

# FIZIKA

11

FIZIKA

11

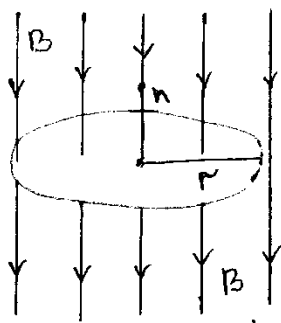


$$F=qBv\sin\alpha$$

11-sinf fizika masalalari yechimlari!

1-mashq

1° - Ber.  
 $r = 4 \text{ sm} = 4 \cdot 10^{-2} \text{ m}$   
 $B = 0,5 \text{ Ts}$   
 $\alpha = 0^\circ$   $\alpha \rightarrow n \wedge B$



$\Phi = B S \cos \alpha$  n-normal

$\Phi = B \cdot \pi r^2 \cdot \cos 0^\circ$   
 $\Phi = 0,5 \cdot 3,14 \cdot 16 \cdot 10^{-4} \cdot 1 = 25,12 \cdot 10^{-4} \text{ Vb}$

Javob:  $\Phi = 2,512 \text{ mVb}$

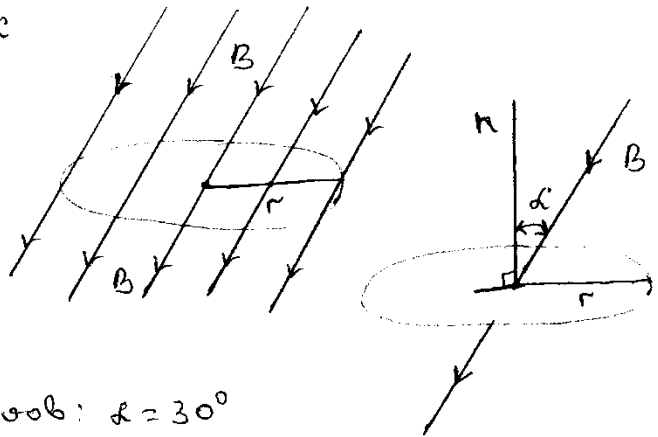
$\Phi (\text{mVb}) = ?$

2° - Ber. = Abdubannanov Akramjon =

$B = 4 \text{ Ts}$   
 $S = 250 \cdot 10^{-4} \text{ m}^2$   
 $\Phi = 87 \cdot 10^{-3} \text{ Vb}$

$\Phi = B S \cdot \cos \alpha$

$\alpha \rightarrow n \wedge B$

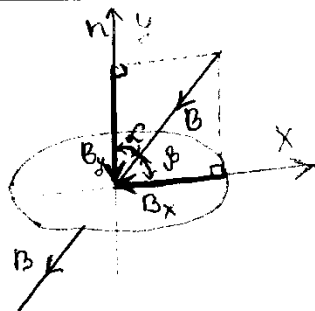


$\alpha = ?$   $\cos \alpha = \frac{\Phi}{B S}$   
 $\cos \alpha = \frac{87 \cdot 10^{-3}}{4 \cdot 250 \cdot 10^{-4}} = 0,87 \approx \frac{\sqrt{3}}{2}$   
 $\cos \alpha = \frac{\sqrt{3}}{2}$   $\alpha = 30^\circ$

Javob:  $\alpha = 30^\circ$

3° - Ber.  
 $B = 50 \cdot 10^{-3} \text{ Ts}$   
 $\beta = 30^\circ \rightarrow \alpha = 0^\circ$

$B_y = ?$



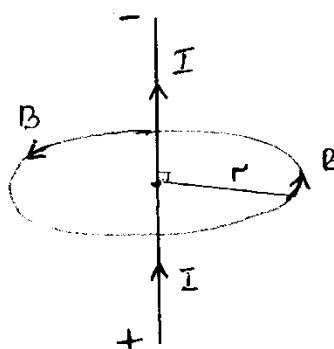
1°  $B_y$  - B ni normal tashkil etuvchisi. U yuzani tik kesib o'tib oqim hosil qiladi  
 2°  $B_x$  - B ni gorizontal tashkil etuvchisi. U yuzani kesib o'tmaydi. Yuzada oqim hosil qilmaydi.

$\frac{B_y}{B} = \cos \alpha$

$B_y = B \cdot \cos \alpha$

$B_y = 50 \cdot 10^{-3} \cdot \cos 60^\circ = 50 \cdot 10^{-3} \cdot \frac{1}{2} = 25 \text{ mTs}$  Javob:  $B_y = 25$

4° - Ber.  
 $I = 5 \text{ A}$   
 $r = 2 \text{ sm} = 2 \cdot 10^{-2} \text{ m}$   
 $B = ?$



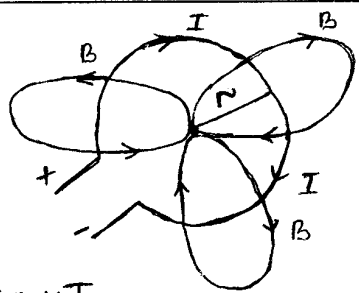
$B = \mu_0 \frac{I}{2 \pi r}$

Bio - Savar - Laplas qonuni  
 $\mu_0 = 4 \pi \cdot 10^{-7}$

$B = 4 \pi \cdot 10^{-7} \frac{5}{2 \pi \cdot 2 \cdot 10^{-2}} = 5 \cdot 10^{-5} \text{ Ts}$

Javob:  $B = 50 \mu \text{ Ts}$   $1 \mu = 10^{-6}$

5°-Ber  
 $r = 5 \cdot 10^{-2} \text{ m}$   
 $I = 3 \text{ A}$



$$B = \mu_0 \mu \frac{I}{2R}$$

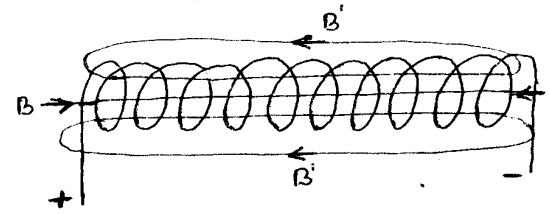
$\mu$ -muhitning magnit singdiruvchanligi:  
 $\mu = 1$

$$B = 4 \cdot 3,14 \cdot 10^{-7} \cdot \frac{3}{2 \cdot 5 \cdot 10^{-2}} = 37,68 \cdot 10^{-6} \text{ T}$$

$B = ?$

Javob:  $B = 37,68 \mu\text{T}$

6°-Ber.  
 $r = 10 \cdot 10^{-2} \text{ m}$   
 $N = 500$   
 $B = 25 \cdot 10^{-3} \text{ Ts}$



$$B = \frac{\mu_0 \mu I N}{2R}$$

$$I = \frac{2RB}{\mu_0 \mu N}$$

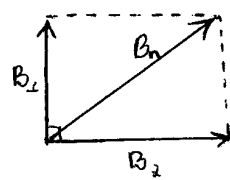
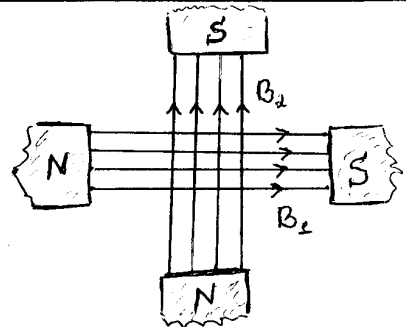
$\mu = 1$

$$I = \frac{2 \cdot 10 \cdot 10^{-2} \cdot 25 \cdot 10^{-3}}{4 \cdot 3,14 \cdot 500 \cdot 10^{-7}} = 7,9 \text{ A}$$

Javob:  $I \approx 8 \text{ A}$

$I = ?$

7°-Ber  
 $B_1 = 3 \text{ mTs}$   
 $B_2 = 4 \text{ mTs}$   
 $B_n = ?$

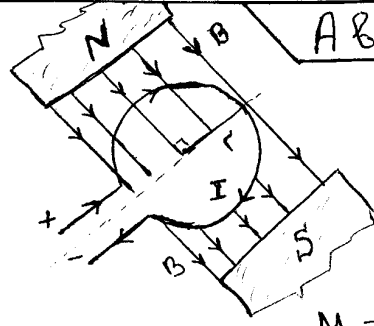


$$B_n = \sqrt{B_1^2 + B_2^2}$$

$$B_n = \sqrt{3^2 + 4^2} = 5 \text{ mTs}$$

Javob:  $B_n = 5 \text{ mTs}$

8°-Ber  
 $r = 10 \cdot 10^{-2} \text{ m}$   
 $B = 20 \cdot 10^{-3} \text{ Ts}$   
 $I = 2 \text{ A}$   
 $M = ?$



Abdubannanov Akramjon

$$M = I B S \cdot \sin \alpha$$

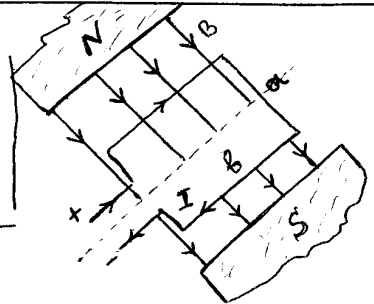
$$d \rightarrow B \uparrow r$$

$$M = I B \cdot \pi r^2 \cdot \sin 90^\circ$$

$$M = 2 \cdot 20 \cdot 10^{-3} \cdot 3,14 \cdot 100 \cdot 10^{-4} \cdot 1 = 1256 \cdot 10^{-6}$$

Javob:  $1,26 \text{ mN}\cdot\text{m}$

9°-Ber  
 $a = 4 \cdot 10^{-2} \text{ m}$   
 $b = 8 \cdot 10^{-2} \text{ m}$   
 $B = 2 \text{ Ts}$   
 $I = 0,5 \text{ A}$   
 $M = ?$



$$M = I B S \cdot \sin \alpha$$

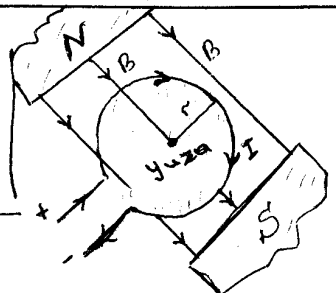
$\alpha = 90^\circ$

$$M = I B \cdot a \cdot b \cdot \sin 90^\circ$$

$$M = 0,5 \cdot 2 \cdot 4 \cdot 10^{-2} \cdot 8 \cdot 10^{-2} \cdot 1 = 32 \cdot 10^{-4} \text{ N}\cdot\text{m}$$

Javob:  $M = 3,2 \text{ mN}\cdot\text{m}$

10°-Ber  
 $S = 80 \cdot 10^{-4} \text{ m}^2$   
 $M = 7,2 \cdot 10^{-3} \text{ N}\cdot\text{m}$   
 $I = 0,2 \text{ A}$   
 $B = ?$



$$M = I B S \cdot \sin \alpha$$

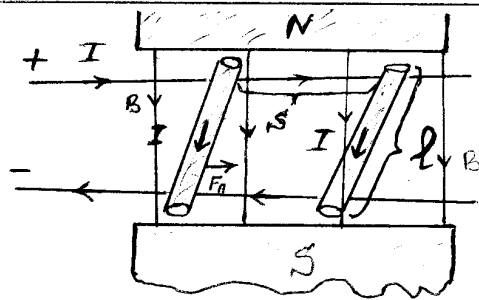
$\alpha = 90^\circ$

$$B = \frac{M}{I \cdot S \cdot \sin 90^\circ}$$

$$B = \frac{7,2 \cdot 10^{-3}}{0,2 \cdot 80 \cdot 10^{-4} \cdot 1} = 4,5 \text{ Ts}$$

