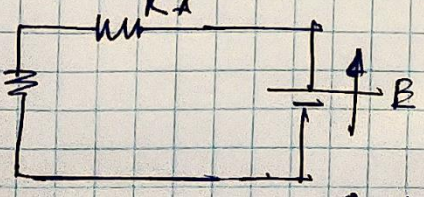
34)



⇒ தொடரில் உள்ள ஒவ்வொரு மின்கலத்தின் குறுக்கே ΔV சமன். But; R சமனாக இல்லாமல் இருக்கலாம். ∴ மின்னோட்டம் மாறலாம் ∴ 1) X.

⇒ ஒரேப் பக்கம் உள்ள மின்கலத்தின் குறுக்கே ΔV சமனாக இருந்தாலும் இருக்கலாம் (R மாறும்).
∴ 2) X.

≡



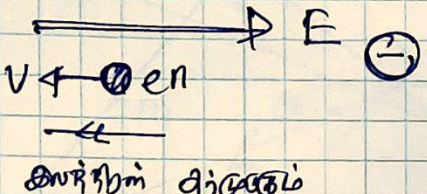
R_A ⇒ ஒரேப் பக்கம் உள்ள மின்தடை

R_B ⇒ தொடரில் உள்ள மின்தடை.

∴ மின்னோட்டம் தரும் மின்தடை $(R) = (R_A + R_B)$

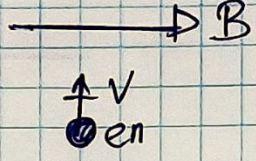
But; $R_A = (R_1 + R_2 + R_3 + R_4)$ ∴ ——— 3rd

35) 2Ⓑ 01



அசைந்தும் திருப்பும்

2Ⓑ 02.



நேரான பாதையில் திரும்பும்.

$\lambda_D = \frac{h}{mV}$ m = நியூத்திரனின் நிறை.

V = நியூத்திரனின் வேகம்.

2Ⓑ (01) இல் en இன் வேகம் ↑. ∴ λ_D ↓.

2Ⓑ (02) இல் en இன் வேகம் மாறாது ∴ λ_D மாறாது.

∴ ——— 3rd.

36) $V_T = \frac{2r^2 g}{9\eta}(\sigma - \rho)$.

∴ $V_T \propto r^2$

$\vec{r}$ × 8 ⇒ 

$\frac{4}{3}\pi r^3 \times 8 = \frac{4}{3}\pi R^3$.

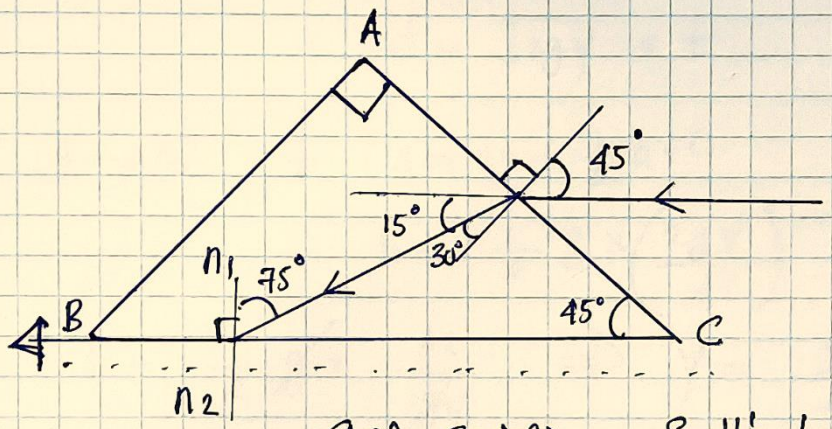
∴ $2r = R$.

∴ $8 \propto r^2$ ——— (1)

$V \propto 4r^2$ ——— (2).

∴ $V = 32\ cm\ s^{-1}$ ——— 4th.

37)



(AC) ගොඩකිරීම, Snell's Law $n\sin i = k$.

$1 \times \sin 45^\circ = n_1 \times \sin 30^\circ$

$\therefore n_1 = \dfrac{\sin 45^\circ}{\sin 30^\circ}$ ——— (1).

(BC) ගොඩකිරීම, Snell's Law $n\sin i = k$.

