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Termiz muhandislikva agrotexnologiyalar universiteti.

Annotatsiya. Ushbu maqolada muallif Oliy ta'lim muassasalarida fizika fanining o'qitilishi va har tomonlama rivojlantirish, shuningdek, fizikani o'qitishda induksiya, deduksiya metodlaridan foydalanish haqida batafsil bayon qiladi va ilmiy-tadqiqot muassasalarida fizika ta'limini rivojlantirish, fizikaning elektromagnetizm bolimini o'qitishda induksiya, deduksiya metodlaridan keng foydalanish, xalqaro baholash dasturini tatbiq etish, takomillashtirish, fizika o'qitishda integrativ yondashish asosida ta'lim mazmunini modernizatsiyalash, ta'limda innovatsion axborot texnologiyasini joriy etish bo'yicha ilmiy-tadqiqot ishlari olib borilmoqda bu tadqiqotlarda har bo'limdan masalalar yechish doizarb hisoblanadi. Bugun Oliy ta'lim tizimida katta islohotlar va yangiliklar amalga oshirilmoqda. Shunga ko'ra tabalabalarga har bir fanning mazmunini chuqur singdirish va har bir fan doirasida malakali kadr tayyorlash masalalari ayni ustivor mavzulardan biridir.

mavzuning maqsadi. Texnika oliy ta'lim muassasalarida bo'lajak texnik muxandislarni tayyorlashda kompetensiyaviy yondashuvning metodik asoslarini takomillashtirish yuzasidan ilmiy asoslangan taklif va tavsiyalar ishlab chiqishdan, hamda o'qitish metodikasini takomillashtirish va masalalar yechishdan iborat.

Mavzuning vazifasi .Kompetensiyaga asoslangan yondashuv talabani shaxsiy maqsadlari va vazifalari bilan ta'lim jarayonining asosiy ishtirokchisiga aylanadi. Ushbu yondashuv talabani faol, ongli faoliyatga jalb qilish, axborot, kommunikativ, ta'lim va bilish qobiliyatlarini, shaxsiy salohiyatini rivojlantirish, o'z-o'zining qadr-qimmatini shakllantirish, o'z-o'zini boshqarish qobiliyatini rivojlantirishga imkon beradi. Talaba qobiliyati uning kompetensiyasi orqali namoyon bo'ladi. Talaba fazilatlarini, motivatsiyasi, qobiliyati kombinatsiyasini quyidagicha vektor shaklida ko'rsatish mumkin va uning tarkibi, bilim, ko'nikma, malaka va kompetensiya to'plami sifatida shakllantirishdan iborat.

Elektr tebranishlarga doir muammoli masalalar echishda Asosiy tushuncha va formulalar

Muhitda elektromagnit to'lqinlarining tarqalish tezligi:

$$g = \frac{c}{n} = \frac{c}{\sqrt{\epsilon\mu}}; n = \sqrt{\epsilon\mu}.$$

Bu yerda c -yorug‘likning bo‘shliqdagi tarqalish tezligi, ϵ, μ -mos ravishda muxitning nisbiy dielektrik va magnit singdiruvchanligi, n -muxitning nisbiy sindirish ko‘rsatkichi.

Tebranishlar konturidagi elektromagnit tebranishlarning davri, chastotasi va siklik chastotasi:

$$T = \frac{1}{\nu} = \frac{2\pi}{\omega_0} = 2\pi\sqrt{LC}; \nu = \frac{1}{T} = \frac{\omega_0}{2\pi} = \frac{1}{2\pi\sqrt{LC}};$$

$$\omega_0 = 2\pi\nu = \frac{2\pi}{T} = \frac{1}{\sqrt{LC}},$$

bu yerda L va C -tebranishlar konturining induktivligi va sig‘imi .

Tebranishlar konturidagi zaryadning va tokning vaqtga bog‘lanishi:

$$q = q_m \cos \omega_0 t; i = -q_m \omega_0 \sin \omega_0 t = I_m \cos\left(\omega_0 t + \frac{\pi}{2}\right),$$

bu yerda: q_m -zaryad tebranishlarining amplitudasi, $I_m = q_m \omega_0$ -tok kuchi tebranishlarining amplitudasi.

$$\text{Radiolokatsiya: } s = \frac{ct}{2}$$

t -elektromagnit to‘lqinini nishonga borib kelish vaqti, $c=3 \cdot 10^8$ m/s, yorug‘likning vakuumdagi tezligi.