Javob:  $B = 4,5 \text{ Ts}$

11°-Ber  
 $B = 200 \cdot 10^{-3} \text{ T}$   
 $l = 50 \cdot 10^{-2} \text{ m}$   
 $I = 4 \text{ A}$   
 $S = 3 \cdot 10^{-2} \text{ m}$



1° Bunda Amper kuchi ish bajaradi.

$$F_A = I B l \cdot \sin \alpha$$

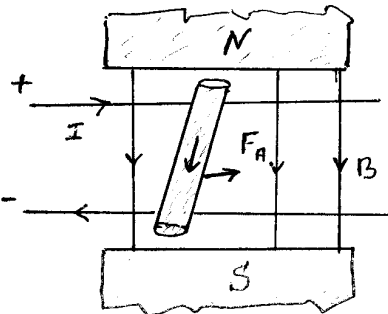
$$\alpha \rightarrow B \perp l \quad \alpha = 90^\circ$$

2° Bajarilgan ish

$$A = F_A \cdot S$$

Javob: 2  
 $A = 12 \text{ mJ}$

12°-Ber  
 $B = 0,1 \text{ T}$   
 $\alpha = 90^\circ$   
 $l = 10 \cdot 10^{-2} \text{ m}$   
 $I = 2 \text{ A}$



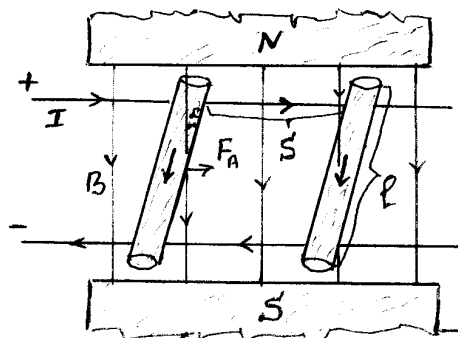
Ötkazgichga Amper kuchi ta'sir qiladi.

$$F_A = I B l \sin \alpha$$

$$F_A = 2 \cdot 0,1 \cdot 10 \cdot 10^{-2} \cdot 1 = 2 \cdot 10^{-2} \text{ N}$$

Javob:  $F_A = 20 \text{ mN}$

13°-Ber  
 $l = 25 \cdot 10^{-2} \text{ m}$   
 $I = 4 \text{ A}$   
 $B = 1,2 \text{ T}$   
 $\alpha = 45^\circ$   
 $S = 3 \cdot 10^{-2} \text{ m}$



$$A = F_A \cdot S$$

$$A = I \cdot B \cdot l \cdot \sin \alpha \cdot S$$

$$A = 4 \cdot 1,2 \cdot 25 \cdot 10^{-2} \cdot 1 \cdot 3 \cdot 10^{-2} = 2,545 \cdot 10^{-2}$$

Javob:  $A = 25,5 \text{ mJ}$

A = ?

Abdubannanov Akramjon

14°-Ber  
 $l = 40 \cdot 10^{-2} \text{ m}$   
 $I = 2,5 \text{ A}$   
 $\alpha = 90^\circ$   
 $S = 8 \cdot 10^{-2} \text{ m}$   
 $A = 32 \cdot 10^{-3} \text{ J}$

Masala  
 chizmasi  
 11-masala  
 chizmasi  
 kabi  
 bo'ladi!

$B = ?$

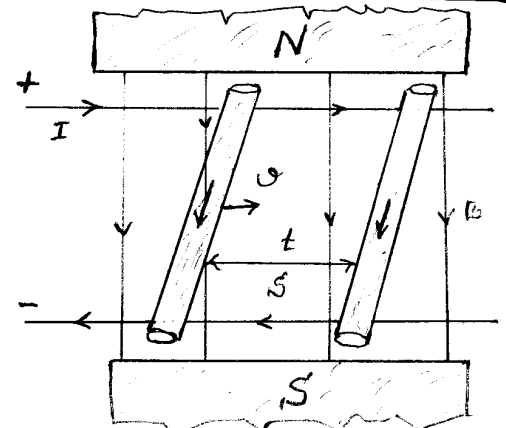
$$A = I B l \sin \alpha \cdot S$$

$$B = \frac{A}{I \cdot l \cdot S \cdot \sin 90^\circ}$$

$$B = \frac{32 \cdot 10^{-3}}{2,5 \cdot 40 \cdot 10^{-2} \cdot 8 \cdot 10^{-2} \cdot 1} = 0,4 \text{ T}$$

Javob:  $B = 0,4 \text{ T}$

15°-Ber  
 $l = 40 \cdot 10^{-2} \text{ m}$   
 $B = 2,5 \text{ T}$   
 $v = 12 \cdot 10^{-2} \frac{\text{m}}{\text{c}}$   
 $t = 3 \text{ c}$   
 $\alpha = 90^\circ$   
 $S = 8 \cdot 10^{-2} \text{ m}$   
 $A = 144 \cdot 10^{-3} \text{ J}$



$$I = ? \quad A = F_A \cdot S = F_A \cdot v \cdot t$$

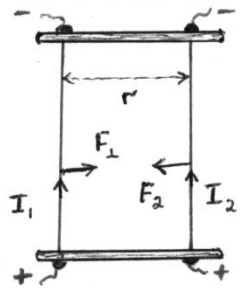
$$A = I B l \cdot \sin \alpha \cdot v \cdot t$$

$$I = \frac{A}{B \cdot l \cdot \sin 90^\circ \cdot v \cdot t} = \frac{144 \cdot 10^{-3}}{2,5 \cdot 40 \cdot 10^{-2} \cdot 1 \cdot 12 \cdot 10^{-2} \cdot 3} = 0,4 \text{ A}$$

Javob:  $I = 0,4 \text{ A}$



16°-Ber  
 $l = 1 \text{ m}$   
 $r = 2 \text{ m}$   
 $I_1 = I_2 = 50 \text{ A}$   
 $F = ?$

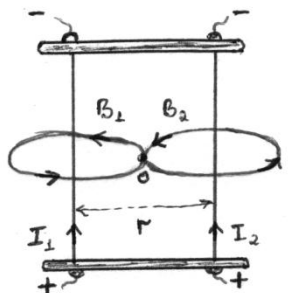


$$F = \mu_0 \mu \frac{I_1 \cdot I_2 \cdot l}{2\pi r}$$

$$F = \frac{4\pi \cdot 10^{-7} \cdot 1 \cdot 50 \cdot 50 \cdot 1}{2\pi \cdot 2} = 25 \cdot 10^{-5} \text{ N}$$

Javob:  $F = 0,25 \text{ mN}$

17°-Ber  
 $I_1 = I_2 = 2 \text{ A}$   
 $r = 4 \cdot 10^{-2} \text{ m}$   
 $B_n = ?$



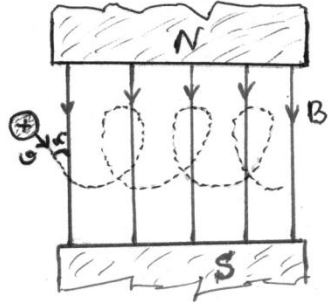
$$B_1 = \mu_0 \mu \frac{I_1}{2\pi \frac{r}{2}}$$

$$B_2 = \mu_0 \mu \frac{I_2}{2\pi \frac{r}{2}}$$

2° Bundan:  $B_1 = B_2$

3°  $B_n = B_1 - B_2$   $B_n = 0$ . Javob:  $B_n = 0$  holga teng.

18°-Ber  
 $\vartheta = 4 \cdot 10^7 \frac{\text{m}}{\text{c}}$   
 $q = 1,6 \cdot 10^{-19} \text{ C}$   
 $B = 5 \text{ Ts}$   
 $\alpha = 45^\circ$   
 $F_u = ?$



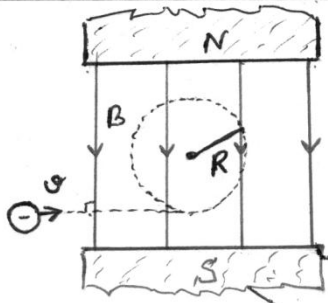
Bu zaryadli zarruga Lorens kuchi ta'sir qiladi.

$$F_u = q B \vartheta \cdot \sin \alpha \quad \alpha \rightarrow B \perp \vartheta$$

$$F_u = 1,6 \cdot 10^{-19} \cdot 5 \cdot 4 \cdot 10^7 \cdot \frac{\sqrt{2}}{2} = 22,6 \cdot 10^{-12} \text{ N}$$

Javob:  $F_u = 22,6 \text{ pN}$

19°-Ber  
 $B = 0,3 \text{ Ts}$   
 $\alpha = 90^\circ$   
 $\vartheta = 160 \cdot 10^6 \frac{\text{m}}{\text{c}}$   
 $q = -1,6 \cdot 10^{-19} \text{ C}$   
 $R = ?$



$$R = \frac{m \vartheta}{q B}$$

$$R = \frac{9,1 \cdot 10^{-31} \cdot 160 \cdot 10^6}{1,6 \cdot 10^{-19} \cdot 0,3} = 3033 \cdot 10^{-6} \text{ m}$$

Javob:  $R = 3,033 \text{ mm}$

Abdubannanov Akramjon

20°-Ber  
 $\alpha = 90^\circ$   
 $T = 8 \cdot 10^{-9} \text{ s}$   
 $q = 1,6 \cdot 10^{-19} \text{ C}$   
 $m = 9,1 \cdot 10^{-31} \text{ kg}$   
 $B = ?$   
 Javob:  $B = 4,46 \text{ mTs}$

$$T = \frac{2\pi m}{q B}$$

$$B = \frac{2\pi m}{q \cdot T}$$

$$B = \frac{2 \cdot 3,14 \cdot 9,1 \cdot 10^{-31}}{1,6 \cdot 10^{-19} \cdot 8 \cdot 10^{-9}} = 4,46 \cdot 10^{-3} \text{ Ts}$$

21°-Ber  
 $B = 1,5 \text{ Ts}$   
 $\alpha = 90^\circ$   
 $F = 120 \cdot 10^{-12} \text{ N}$   
 $q = 2 \cdot 1,6 \cdot 10^{-19} \text{ C}$   
 $\vartheta = ?$   
 Javob:  $\vartheta = 2,5 \cdot 10^8 \frac{\text{m}}{\text{c}}$

$$F = q B \vartheta \cdot \sin \alpha$$

$$\vartheta = \frac{F}{q B \sin \alpha} = \frac{120 \cdot 10^{-12}}{2 \cdot 1,6 \cdot 10^{-19} \cdot 1,5 \cdot 1} = 2,5 \cdot 10^7$$

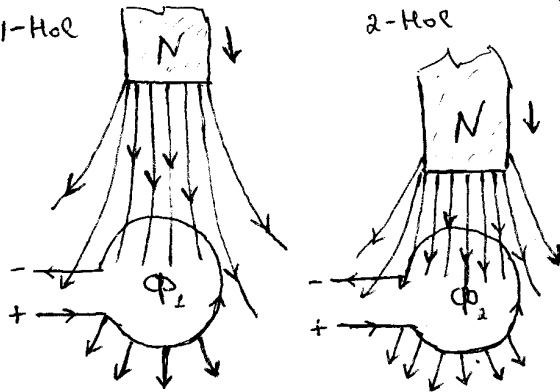
11-sinf fizika masalalari yechimlari!