$n_1 \sin 75^\circ = n_2 \times \sin 90^\circ$

$\therefore n_2 = \dfrac{\sin 45^\circ}{\sin 30^\circ} \times \sin 75^\circ$

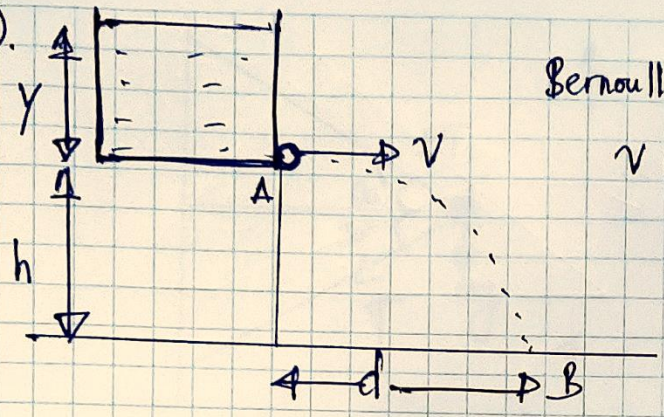
$= \dfrac{2}{\sqrt{2}} \sin 75^\circ = \underline{\sqrt{2} \sin 75^\circ}$

2nd

No :

Date: __/__/____

38).



Bernoulli's Theorem ⇒ ; $v = \sqrt{2gy}$.

$(A \rightarrow B)$ → $s = ut + \frac{1}{2}at^2$.

$d = \sqrt{2gy} \times t$

$(A \rightarrow B)$ ↓ $s = ut + \frac{1}{2}at^2$.

$h = \frac{1}{2} g \times \left(\frac{2gy}{d^2}\right)^{-1}$

$h = \frac{1}{2} g \times \frac{d^2}{2gy} \Rightarrow y = \frac{d^2}{4h}$ ——— 3rd

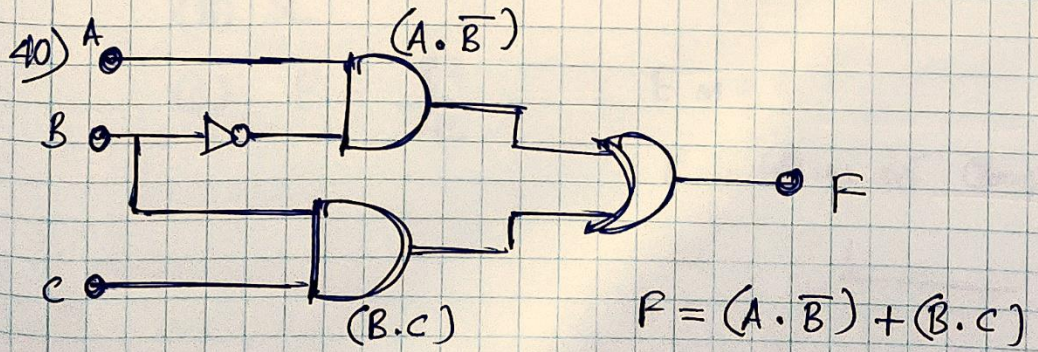
39) $\underline{F} = m\underline{a}$

$Bqv = \frac{mv^2}{r}$ $\therefore mv = (Bqr)$.

$\therefore \frac{m_2 v_2}{m_1 v_1} = \frac{q_2 r_2}{q_1 r_1} = \frac{qq \times 2r}{2q \times qr} = 1$.

$\therefore$ ——— 5th

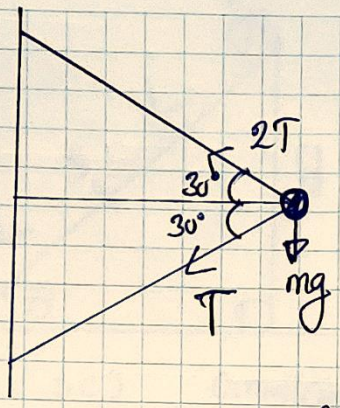
40)



$F = (A \cdot \bar{B}) + (B \cdot C)$

——— 1st

41)