2-mashq

1°-Ber.  
 $\Delta t = 0,4 \text{ s}$   
 $\Phi_1 = 5 \text{ Vb}$   
 $\Phi_2 = 13 \text{ Vb}$   


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 $\mathcal{E} = ?$



$$\mathcal{E} = \frac{\Delta \Phi}{\Delta t}$$

$$\mathcal{E} = \frac{\Phi_2 - \Phi_1}{\Delta t}$$

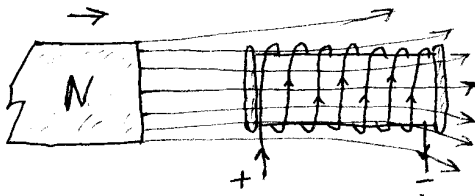
$$\mathcal{E} = \frac{13 - 5}{0,4} = 20 \text{ V}$$

Javob:  $\mathcal{E} = 20 \text{ V}$

2°-Ber.  
 $n = 250$   
 $\Delta t = 0,4 \text{ s}$   
 $\Delta \Phi = 2 \text{ Vb}$   


---

 $\mathcal{E} = ?$



$$\mathcal{E} = \frac{\Delta \Phi}{\Delta t} \cdot n$$

$$\mathcal{E} = \frac{2}{0,4} \cdot 250 = 1250 \text{ V}$$

Javob:  $\mathcal{E} = 1250 \text{ V}$

3°-Ber  
 $\frac{\Delta \Phi}{\Delta t} = 0,15 \frac{\text{Vb}}{\text{s}}$   
 $\mathcal{E} = 120 \text{ V}$   


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 $n = ?$

2°-masaladagi  
 chizma

$$\mathcal{E} = \frac{\Delta \Phi}{\Delta t} \cdot n$$

$$n = \frac{\Delta t}{\Delta \Phi} \cdot \mathcal{E} = \frac{120}{0,15} = 800$$

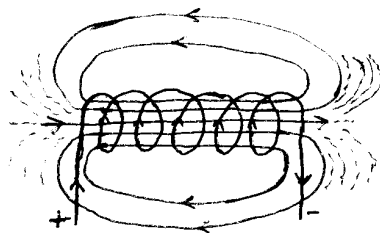
Javob:  $n = 800 \text{ ta}$

Abdubannanov Akramjon

4°-Ber  
 $I = 0,6 \text{ A}$   
 $L = 80 \cdot 10^{-3} \text{ gn}$   


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 $\Phi = ?$



$$\Phi = L \cdot I$$

$$\Phi = 80 \cdot 10^{-3} \cdot 0,6 = 48 \cdot 10^{-3} \text{ Vb}$$

Javob:  $\Phi = 48 \text{ mVb}$

5°-Ber.  
 $L = 0,8 \text{ gn}$   
 $S = 200 \cdot 10^{-4} \text{ m}^2$   
 $I = 2 \text{ A}$   
 $n = 50$   


---

 $B = ?$

4°-masaladagi  
 chizma

$$\Phi = B_n \cdot S \cdot n$$

$$\Phi = L I$$

$$B S \cdot n = L I$$

$$B = \frac{L I}{S \cdot n} = \frac{0,8 \cdot 2}{200 \cdot 10^{-4} \cdot 50} = 1,6 \text{ Ts}$$

Javob:  $B = 1,6 \text{ Ts}$

6°-Ber  
 $L = 2 \text{ gn}$   
 $\mathcal{E} = 36 \text{ V}$   


---

 $\frac{I}{t} = ?$

4°-masaladagi  
 chizma

$$\mathcal{E} = \frac{L I}{t}$$

$$\frac{I}{t} = \frac{\mathcal{E}}{L} = \frac{36}{2} = 18 \frac{\text{A}}{\text{s}}$$

Javob:  $\frac{I}{t} = 18 \frac{\text{A}}{\text{s}}$

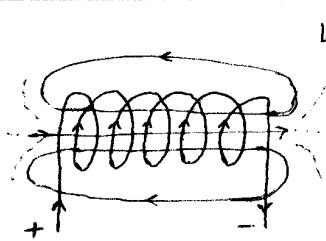
7° - Ber

$$B_1 = 25 \cdot 10^{-3} \text{ T}_s$$

$$\mu_1 = 1$$

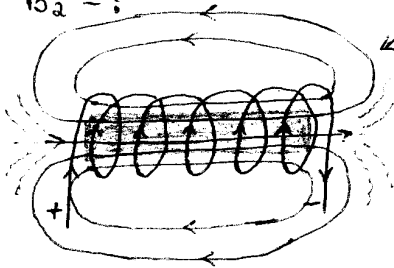
$$\mu_2 = 60$$

$$B_2 = ?$$



1-Hol  $\mu_1 = 1$  da  $\mu$  altak vakuum-  
da bo'lgan.

$$B_1 = \mu_1 B_0 \rightarrow B_1 = B_0$$



2-Hol Ferromagnet o'zak kiritilsa,  
 $\mu \gg 1$  ortade.

$$B_2 = \mu_2 B_0 \rightarrow B_2 = \mu_2 B_1 \quad B_2 = 60 \cdot 25 \cdot 10^{-3} = 1,5 \text{ T}_s$$

Javob:  $B_2 = 1,5 \text{ T}_s$

8° - Ber

$$B_1 = 20 \cdot 10^{-3} \text{ T}_s$$

$$\mu_1 = 1$$

$$B_2 = 200 \cdot 10^{-3} \text{ T}_s$$

$$\mu_2 = ?$$

7° - masaladagi 1)  $B_1 = 1 \cdot B_0$   $B_0 = 20 \cdot 10^{-3} \text{ T}_s$   
dizma

$$B_1 = \mu_1 B_0$$

$$B_2 = \mu_2 B_0$$

2)  $B_2 = \mu_2 B_0 = \mu_2 B_1$

$$\mu_2 = \frac{B_2}{B_1} = \frac{200 \cdot 10^{-3}}{20 \cdot 10^{-3}} = 10$$

Javob:  $\mu_2 = 10$

9° - Ber

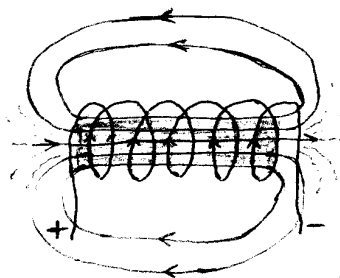
$$R = 2 \cdot 10^{-2} \text{ m}$$

$$I = 3 \text{ A}$$

$$\mu = 20$$

$$n = 150$$

$$B = ?$$



$$B = \mu_0 \mu \frac{I}{l} \cdot n$$

\* l - g'altarni  
hosil qilgan  
sim uzunligi.

\* n - o'ramlar soni. Bizga "l" ya'ni  
jami sim uzunligi berilmagan.

\*  $l = 2\pi R \cdot n$  deb olish mumkin

$$B = \mu_0 \mu \frac{I n}{2\pi R \cdot n} = 4\pi \cdot 10^{-7} \cdot 20 \cdot \frac{3 \cdot 150}{2\pi \cdot 2 \cdot 10^{-2} \cdot 150} = 6 \cdot 10^{-4} = 0,6 \text{ mT}_s$$

Javob:  $B = 0,6 \text{ mT}_s$

Abdubannanov Akramjon

10° - Ber

$$I = 2,5 \text{ A}$$

$$\phi = 0,8 \cdot 10^{-3} \text{ Vb}$$

$$W = ?$$

$$W = \frac{4I^2}{2} = \frac{\phi I}{2}$$

$$W = \frac{0,8 \cdot 10^{-3} \cdot 2,5}{2} = 1 \text{ mJ}$$

Javob:  $W = 1 \text{ mJ}$

11° - Ber

$$L = 5 \cdot 10^{-3} \text{ gH}$$

$$I = 0,4 \text{ A}$$

$$W = ?$$

$$W = \frac{LI^2}{2}$$

$$W = \frac{5 \cdot 10^{-3} \cdot 0,4^2}{2} = 0,4 \text{ mJ}$$

Javob:  $W = 0,4 \text{ mJ}$

12° - Ber

$$I = 3 \text{ A}$$

$$W = 60 \text{ mJ} = 60 \cdot 10^{-3} \text{ J}$$

$$L = ?$$

$$W = \frac{LI^2}{2} \quad L = \frac{2W}{I^2}$$

$$L = \frac{2 \cdot 60 \cdot 10^{-3}}{3^2} = 13,3 \text{ mJ}$$

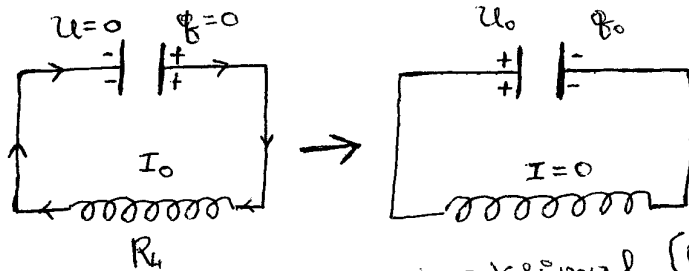
Javob:  $L = 13,3 \text{ mJ}$


11-son fizika masalalare yechimlari!

3-mashq.

1°-Ber

$C = 8 \cdot 10^{-12} \text{ F}$   
 $L = 0,5 \cdot 10^{-3} \text{ gH}$   
 $I_0 = 40 \cdot 10^{-3} \text{ A}$



Kondensator va induktee g'altak bir-biriga paral-

$U_0 = ?$

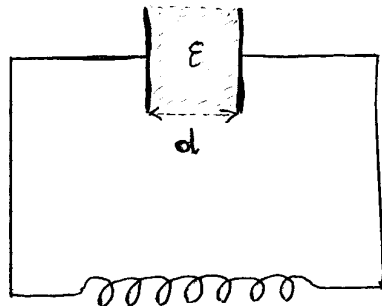
l el bo'lgani uchun ulardagi maksimal ( $U_0 = U_C = U_L$ ) kuchlanishlar bir-biriga teng bo'ladi.

$$I_0 = \frac{U_0}{R_H} = \frac{U_0}{\omega L} = \frac{U_0 \sqrt{4\epsilon}}{L} = U_0 \sqrt{\frac{C}{L}} \Rightarrow U_0 = I_0 \sqrt{\frac{L}{C}}$$

$$U_0 = 40 \cdot 10^{-3} \cdot \sqrt{\frac{0,5 \cdot 10^{-3}}{8 \cdot 10^{-12}}} = 316 \text{ V} \quad \text{Javob: } U_0 = 316 \text{ V.}$$

2°-Ber

$L = 31 \cdot 10^{-3} \text{ gH}$   
 $S = 20 \cdot 10^{-4} \text{ m}^2$   
 $d = 10^{-2} \text{ m}$   
 $I_0 = 0,2 \cdot 10^{-3} \text{ A}$   
 $U_0 = 10 \text{ V}$



1°-masaladagi formulaga ko'ra

$$U_0 = I_0 \sqrt{\frac{L}{C}} = I_0 \sqrt{\frac{L d}{\epsilon_0 \epsilon S}}$$

$$\epsilon_m = \frac{I_0^2 \cdot L d}{U_0^2 \cdot \epsilon_0 S}$$

$\epsilon_m = ?$

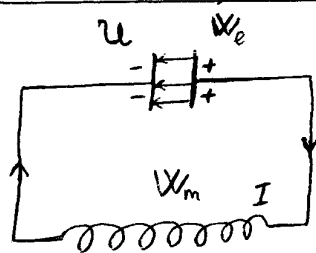
$$\epsilon_m = \frac{0,04 \cdot 10^{-6} \cdot 31 \cdot 10^{-3} \cdot 10^{-2}}{100 \cdot 8,85 \cdot 10^{-12} \cdot 20 \cdot 10^{-4}} = 7$$

Javob:  $\epsilon_m = 7$

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3°-Ber

$L = 0,2 \text{ gH}$   
 $C = 20 \cdot 10^{-6} \text{ F}$   
 $U = 1 \text{ V}$   
 $I = 0,01 \text{ A}$



Tebanish konturidagi energiya-ning saqlanish qonuniga binoan

$$W_0^m = W_0^e = W_C + W_L$$

$$\frac{L I_0^2}{2} = \frac{L I^2}{2} + \frac{C U^2}{2} = \frac{C U^2}{2}$$

$I_0 = ?$

$$I_0 = \sqrt{\frac{L I^2 + C U^2}{L}}$$

$$I_0 = \sqrt{\frac{0,2 \cdot 0,01^2 + 20 \cdot 10^{-6} \cdot 1^2}{0,2}} = 0,014$$

Javob:  $I_0 = 0,014 \text{ A}$

4°-Ber

$C = 2,5 \cdot 10^{-6} \text{ F}$   
 $L = 1 \text{ gH}$   
 $q_0 = 0,5 \cdot 10^{-6} \text{ C}$

$$q = q_0 \cos \omega t$$

$$q = q_0 \cos \frac{t}{\sqrt{LC}} \cdot t$$

$$q = 0,5 \cdot 10^{-6} \cos \frac{t}{\sqrt{1 \cdot 2,5 \cdot 10^{-6}}} \cdot t$$

$q(t) = ?$

$$q = 0,5 \cdot 10^{-6} \cos 632 t \quad \text{Javob: } q = 0,5 \cdot 10^{-6} \cos 632 t.$$



5°-Ber  
 $L = 0,04 \text{ gH}$   
 $D = 800 \text{ gr}$

$$\omega = \frac{1}{T} = \frac{1}{2\pi\sqrt{LC}}$$

$$C = \frac{1}{4\pi^2 \cdot L \cdot D}$$

$C = ?$   $C = \frac{1}{4 \cdot 3,14^2 \cdot 0,04 \cdot 800} = 9,9 \cdot 10^{-7} \text{ F}$  Javob:  $C \approx 1 \mu\text{F}$

6°-Ber  
 $C = 0,5 \cdot 10^{-6} \text{ F}$   
 $L = 5 \cdot 10^{-3} \text{ gH}$   
 $W_e = W_m$

1°  $q = q_0 \sin \omega t$

4°  $\frac{q_0}{\sqrt{2}} = q_0 \sin \omega t$

2°  $\frac{q_0^2}{2C} = W_e + W_m = 2W_e$

$\frac{1}{\sqrt{2}} = \sin \omega t \rightarrow \omega t = \frac{\pi}{4}$

3°  $\frac{q_0^2}{2C} = 2 \frac{q^2}{2C}$   $q = \frac{q_0}{\sqrt{2}}$

5°  $\frac{2\pi}{T} t = \frac{\pi}{4} \rightarrow t = \frac{T}{8}$

$t = ?$

6°  $t = \frac{2\pi\sqrt{LC}}{8} = \frac{2 \cdot 3,14 \cdot \sqrt{5 \cdot 10^{-3} \cdot 0,5 \cdot 10^{-6}}}{8} = 3,925 \cdot 10^{-5} \text{ c}$  Javob:  $t = 3,9 \cdot 10^{-5} \text{ c}$

7°-Ber

$q = 0,03 \cos(100\pi t + \frac{\pi}{3})$

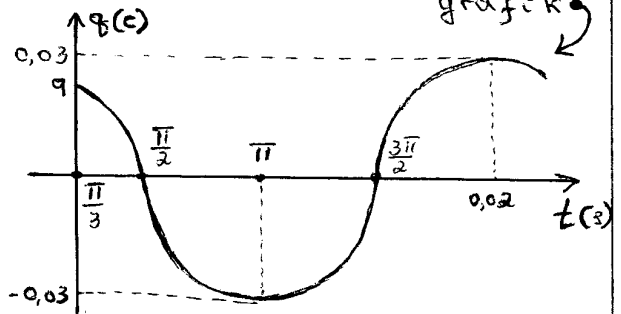
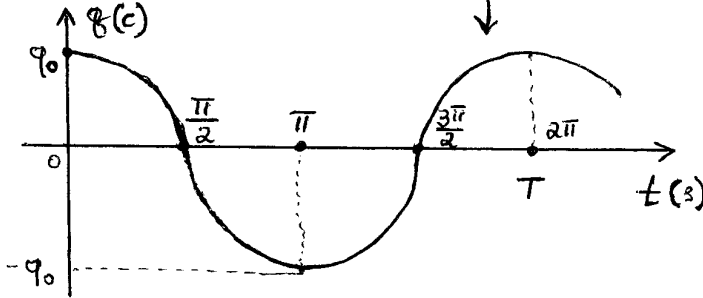
1°  $q_0 = 0,03 \text{ kC}$ ;  $\omega = 100\pi$   
 boshlang'ich faza -  $\varphi_0 = \frac{\pi}{3}$

grafikni chizing.

2°  $\omega = \frac{2\pi}{T} = 100\pi \rightarrow T = 0,02 \text{ c}$

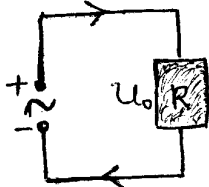
3° Umumiy grafik.

Masalaga mos grafik



8°-Ber

$R = 50 \Omega$   
 $U_0 = 100 \text{ V}$   
 $D = 100 \text{ gr}$



1°  $I = I_0 \cos \omega t$  2°  $I_0 = \frac{U_0}{R} = \frac{100}{50} = 2 \text{ A}$

3°  $\omega = 2\pi D \rightarrow \omega = 2\pi \cdot 100 = 200\pi$

Javob:  $I = 2 \cos 200\pi \cdot t$

$I(t) = ?$

Abdubannanov Akramjon

9°-Ber

$I = 8,5 \sin(628t + 0,325)$

1°  $I = I_0 \sin(\omega t + \varphi_0)$  2°  $I_0 = 8,5 \text{ A}$

$I_{ef} = ?$   $\omega t + \varphi_0 = ?$   $D = ?$

3°  $I_{ef} = \frac{I_0}{\sqrt{2}} \rightarrow I_{ef} = \frac{8,5}{\sqrt{2}} = 6,03 \text{ A}$

4°  $\omega = 628 \frac{\text{rad}}{\text{c}}$

6° faza  $\rightarrow \omega t + \varphi_0$

Javob:

5°  $\omega = 2\pi D$

boshlang'ich faza  $\rightarrow \varphi_0$

$I_{ef} = 6,03 \text{ A}$

$D = 100 \text{ gr}$

$\varphi_0 = 0,325$

faza  $\rightarrow 628t + 0,325$

$628 = 2 \cdot 3,14 D$

faza  $\rightarrow 628t + 0,325$

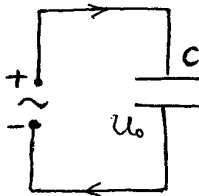
$D = 100 \text{ gr}$

10°-Ber

$$I = 0,03 \cos(314t + 1,57)$$

$$U_0 = 60 \text{ V}$$

C = ?



$$U_0 = I_0 R_c \rightarrow U_0 = \frac{I_0}{\omega C}$$

$$C = \frac{I_0}{\omega U_0} = \frac{0,03}{314 \cdot 60} = 1,6 \cdot 10^{-6} \text{ F}$$

Javob:  $C = 1,6 \cdot 10^{-6} \text{ F} = 1,6 \mu\text{F}$

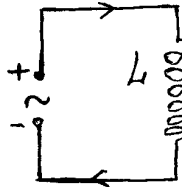
11°-Ber

$$U_0 = 157 \text{ V}$$

$$I_0 = 5 \text{ A}$$

$$\omega = 50 \text{ gr}$$

L = ?



$$U_0 = I_0 R_L \rightarrow U_0 = I_0 \omega L$$

$$L = \frac{U_0}{\omega I_0} = \frac{157}{2 \cdot 3,14 \cdot 50 \cdot 5} = 0,1 \text{ gn}$$

Javob:  $L = 0,1 \text{ gn}$

12°-Ber

$$U_{ef} = 127 \text{ V}$$

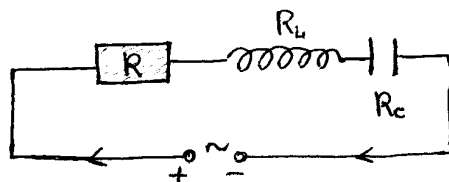
$$L = 0,16 \text{ gn}$$

$$R = 2 \text{ Ohm}$$

$$C = 64 \cdot 10^{-6} \text{ F}$$

$$\omega = 200 \text{ gr}$$

I<sub>ef</sub> = ?



$$I_{ef} = \frac{U_{ef}}{R_T}$$

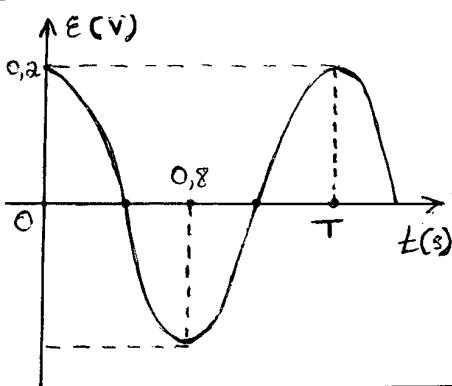
Javob:  $I_{ef} = 0,67 \text{ A}$

$$I_{ef} = \frac{U_{ef}}{\sqrt{R^2 + \left( \omega L - \frac{1}{\omega C} \right)^2}}$$

$$I_{ef} = \frac{127}{\sqrt{2^2 + \left( 2 \cdot 3,14 \cdot 200 \cdot 0,16 - \frac{1}{2 \cdot 3,14 \cdot 200 \cdot 64 \cdot 10^{-6}} \right)^2}} = 0,67 \text{ A}$$