$\uparrow \quad 2T\sin 30^\circ = T\sin 30^\circ + mg.$

$\therefore \frac{T}{2} = mg.$

$T = 2mg \quad \text{——} (1).$

$\leftarrow \quad R = mg.$

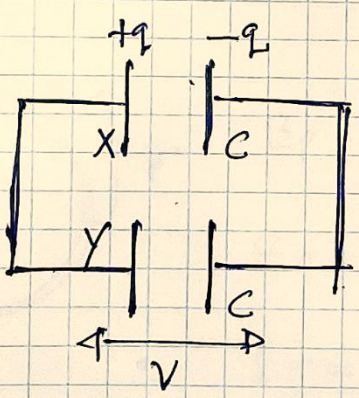
$2T\cos 30^\circ + T\cos 30^\circ = m \times \sqrt{3} \times \omega^2.$

$\therefore \quad 3T\,\frac{\sqrt{3}}{2} = m\sqrt{3}\,\omega^2$

$\frac{3}{2} \times 2mg = m\omega^2 \qquad \omega = \sqrt{3g}.$

∴ 3rd

42)



Outer potential $\equiv \left(\frac{q+0}{2C}\right)$ (V).

$\therefore \quad q_x = \frac{q}{2C} \times C = \left(\frac{q}{2}\right).$

$q_y = \frac{q}{2C} \times C = \left(\frac{q}{2}\right)$

∴ (A) ✓

(B) ✗

(C) $E = \frac{q^2}{2\varepsilon} \qquad \therefore E \propto q^2$

$\therefore$ E (4) ලොකු වෙනවා (Becomes bigger).

∴ 1 ✗

No :

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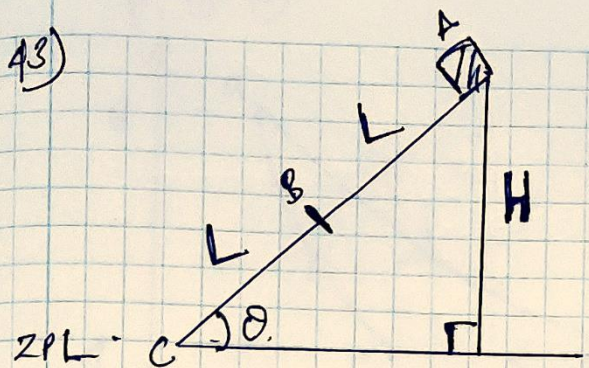
43)



$R = mg\cos\theta$.

$F = \mu R$

$F = \mu mg\cos\theta$.

(A → B → C) Work-energy theorem,

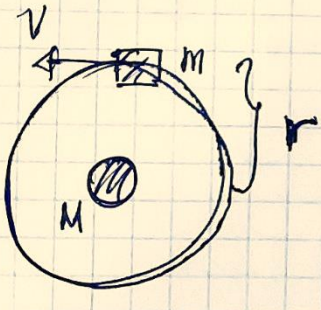
$mgH = 0 + 0 + \mu mg\cos\theta \times L$

$\mu = \frac{H}{L\cos\theta} = \frac{2H}{2L\cos\theta} = 2 \times \frac{\sin\theta}{\cos\theta}$

$\therefore \mu = 2\tan\theta$

1 st

44)



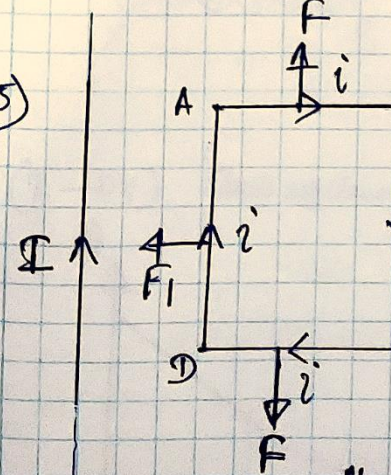
$E_P = -\frac{GMm}{r}$, $E_K = \frac{GMm}{2r}$

$E_T = -\frac{GMm}{2r}$

$\therefore E_T = -E_K$

1 st

45)