Abdubannanov Akramjon

13°-Ber



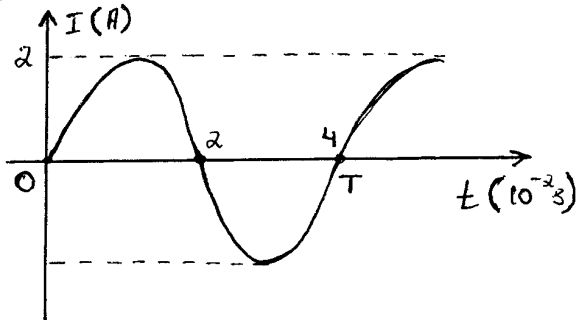
1° Tibranish davri -  $T = 1,6 \text{ s}$

2° Chastotasi -  $\omega = \frac{1}{T} = \frac{1}{1,6} = 0,625 \text{ s}$

3° Seklik chastotasi -  $\omega = 2\pi\omega$   
 $\omega = 2 \cdot 0,625\pi = 1,25\pi$

4°  $E = 0,2 \cos 1,25\pi \cdot t$

14°-Ber



1° Tokning maksimal qiymati

$$I_0 = 2 \text{ A}$$

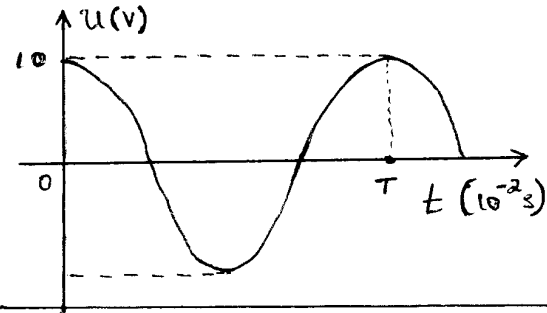
2° Davri -  $T = 4 \cdot 10^{-2} \text{ s}$

3° Chastotasi -  $\omega = \frac{1}{T} = 25 \text{ gr}$

4°  $\omega = 2\pi\omega - \omega = 50\pi$

5°  $I = 2 \sin 50\pi t$

15° - Ber.



- 1° kuchlanishning maksimal qiymati -  $U_0 = 10V$
- 2° Davri taqriban -  $T = 4 \cdot 10^{-2}s$
- 3° chastotasi -  $\nu = \frac{1}{T} = 25 gr$
- 4°  $\omega = 2\pi\nu = 50\pi$
- 5°  $U = 10 \cos 50\pi \cdot t$

Davri berilmagan

16° - Ber

- $\nu = 400 gr$
- $L = 0,1 gn$
- $R_c = R_n$

$$\nu = \frac{1}{2\pi\sqrt{LC}}$$

$$C = \frac{1}{4\pi^2 \nu^2 L}$$

$$C = \frac{1}{4 \cdot 3,14^2 \cdot 400^2 \cdot 0,1} = 0,016 \cdot 10^{-4} F$$

Javob:

$$C = 1,6 \mu F$$

$C = ?$

17° - Ber

- $C = 50 \cdot 10^{-12} F$
- $\nu = 10 \cdot 10^6 gr$

$$\nu = \frac{1}{2\pi\sqrt{LC}}$$

$$L = \frac{1}{4\pi^2 \nu^2 C}$$

$$L = \frac{1}{4 \cdot 3,14^2 \cdot 10^2 \cdot 10^2 \cdot 50 \cdot 10^{-12}} = 5 \cdot 10^{-6} gn$$

Javob:

$$L = 5 \mu gn$$

$L = ?$

18° - Ber

- $U_0 = 100V$
- $\nu = 50 \cdot 10^6 gr$
- $U = 71V$

$$U = U_0 \cos \omega t$$

$$71 = 100 \cos 2\pi\nu t$$

$$0,71 = \cos 2\pi\nu t$$

$$\frac{\sqrt{2}}{2} = \cos 2\pi\nu t$$

$$\frac{\pi}{4} = 2\pi\nu t$$

$$t = \frac{1}{8\nu}$$

$$t = \frac{1}{8 \cdot 50 \cdot 10^6} = 2,5 ns.$$

$t = ?$

Abdubannanov Akramjon


11-sinf masalalari yechimlari!

4-mashq

1°-Ber  $\lambda = 300\text{m}$   
 $\nu = 10 \cdot 10^3 \text{gr}$

\* Tölgän uzunligini topish formulasi:  
 $\lambda = t \cdot c$

\* To'ush tebranishlari bir marta tebran-ganda tölgän uzunligi  $\lambda = t \cdot c$  bölgän elektromagnet tölgän  $N$  marta tebranadi.  
 \* To'ush tölgänlari bir marta tebrangani u-n  $t = T$ .

1°  $\lambda = \lambda N = T \cdot c$     3°  $\lambda N = \frac{c}{\nu}$      $N = \frac{3 \cdot 10^8}{300 \cdot 10 \cdot 10^3} = 100 \text{ ta}$   
 2°  $T = \frac{1}{\nu}$      $N = \frac{c}{\lambda \nu}$

Javob:  $N = 100 \text{ ta}$

2°-Ber  $t = 400 \cdot 10^{-6} \text{s}$

Signal borib qaytganligi uchun  
 $S = \frac{ct}{2}$      $S = \frac{3 \cdot 10^8 \cdot 400 \cdot 10^{-6}}{2} = 60000 \text{m}$

Javob:  $S = 60 \text{km}$

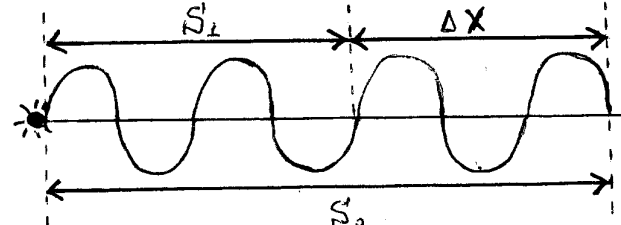
3°-Ber  $\nu = 15 \cdot 10^6 \text{gr}$   
 $t = 30 \text{T}$

$S = c \cdot t = c \cdot 30 \text{T}$      $S = \frac{30 \cdot 3 \cdot 10^8}{15 \cdot 10^6} = 600 \text{m}$   
 $S = \frac{30c}{\nu}$

Javob:  $S = 600 \text{m}$

Abdubannanov Akramjon

4°-Ber  $\nu = 5 \text{gr}$   
 $\varphi = 3 \frac{\text{m}}{\text{s}}$   
 $\Delta X = 20 \cdot 10^{-2} \text{m}$



1°  $\varphi = \omega t$   
 $\omega = 2\pi \nu$   
 $t = \frac{S}{\varphi}$

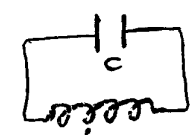
2°  $\varphi = 2\pi \nu \frac{S}{\varphi}$

3°  $\Delta \varphi = \varphi_2 - \varphi_1 = 2\pi \nu \frac{S_2}{\varphi} - 2\pi \nu \frac{S_1}{\varphi} = 2\pi \nu \frac{S_2 - S_1}{\varphi}$

4°  $\Delta \varphi = 2\pi \nu \frac{\Delta X}{\varphi}$     Qo'shimda  $\Delta \varphi = 2\pi \frac{\Delta X}{\lambda} = 2\pi \frac{\Delta X}{\varphi \cdot t} = 2\pi \frac{\Delta X}{c \cdot T}$

$\Delta \varphi = 2\pi \cdot 5 \cdot \frac{20 \cdot 10^{-2}}{3} = \frac{2\pi}{3} = \frac{2 \cdot 180^\circ}{3} = 120^\circ$     Javob:  $\Delta \varphi = 120^\circ$

5°-Ber  $t = 1,2 \text{s}$   
 $\Delta I = 2 \text{A}$   
 $\mathcal{E} = 0,4 \cdot 10^{-3} \text{V}$   
 $S = 50 \cdot 10^{-4} \text{m}^2$   
 $d = 3 \cdot 10^{-3} \text{m}$



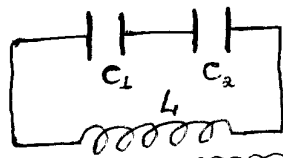
1°  $\lambda = 2\pi c_y \sqrt{LC}$   
 $\mathcal{E} = \frac{\Delta \varphi}{t} = \frac{L \Delta I}{t}$

2°  $\lambda = 2\pi c_y \sqrt{\frac{\mathcal{E} t}{\Delta I} \cdot \frac{\mathcal{E}_0 S'}{d}}$

Javob:  $\lambda = 112 \text{m}$



6°-Ber  
 $L = 10^{-3} \text{ gH}$   
 $C_1 = 500 \cdot 10^{-12} \text{ F}$   
 $C_2 = 200 \cdot 10^{-12} \text{ F}$   
 $\lambda = ?$



$$\lambda = 2\pi c \sqrt{L C_{\text{um}}}$$

$$\frac{1}{C_{\text{um}}} = \frac{1}{C_1} + \frac{1}{C_2}$$

$$\lambda = 2\pi c \sqrt{\frac{C_1 \cdot C_2}{C_1 + C_2} \cdot L}$$

$$\lambda = 2 \cdot 3,14 \cdot 3 \cdot 10^8 \cdot \sqrt{\frac{500 \cdot 200 \cdot 10^{-24}}{500 + 200} \cdot 10^{-3}} = 712 \cdot 10^{-6} \text{ m}$$

Javob:  $\lambda = 712 \mu\text{m}$ .

7°-Ber  
 $\lambda_1 = 0,76 \cdot 10^{-6} \text{ m}$   
 $n_1 = 1,329$   
 $\lambda_2 = 0,4 \cdot 10^{-6} \text{ m}$   
 $n_2 = 1,344$   
 $\nu_1 = ?$   $\nu_2 = ?$

\* Ikki holatda suvning sendirish ko'rsatkichini turli to'lqin uzunliklari orqali aniqlanmoqda

$$1^\circ \nu_1 = \frac{c}{n_1}$$

$$\nu_1 = \frac{3 \cdot 10^8}{1,329} = 2,26 \cdot 10^8 \frac{\text{m}}{\text{s}}$$

$$\nu_2 = \frac{c}{n_2}$$

$$\nu_2 = \frac{3 \cdot 10^8}{1,344} = 2,23 \cdot 10^8 \frac{\text{m}}{\text{s}}$$

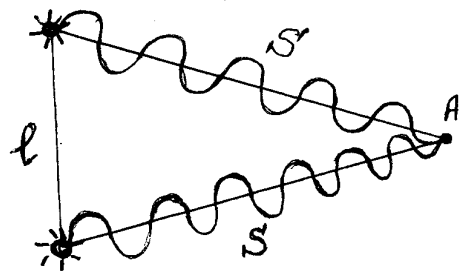
Suvdagi tezliklar

$$2^\circ \lambda_c^1 = \frac{\lambda_1}{n_1}; \lambda_c^2 = \frac{\lambda_2}{n_2}$$

Suvdagi to'lqin uzunlik

$$\text{Javob: } \nu_1 = 2,26 \cdot 10^8 \frac{\text{m}}{\text{s}}; \nu_2 = 2,23 \cdot 10^8 \frac{\text{m}}{\text{s}}$$

13°-Ber  
 $l = 30 \cdot 10^{-3} \text{ m}$   
 $\lambda = 5 \cdot 10^{-7} \text{ m}$   
 $S = 4 \text{ m}$

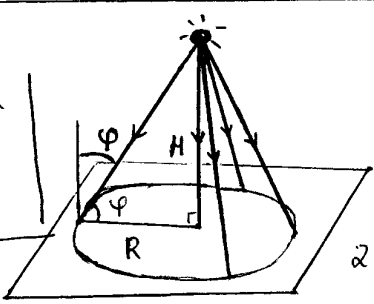


$$1^\circ N = \frac{S'}{\lambda} \quad N = \frac{4}{5 \cdot 10^{-7}} = 8 \cdot 10^6 \text{ ta}$$

2° Tölg'inlar A nuqtaya bir xil fazada uchra-shadi.

Javob: Interferensiya kuchayadi.

14°-Ber  
 $I = 200 \text{ cd}$   
 $\varphi = 45^\circ$   
 $E = 141 \text{ lx}$   
 $H = ?$



$$1^\circ E = \frac{I}{R^2} \cdot \cos \varphi \quad R^2 = \frac{I \cos \varphi}{E}$$

$$R^2 = \frac{200 \cdot \sqrt{2}}{2 \cdot 141} = 1 \quad R = 1 \text{ m}$$

$$2^\circ \frac{H}{R} = \text{tg } \varphi \quad \frac{H}{1} = 1 \quad H = 1 \text{ m}$$

Javob:  $H = 1 \text{ m}$ .

15°-Ber  
 $\varphi_1 = 30^\circ$   
 $\varphi_2 = 45^\circ$   
 $\frac{E_2}{E_1} = ?$

$$E_1 = \frac{I}{R^2} \cos \varphi_1$$

$$E_2 = \frac{I}{R^2} \cos \varphi_2$$

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Javob: 1,22 marta kamayadi.

$$\frac{E_2}{E_1} = \frac{\cos \varphi_2}{\cos \varphi_1}$$

$$\frac{E_2}{E_1} = \frac{\cos 45^\circ}{\cos 30^\circ} = \frac{\sqrt{2} \cdot 2}{2 \cdot \sqrt{3}} = \frac{1}{1,22}$$

16°-Ber  
 $R = 10 \cdot 10^{-2} \text{ m}$   
 $I = 100 \text{ cd}$

$$\Phi = 4\pi I$$

$$\Phi = 4 \cdot 3,14 \cdot 100 = 1256 \text{ lm}$$

$\Phi = ?$

Javob:  $\Phi = 1256 \text{ lm}$

17°-Ber

$$S = 25 \cdot 10^{-4} \text{ m}^2$$

Taxmin x burchak  $45^\circ$  bōlganda deb  
 ōylasak quyidagicha bōladi.

$$1^\circ S = a \cdot a = a^2$$

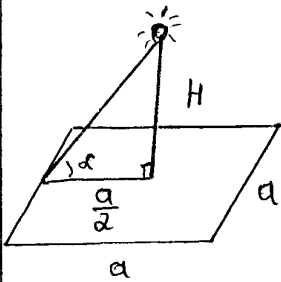
$$a = 5 \text{ sm}$$

$$2^\circ \frac{H}{\frac{a}{2}} = \text{tg } 45^\circ$$

$$\frac{H}{\frac{5 \cdot 10^{-2}}{2}} = 1$$

$$H = 2,5 \text{ sm}$$

Javob:  $= 5 \text{ sm}$



Abdubannanov Akramjon

20°-Ber

$$R = 5 \text{ m}$$

$$m_1 = 4$$

$$\lambda_1 = 400 \cdot 10^{-9} \text{ m}$$

$$m_2 = 3$$

$$\lambda_2 = 630 \cdot 10^{-9} \text{ m}$$

$$r_1 = \sqrt{\left(m_1 + \frac{1}{2}\right) \cdot \lambda_1 R}$$

$$r_1 = \sqrt{\left(4 + \frac{1}{2}\right) \cdot 5 \cdot 400 \cdot 10^{-9}} = 3 \cdot 10^{-3} \text{ m}$$

$$r_2 = \sqrt{\left(m_2 + \frac{1}{2}\right) \cdot \lambda_2 R}$$

$$r_2 = \sqrt{\left(3 + \frac{1}{2}\right) \cdot 5 \cdot 630 \cdot 10^{-9}} = 33,2 \cdot 10^{-4} \text{ m}$$

$r_1 = ?$   $r_2 = ?$

Javob:  $r_1 = 3 \text{ mm}$   $r_2 = 3,32 \text{ mm}$ .



11-sinf masalalari yechimlari

5-mashq

1°-Ber

$m_c = 1 \text{ kg}$   
 $m_k = 1 \text{ kg}$   
 $m_B = 1 \text{ kg}$

\* Har qanday jismning energiyasi nisbiylik nazariyasiga asosan  $E = mc^2$  ga teng.

$E_c = m_c c^2$     $E_k = m_k c^2$     $E_B = m_B c^2$     $m_c = m_k = m_B$

Demak:  $E_c = E_k = E_B$

Javob:  $E_c = E_k = E_B$

$E_c$  va  $E_k$  va  $E_B$

2°-Ber

$m$  | \* Kömir erish temperaturasida bolsa -  $E_1 = m\lambda$   
 \* Töla yonsa -  $E_2 = qm$  energiyaga ega bo'lar edi. Masala shartiga binoan kömir  $E = mc^2$  energiyaga ega.

$E = ?$    Javob:  $E = mc^2$

3°-Ber

$v = 0,36c$  | 1°  $E_k = \frac{m v^2}{2}$    2°  $m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$

$E_k$  va  $E_0$     $E_0 = m_0 c^2$     $m = \frac{m_0}{\sqrt{1 - \frac{0,36c^2}{c^2}}} = \frac{m_0}{0,8}$

3°  $\frac{E_0}{E_k} = \frac{2m_0 c^2}{m v^2} = \frac{m_0 c^2 \cdot 0,8 \cdot 2}{m_0 \cdot 0,36c^2} = 4,4$    Javob: ketek energiya taqriban 4 marta kichik

4°-Ber

$W_k = 2W_0$  | 1°  $W_T = W_0 + W_k$   
 $W_T = 2W_0$    2°  $mc^2 = 2m_0 c^2$    3°  $m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$     $v = \frac{\sqrt{3}}{2}c$

$v = ?$    Javob:  $\frac{\sqrt{3}}{2}c$

5°-Ber

$K = 20 \cdot 10^3 \frac{\text{N}}{\text{m}}$   
 $\Delta x = 0,3 \text{ m}$  | 1°  $\Delta E = \Delta mc^2$   
 $\Delta E = \frac{K \Delta x^2}{2}$    2°  $\Delta E = \Delta E$   
 $\Delta mc^2 = \frac{K \Delta x^2}{2} \rightarrow \Delta m = \frac{K \Delta x^2}{2c^2}$

$\Delta m = ?$    Javob:  $\Delta m = 10^{-14} \text{ kg}$  ga ortadi.

$\Delta m = \frac{20 \cdot 10^3 \cdot 9 \cdot 10^{-2}}{2 \cdot 9 \cdot 10^{16}} = 10^{-14} \text{ kg}$

Abdubannanov Akramjon

6°-Ber

$m = 1 \text{ kg}$   
 $\Delta t = 81 \text{ k}$  | \* 5°-masalaga binoan:  $\Delta E = \Delta mc^2$     $\Delta E = c_0 m \Delta t$   
 $\Delta E = \Delta E$     $\Delta mc^2 = c_0 m \Delta t$   
 $\Delta m = \frac{c_0 m \Delta t}{c^2}$     $\Delta m = \frac{4200 \cdot 1 \cdot 81}{9 \cdot 10^{16}} = 378 \cdot 10^{-14} \text{ kg}$

$\Delta m = ?$    Javob:  $\Delta m = 3,78 \cdot 10^{-12} \text{ kg}$

7°-Ber

$m = 20 \text{ kg}$   
 $\Delta t = 200 \text{ k}$   
 $c = 1,05 \cdot 10^8 \frac{\text{m}}{\text{s}}$  | \* 5°-masalaga kora:  $\Delta E = \Delta mc^2$     $\Delta E = c m \Delta t$   
 $\Delta m = \frac{c m \Delta t}{c^2}$     $\Delta m = \frac{1,05 \cdot 10^3 \cdot 20 \cdot 200}{9 \cdot 10^{16}} = 4,7 \cdot 10^{-11} \text{ kg}$

$\Delta m = ?$    Javob:  $\Delta m = 4,7 \cdot 10^{-8} \text{ gr}$

8°-Ber.

$$N = 3,78 \cdot 10^{26} \sqrt{t}$$

$$t = 1 \text{ s}$$

$\Delta m = ?$

\* 5°-masalaga kora:  $\Delta E = \Delta mc^2$   $\Delta E = N \cdot t$

$$\Delta m = \frac{Nt}{c^2}$$

$$\Delta m = \frac{3,78 \cdot 10^{26} \cdot 1}{9 \cdot 10^{16}} = 42 \cdot 10^8 \text{ kg.}$$

Javob: Har sekunda  $\Delta m = 42 \cdot 10^8 \text{ kg}$  yuqotade.

9°-Ber

$$v = 0,89c$$

$$\frac{p}{p_0} = ?$$

$$p = \frac{p_0}{1 - \frac{v^2}{c^2}}$$

$$\frac{p}{p_0} = \frac{1}{1 - \frac{0,89^2 \cdot c^2}{c^2}} = 4,8$$

Javob:

$$p \approx 5 p_0$$

5 marta ortadi.

10°-Ber.

$$S = 5 \cdot 10^3 \text{ m}$$

$$t_0 = 2 \cdot 10^{-6} \text{ s}$$

$$v = ?$$

$$t = \frac{S'}{v}$$

$$t = \frac{t_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$\frac{S'}{v} = \frac{t_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$\frac{5 \cdot 10^3}{v} = \frac{2 \cdot 10^{-6}}{\sqrt{1 - \frac{v^2}{9 \cdot 10^{16}}}}$$

Javob:

$$v = 0,99c$$

11°-Ber.

$$l = \frac{l_0}{\sqrt{2}}$$

$$v = ?$$

$$l = l_0 \cdot \sqrt{1 - \frac{v^2}{c^2}}$$

$$\frac{l_0}{\sqrt{2}} = l_0 \sqrt{1 - \frac{v^2}{c^2}} \rightarrow \frac{1}{2} = \frac{c^2 - v^2}{c^2}$$

$$2c^2 - 2v^2 = c^2 \quad v = \frac{c}{\sqrt{2}}$$

Javob:  $v = \frac{\sqrt{2}}{2} c$ .