$F_{NET} = (F_1 - F_2)$

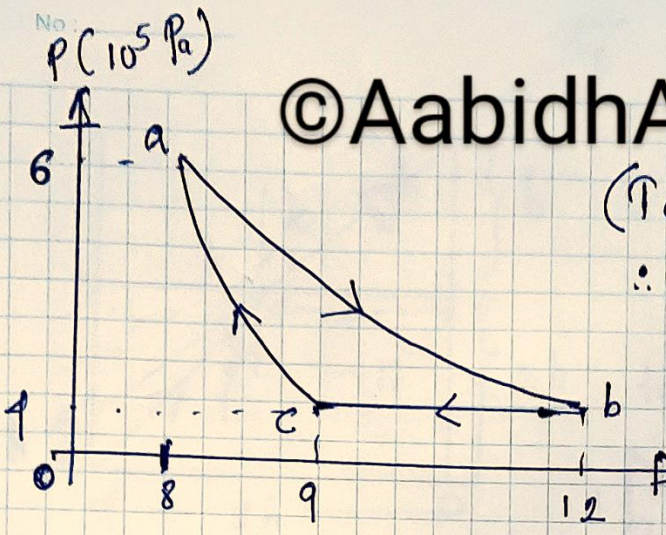
$F_1 = \frac{\mu_0 I i}{2\pi r} \times b$

$F_2 = \frac{\mu_0 I i}{2\pi(r+a)} \times b$.

$\therefore (F_1 - F_2) = \frac{\mu_0 I i b}{2\pi}\left(\frac{1}{r} - \frac{1}{r+a}\right)$.

4th

46)



$(T_a = T_b)$ (PV ගුණිතය සමාන)

$\therefore U_a = U_b$.

$PV = nRT \Rightarrow PV \propto T$.

$\therefore PV_{(a)} = 48 \times 10^2 \quad \therefore 48 \propto 600$ —— ①

$PV_{(c)} = 36 \times 10^2 \quad 36 \propto T$ —— ②

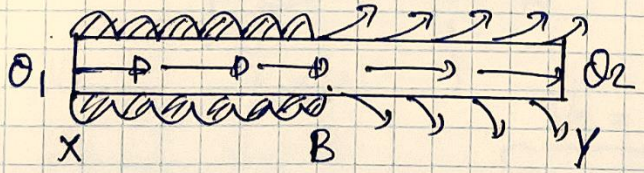
$\frac{②}{①} \Rightarrow \frac{T}{600} = \frac{36}{48}^{3}_{4}$

$T = 450\ K$.

$= 177^\circ C$

—— 1 ——— 1st

47)

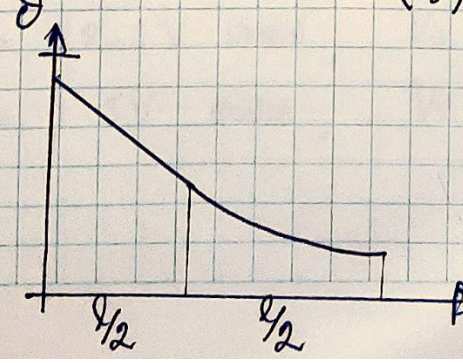


$(X \to B)\left(\frac{Q}{t}\right) = K \cdot A \cdot \left(\frac{\Delta Q}{x}\right)$.

$\therefore (X \to B)\left(\frac{\Delta Q}{x}\right)$ නියතයි.

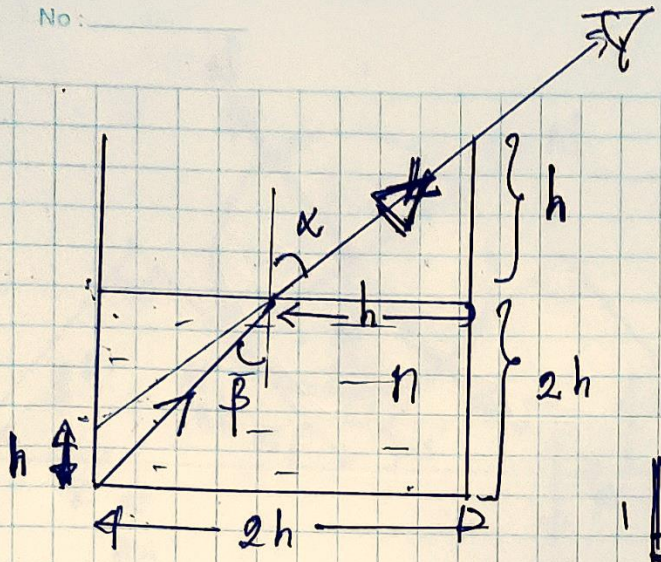
$(B \to Y)$ තාපය ඇවිත් යන ප්‍රමාණය $\left(\frac{Q}{t}\right)$ සෑම විටම සමානයි.