12°-Ber.

$$v = 2,4 \cdot 10^8 \frac{\text{m}}{\text{s}}$$

$$\frac{m}{m_0} = ?$$

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$\frac{m}{m_0} = \frac{1}{\sqrt{1 - \left(\frac{2,4 \cdot 10^8}{3 \cdot 10^8}\right)^2}} = 1,67$$

Javob: 1,67 marta katta

13°-Ber.

$$l = 0,005 l_0$$

$$v = ?$$

$$l = l_0 \sqrt{1 - \frac{v^2}{c^2}}$$

$$0,005 l_0 = l_0 \sqrt{1 - \frac{v^2}{c^2}}$$

Javob:

$$v = 3 \cdot 10^7 \frac{\text{m}}{\text{s}}$$

Abdubannanov Akramjon

14°-Ber.

$$t = 5 \text{ s}$$

$$\Delta t = 0,1 \text{ s}$$

$$t_0 = t - \Delta t$$

$$t_0 = 4,9 \text{ s}$$

$$v = ?$$

$$t = \frac{t_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$5 = \frac{4,9}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$25c^2 - 25v^2 = 24,01c^2$$

$$25v^2 = 0,99c^2$$

$$v = \sqrt{\frac{0,99c^2}{25}} \approx 0,2c$$

Javob:  $v = 0,2c$



15°-Ber

$$\frac{P_r = 2 P_k}{v = ?}$$

$$P_r = \frac{P_k}{\sqrt{1 - \frac{v^2}{c^2}}} \Rightarrow 2 P_k = \frac{P_k c}{\sqrt{c^2 - v^2}}$$

$$\sqrt{4c^2 - 4v^2} = c \quad v = \frac{\sqrt{3}}{2} c$$

Javob:  $v = \frac{\sqrt{3}}{2} c$

16°-Ber

$$\frac{E_k = E_0}{v = ?}$$

$$1^\circ \quad E_r = E_0 + E_k$$

$$mc^2 = 2 E_0 = 2 m_0 c^2$$

$$m = 2 m_0$$

$$2^\circ \quad m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$2 m_0 = \frac{m_0 c}{\sqrt{c^2 - v^2}}$$

$$4c^2 - 4v^2 = c^2$$

$$v = \frac{\sqrt{3}}{2} c$$

Javob:  $v = \frac{\sqrt{3}}{2} c$

Abdubannanov Akramjon.

17°-Ber

$$\frac{E = 4,08 \cdot 10^6 \text{ eV}}{v = ? \quad m = ?}$$

$$1^\circ \quad E = mc^2$$

$$m = \frac{E}{c^2} = \frac{4,08 \cdot 10^6 \cdot 1,6 \cdot 10^{-19}}{9 \cdot 10^{16}} = 0,73 \cdot 10^{-29} = 73 \cdot 10^{-31} \text{ kg.}$$

$$2^\circ \quad m_0 = 9,1 \cdot 10^{-31} \text{ kg.}$$

$$\frac{m}{m_0} = \frac{73 \cdot 10^{-31}}{9,1 \cdot 10^{-31}} = 8$$

$$m = 8 m_0$$

$$3^\circ \quad m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$64 m_0^2 = \frac{m_0^2 c^2}{c^2 - v^2}$$

$$v \approx 0,99c$$

Javob:  $v \approx 0,99c, \quad m = 8 m_0$


11-sinf masalalare yechimlari!

6-mashq

1°-mashq

$$m_1 = 35 \cdot 10^{-3} \text{ kg}$$

$$m_2 = 33 \cdot 10^{-3} \text{ kg}$$

$$\mathcal{D} = 10^5 \text{ gr}$$

$$N = ?$$

$$mc^2 = h\nu N$$

$$(m_1 + m_2)c^2 = h\nu N$$

$$N = \frac{(m_1 + m_2) \cdot c^2}{h\nu}$$

$$N = \frac{(35+33) \cdot 10^{-3} \cdot 9 \cdot 10^{16}}{6,62 \cdot 10^{-34} \cdot 10^5} = 9 \cdot 10^{43}$$

Javob:  $N = 9 \cdot 10^{43}$  ta

2°-Ber

$$E_1 = 2E_2$$

$P_1$  va  $P_2$

$$E = mc^2$$

$$P = mc$$

$$E = P \cdot c$$

$$E_1 = P_1 c \quad E_2 = P_2 c$$

$$\frac{E_2}{E_1} = \frac{P_2 c}{P_1 c} = \frac{E_2}{2E_2}$$

$$P_1 = 2P_2$$

Javob: 2 marta

3°-Ber. 1° Impuls 2° Tezlik  $v=c$  bo'lganda

$$\frac{n}{p} = ?$$

$$P = mv$$

$$p = mc$$

3° Ber muhtidan ( $n$ ) ekinchi muhitga o'tganda  $v = \frac{c}{n}$

$$P = m \frac{c}{n} \text{ yoki } P = \frac{h\nu}{cn}$$

$$\text{Javob: } P = \frac{h\nu}{cn}; P = \frac{mc}{n}$$

4°-Ber.

$$m = m_e$$

$$E = ?$$

$$E = mc^2 = m_e c^2$$

$$E = 9,1 \cdot 10^{-31} \cdot 9 \cdot 10^{16} = 81,9 \cdot 10^{-15} \text{ Joul.}$$

$$E = \frac{81,9 \cdot 10^{-15}}{1,6 \cdot 10^{-19}} = 51 \cdot 10^4 \text{ eV}$$

Javob:  $E = 0,51 \text{ MeV}$

Abdubannanov Akramjon

5°-Ber.

$$\mathcal{D} = 10^{17} \text{ gr}$$

$$\alpha = 0^\circ$$

$$\Delta P = ?$$

$$\Delta P = 2 \frac{h\nu}{c}$$

\* Töla yutsa  $\rightarrow \Delta P = h\nu$

\* Tek tushib qaytsa  $\rightarrow \Delta P = 2 \frac{h\nu}{c}$

\*  $\alpha$  burchak ostida tushib qaytsa  $\rightarrow \Delta P = \frac{2h\nu}{c} \cos \alpha$

$$= 2 \cdot \frac{6,62 \cdot 10^{-34} \cdot 10^{17}}{3 \cdot 10^8} = 4,4 \cdot 10^{-25} \text{ kg} \cdot \frac{\text{m}}{\text{s}}$$

Javob:  $\Delta P = 4,4 \cdot 10^{-25}$

6°-Ber.

$$S = 100 \cdot 10^{-4} \text{ m}^2$$

$$t = 60 \text{ s}$$

$$E = 63 \text{ J.}$$

$$P = ?$$

$$P = \frac{I}{c}$$

$$I = \frac{E}{st}$$

$$P = \frac{2E}{st \cdot c}$$

$$P = \frac{2 \cdot 63}{10^{-2} \cdot 60 \cdot 3 \cdot 10^8} = 7 \cdot 10^{-7} \frac{\text{N}}{\text{m}^2}$$

Yorug'lik qaytgani uchun  
Töla yutsa

Javob:  $P = 7 \cdot 10^{-7} \frac{\text{N}}{\text{m}^2}$

7°-Ber

\* Yorug'likne to'la yutsa -  $P_1 = \frac{E}{S \cdot t \cdot c}$

$\frac{P_2}{P_1} = \frac{2EStc}{StcE} = 2$   
 $P_2 = 2P_1$

\* Yorug'likne qaytarsa -  $P_2 = \frac{2E}{S \cdot t \cdot c}$

Javob: 2 marta

8°-Ber

$\lambda = 3 \cdot 10^{-7} \text{ m}$  |  $E = \frac{hc}{\lambda}$   $E = \frac{6,62 \cdot 10^{-34} \cdot 3 \cdot 10^8}{3 \cdot 10^{-7}} = 6,62 \cdot 10^{-19} \text{ J}$

$E = ?$

Javob:  $E = 6,62 \cdot 10^{-19} \text{ Joul}$

9°-Ber

$A = 3,3 \cdot 10^{-19} \text{ J}$  |  $A = h\nu$   $\nu = \frac{A}{h} = \frac{3,3 \cdot 10^{-19}}{6,6 \cdot 10^{-34}} = 5 \cdot 10^{14} \text{ gr}$

$\nu = ?$

Javob:  $\nu = 5 \cdot 10^{14} \text{ gr}$

10°-Ber

$\lambda = 5 \cdot 10^{-7} \text{ m}$  |  $p = \frac{h}{\lambda}$   $p = \frac{6,6 \cdot 10^{-34}}{5 \cdot 10^{-7}} = 1,32 \cdot 10^{-27} \text{ kg} \cdot \text{m/c}$

$p = ?$

Javob:  $p = 1,32 \cdot 10^{-27} \text{ kg} \cdot \frac{\text{m}}{\text{c}}$

11°-Ber

$E = 4,4 \cdot 10^{-19} \text{ J}$  |  $E = \frac{hc}{\lambda n}$   $n = \frac{hc}{\lambda E} = \frac{6,6 \cdot 10^{-34} \cdot 3 \cdot 10^8}{3 \cdot 10^{-7} \cdot 4,4 \cdot 10^{-19}} = 1,5$

$\lambda = 3 \cdot 10^{-7} \text{ m}$

Javob:  $n = 1,5$

$n = ?$

Abdubannanov Akramjon

12°-Ber

$\nu_q = 4,3 \cdot 10^{14} \text{ gr}$  |  $E_k \uparrow$   $h\nu$   $h\nu = A_d + E_k$   $E_k = \frac{hc}{\lambda} - h\nu_q$

$\lambda = 3 \cdot 10^{-7} \text{ m}$

$A_d \uparrow$

$E_k = 6,6 \cdot 10^{-34} \left( \frac{3 \cdot 10^8}{3 \cdot 10^{-7}} - 4,3 \cdot 10^{14} \right) = 37,6 \cdot 10^{-20} \text{ J}$

$E_k = ?$

Javob:  $E_k = 3,76 \cdot 10^{-19} \text{ J}$

13°-Ber.

$E_1 \uparrow$   $h\nu_1$

$E_2 \uparrow$   $h\nu_2$

$\nu_2 = 3\nu_1$

$A_d \uparrow$

$h\nu_1 = A_d + E_1$

$A_d \uparrow$

$h\nu_2 = A_d + E_2$

\* Chiqish ishlarene tenglaymiz.

$E_2 = 2h\nu_1 + E_1$

Xulosa:  $E_2 > E_1$

$h\nu_1 - E_1 = h\nu_2 - E_2$   
 $h\nu_1 - E_1 = 3h\nu_1 - E_2$

Javob:  $E_2 > 3E_1$  Taqriban

14°-Ber

$\lambda = 600 \cdot 10^{-9} \text{ m}$  |  $\frac{hc}{\lambda} = A_d + U_q$   $\frac{4,1 \cdot 10^{-15} \text{ eV} \cdot 3 \cdot 10^8}{600 \cdot 10^{-9}} = 1,8 \text{ eV} + U_e$

$A_d = 1,8 \cdot 1,6 \cdot 10^{-19} \text{ J}$

$U = 0,25 \text{ V}$

$U = ?$

Javob:  $U = 0,25 \text{ V}$

Omad yor bolsen!!!

15°-Ber  
 $N = 100 \text{ Vt}$   
 $t = 2 \text{ s}$   
 $n = 2,5 \cdot 10^{20}$

$$\frac{hc}{\lambda} \cdot n = N \cdot t \quad \lambda = \frac{hc n}{N t}$$

$$\lambda = \frac{6,6 \cdot 10^{-34} \cdot 3 \cdot 10^8 \cdot 2,5 \cdot 10^{20}}{100 \cdot 2} = 2,5 \cdot 10^{-8} \text{ m}$$

$\lambda = ?$

Javob:  $\lambda = 2,5 \cdot 10^{-7} \text{ m}$

16°-Ber  
 $\mathcal{D} = 10^{16} \text{ gr}$

$$\Delta P = \mathcal{D} \frac{h \mathcal{D}}{c}$$

$$\Delta P = \mathcal{D} \cdot \frac{6,6 \cdot 10^{-34} \cdot 10^{16}}{3 \cdot 10^8} = 4,4 \cdot 10^{-26} \text{ kg} \cdot \frac{\text{m}}{\text{c}}$$

$\Delta P = ?$

Javob:  $\Delta P = 4,4 \cdot 10^{-26} \text{ kg} \cdot \frac{\text{m}}{\text{c}}$

Abdubannanov Akramjon.

17°-Ber  
 $\lambda = 165 \cdot 10^{-9} \text{ m}$   
 $A_{ch} = 4,5 \text{ eV}$

$$\frac{hc}{\lambda} = A_{ch} + U_e$$

$$\frac{4,1 \cdot 10^{-15} \text{ eV} \cdot 3 \cdot 10^8}{165 \cdot 10^{-9}} = 4,5 \text{ eV} + U_e$$

$$U = 2,95 \text{ V}$$

$U = ?$





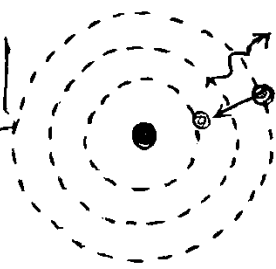
11-sinf masalalari yechimlari!

7-mashq

1°-Ber

$\lambda = 6,56 \cdot 10^{-17} \text{ m}$

$\Delta E = ?$



$\Delta E = \frac{hc}{\lambda}$

$\Delta E = \frac{6,6 \cdot 10^{-34} \cdot 3 \cdot 10^8}{6,56 \cdot 10^{-17}} = 3 \cdot 10^{-9} \text{ Joul}$

Javob:  $\Delta E = 3 \cdot 10^{-9} \text{ Joul}$

8°-Ber.

$T = 2 \text{ sutka}$

$t = 6 \text{ sutka}$

$\frac{N}{N_0} \cdot 100\% = ?$

$N = N_0 \cdot 2^{-\frac{t}{T}}$

$N = N_0 \cdot 2^{-\frac{6}{2}}$

$\frac{N}{N_0} = \frac{1}{8} = 0,125$

$\frac{N}{N_0} \cdot 100\% = 12,5\%$

Javob: 12,5%

9°-Ber

$t = 8 \text{ kun}$

$N = \frac{N_0}{4}$

$T = ?$

$N = N_0 \cdot 2^{-\frac{t}{T}}$

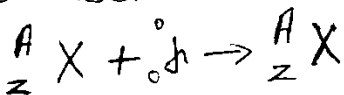
$\frac{N_0}{4} = N_0 \cdot 2^{-\frac{8}{T}}$

$2^{-2} = 2^{-\frac{8}{T}} \rightarrow T = 4 \text{ kun}$

Javob:  $T = 4 \text{ kun}$

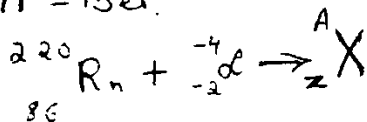
Abdubannanov Akramjon

10°-Ber



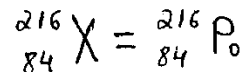
Javob: o'zgar olmaydi.  $h^0$

11°-Ber.



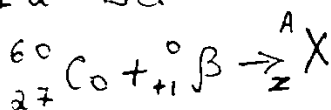
$220 - 4 = A \rightarrow A = 216$

$86 - 2 = Z \rightarrow Z = 84$



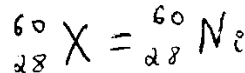
Javob:  ${}_{84}^{216} \text{Po}$

12°-Ber



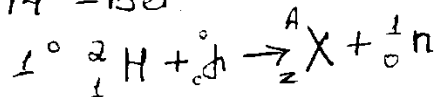
$60 + 0 = A \rightarrow A = 60$

$27 + 1 = Z \rightarrow Z = 28$



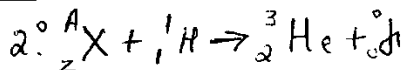
Javob:  ${}_{28}^{60} \text{Ni}$

14°-Ber



$2 + 0 = A + 1 \rightarrow A = 1$

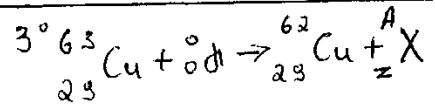
$1 + 0 = Z + 0 \rightarrow Z = 1$



$A + 1 = 3 + 0 \rightarrow A = 2$

$Z + 1 = 2 + 0 \rightarrow Z = 1$

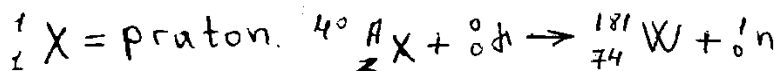
${}_1^2 X = \text{deytron}$



$63 + 0 = 62 + A \rightarrow A = 1$

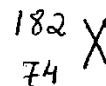
$29 + 0 = 29 + Z \rightarrow Z = 0$

${}_0^1 X = \text{neytron}$



$A + 0 = 181 + 1 \rightarrow A = 182$

$Z + 0 = 74 + 0 \rightarrow Z = 74$



2° - Ber 1°  $A = 7$   $A = N + Z \rightarrow$  Atom massasi  
 $7$   ${}^7_3\text{Li}$  |  $Z = 3$  proton va elektronlar soni  
 $3$   $N = A - Z = 4 \rightarrow$  neytronlar soni.

$E_{sol} = ?$  2°  $m_p = 1,00728 \text{ m.a.b}$   $m_n = 1,00866 \text{ m.a.b}$   
 $m_y = 1,00205 \text{ m.a.b}$   $1 \text{ m.a.b} = 1,67 \cdot 10^{-27} \text{ kg}$

3°  $E_{sol} = \frac{E_{bog}}{A}$   $E_{bog} = \Delta mc^2 = (Z m_p + N m_n - m_y) \cdot c^2$

4°  $E_{bog} = (3 \cdot 1,00728 + 4 \cdot 1,00866 - 7 \cdot 1,00205) \cdot 1,67 \cdot 10^{-27} \cdot 9 \cdot 10^{16} = 0,63321 \cdot 10^{-11} \text{ J}$

$E_{bog} = \frac{0,63321 \cdot 10^{-11}}{1,6 \cdot 10^{-19}} = 0,39575 \cdot 10^8 \text{ eV}$

5°  $E_{sol} = \frac{0,39575 \cdot 10^8 \text{ eV}}{7} = 0,0565 \cdot 10^8 \text{ eV} = 5,6 \text{ MeV}$  Javob:  $E_{sol} = 5,6 \text{ MeV}$

3° - Ber  
 ①  $9$   ${}^9_4\text{Be}$   $A = 9$   
 $4$   $Z = 4$   
 $N = 5$

1°  $E_{bog} = (Z m_p + N m_n - m_y) \cdot c^2 =$   
 $= (4 \cdot 1,00728 + 5 \cdot 1,00866 - 9,00597) \cdot 1,67 \cdot 10^{-27} \cdot 9 \cdot 10^{16} =$   
 $= 0,998 \cdot 10^{-11} \text{ Joule}$

②  $27$   ${}^{27}_{13}\text{Al}$   $A = 27$   
 $13$   $Z = 13$   
 $N = 14$

2°  $E_{sol} = \frac{E_{bog}}{A} = \frac{0,998 \cdot 10^{-11}}{9 \cdot 1,6 \cdot 10^{-19}} = 6,9 \text{ MeV}$

1°  $E_{bog} = (13 \cdot 1,00728 + 14 \cdot 1,00866 - m_y) \cdot 1,67 \cdot 10^{-27} \cdot 9 \cdot 10^{16} =$

2°  $E_{sol} = \frac{E_{bog}}{A \cdot 1,6 \cdot 10^{-19}} = \dots \text{ MeV}$

5° - Ber  
 $2$   ${}^2_1\text{H}$   $A = 2$   
 $1$   $Z = 1$   
 $N = 1$

①  $E_{bog} = (1 \cdot 1,00728 + 1 \cdot 1,00866 - 2,01410) \cdot 1,67 \cdot 10^{-27} \cdot 3 \cdot 10^8 =$   
 $= 0,02765 \cdot 10^{-11} \text{ Joule} = 1,7284 \text{ MeV}$

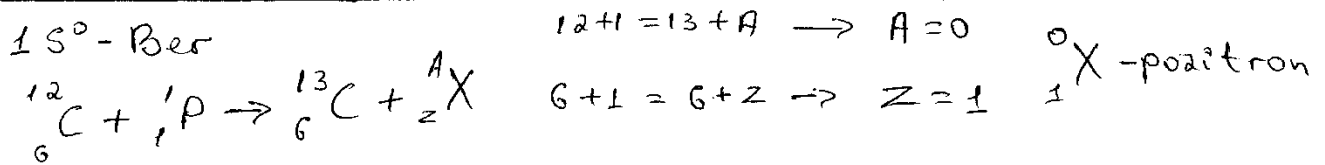
②  $E_{sol} = \frac{1,7284 \text{ MeV}}{2} = 0,8642 \text{ MeV}$

6° - Ber  
 $14$   ${}^{14}_7\text{N}$   $A = 14$   
 $7$   $Z = 7$   
 $N = 7$

1°  $E_{bog} = (7 \cdot 1,00728 + 7 \cdot 1,00866 - 14,00307) \cdot 1,67 \cdot 10^{-27} \cdot 9 \cdot 10^{16} =$   
 $= 1,6304 \cdot 10^{-11} \text{ Joule} = 101,9 \text{ MeV}$

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15°-Ber



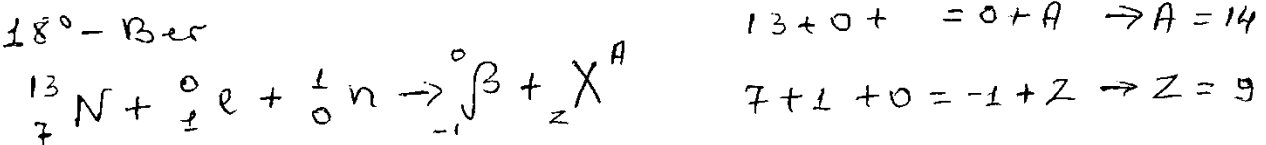
16°-Ber

$d_2^4$  - zarra elementar zarra bōla oladi.

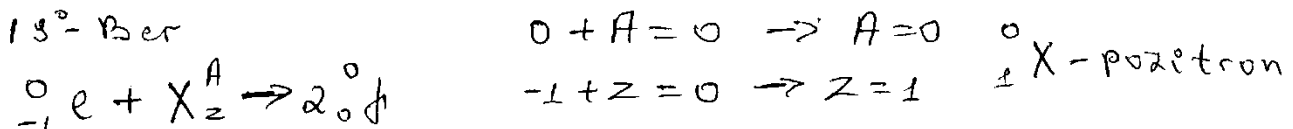
17°-Ber

- \* Elektron antizarrasi - pozitron
- \* Proton antizarrasi - antiproton
- \* Neytronning antizarrasi - antineytron.

18°-Ber



19°-Ber



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