$\therefore \left(\frac{\Delta Q}{x}\right)$ සමානයි.



——— 4th.

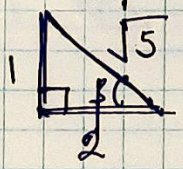
48)



$\tan\alpha = 1$

$\therefore \sin\alpha = \frac{1}{\sqrt{2}}$ —— (1)

$\tan\beta = \frac{1}{2}$.



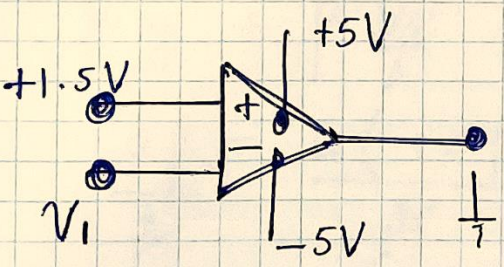
$\therefore \sin\beta = \frac{1}{\sqrt{5}}$ —— (2)

$\therefore$ Snells Law ய்., $1 \times \sin\alpha = n \times \sin\beta$.

$1 \times \frac{1}{\sqrt{2}} = n \times \frac{1}{\sqrt{5}}$.

$n = \sqrt{\frac{5}{2}}$ —— 2nd

49)



$V_{in} = (V_{(+)} - V_{(-)})$

$= (1.5 - V_1)$

$V_o = 10^5 V_{in}$

$\boxed{V_o = 10^5 (1.5 - V_1)}$

$V_1 = +2.5V$ ஆனால் $V_o = -1 \times 10^5$ ✻ $\therefore V_o = -5V$.

$V_1 = -2.5V$ ஆனால், $V_o = 4 \times 10^5$ ✻ $\therefore V_o = +5V$.

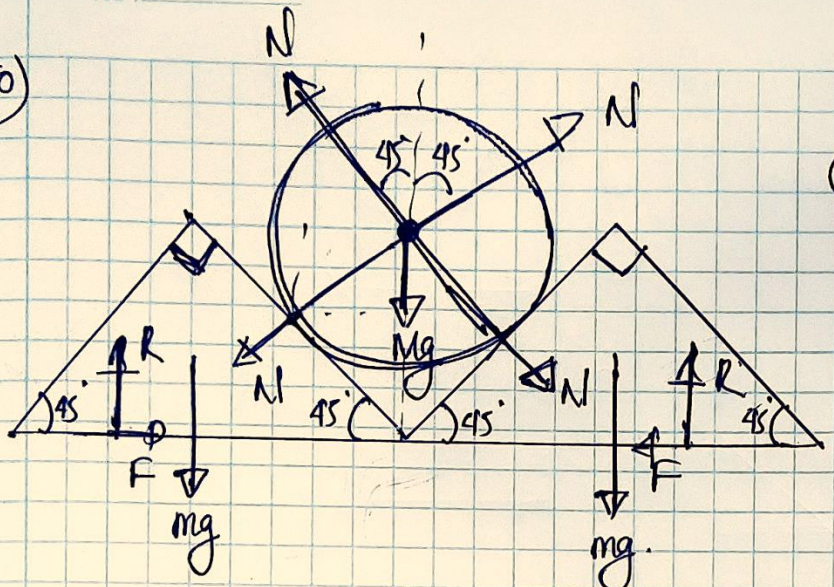
$V_1 = 1.5V$ ஆனால், $V_o = 0$

—— 4th

No :

Date: __/__/____

80)



(2 Forces)

$\uparrow 2N\cos 45^\circ = Mg.$

$N = \frac{\sqrt{2}\,Mg}{2}$ ——— (1).

(Sphere) :- $\uparrow R = mg + N\cos 45^\circ$

$= mg + \left(\frac{Mg}{2}\right)$

(Rod) :- $\rightarrow F = N\sin 45^\circ$

$\mu\left(mg + \frac{Mg}{2}\right) = \frac{\sqrt{2}\,Mg}{2} \times \frac{1}{\sqrt{2}}$

$\mu mg + \mu\frac{Mg}{2} = \frac{Mg}{2}$

$\frac{2\mu m}{2} = \frac{M(1-\mu)}{2}$

$M = \left(\frac{2\mu m}{1-\mu}\right)$ ——— 5th