Tebranish konturi sig‘imi 2,5 mF bo‘lgan kondensator va induktivligi 1 h ga teng o‘altakdan iborat. kondensator qoplamalaridagi zaryadning amplitudasi 0,5 mC bo‘lsa, zaryad tebranishlari tenglamasini yozing. (Javobi: $0,5 \cdot 10^{-6} \cos 630 \cdot 10^6 t$).

Berilgan

Formula

Xisoblash

$$\begin{aligned}
 C &= 2,5 \mu F = 2,5 \cdot 10^{-6} F & q &= q_m \sin(\omega \cdot t + \varphi_0) & \omega &= \frac{1}{\sqrt{1 \cdot 2,5 \cdot 10^{-6}}} = 630 \cdot 10^6 \\
 L &= 1 H & & & & \\
 q_0 &= 0,5 \mu C = 0,5 \cdot 10^{-3} C & \text{Bunda } \omega &= \frac{I}{\sqrt{LC}} & q &= 0,5 \cdot 10^{-6} \cos 630 \cdot 10^6 t \\
 \varphi_0 &= 0 & & & & \\
 \text{-----} & & & & & \\
 q(t) &= ? & & & &
 \end{aligned}$$

2.Masala

Tebranish konturi sio‘imi 2,5 mF bo‘lgan kondensator va induktivligi 1h ga teng o‘altakdan iborat. kondensator qoplamalaridagi zaryadning amplitudasi 0,5 mC bo‘lsa, zaryad tebranishlari tenglamasini yozing. (Javobi: $0,5 \cdot 10^{-6} \cos 630 \cdot 10^6 t$).

Berilgan	Formula	Xisoblash
$C = 2,5 \mu F = 2,5 \cdot 10^{-6} F$ $L = 1 H$ $q_0 = 0,5 \mu C = 0,5 \cdot 10^{-3} C$ $\varphi_0 = 0$ ----- $q(t) = ?$	$q = q_m \sin(\omega \cdot t + \varphi_0)$ Bunda $\omega = \frac{I}{\sqrt{LC}}$	$\omega = \frac{1}{\sqrt{1 \cdot 2,5 \cdot 10^{-6}}} = 630 \cdot 10^6$ $q = 0,5 \cdot 10^{-6} \cos 630 \cdot 10^6 t$

o‘altakning induktivligi 0,04 h bo‘lgan tebranish konturining erkin tebranishlar chastotasi 800 Hz. Konturdagi kondensator sio‘imi nimaga teng? (Javobi: 1mF)

Berilgan	Formula	Xisoblash
$L = 0,04 H$ $\nu = 800 Hz$ ----- $C = ?$	$\omega = \frac{I}{\sqrt{LC}}$ va $\omega = 2 \cdot \pi \cdot \nu$	$C = \frac{1}{4 \cdot 3,14^2 \cdot 800^2 \cdot 0,04} = 1 \cdot 10^{-6} F$
	$C = \frac{1}{4 \cdot \pi^2 \cdot \nu^2 \cdot L}$	

Sio‘imi 0,5 mF teng zaryadlangan kondensator induktivligi 5 mH bo‘lgan o‘altak bilan ulangan. Qancha vaqtdan so‘ng kondensatorning elektr maydon energiyasi o‘altakning magnit maydon energiyasiga teng bo‘ladi? (Javobi: $39 \cdot 10^{-5} s$).

Berilgan	Formula	Xisoblash
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$$L = 5 \cdot 10^{-3} \text{ H}$$

$$C = 0,5 \mu\text{F} = 0,5 \cdot 10^{-6}$$

$$t = ?$$

$$\omega = \frac{I}{\sqrt{LC}}$$

$$W^{\max} = \frac{q_0^2}{2C}$$

$$W^{\max} = W^{\text{elektr}} / 2 + W^{\text{ma}}$$

$$= 2W^{\text{elektr}}$$

$$q_0^2 = 2q^2; \text{ bundan } q = \frac{q_0}{\sqrt{2}}$$

$$q = q_m \sin(\omega \cdot t + \varphi_0)$$

$$\frac{q_0}{\sqrt{2}} = q_0 \sin(\omega \cdot t + 0)$$

$$\sin \frac{\pi}{4} = \sin(\omega \cdot t + 0)$$

$$\frac{\pi}{4} = \omega \cdot t$$

$$\frac{\pi}{4 \cdot \omega} = t$$

$$\omega = \frac{1}{\sqrt{5 \cdot 10^{-3} \cdot 0,5 \cdot 10^{-6}}} = \frac{10^5}{5} =$$

$$t = \frac{3,14}{4 \cdot 2 \cdot 10^4} = 39 \cdot 10^{-6} \text{ s}$$

Aktiv qarshiligi 50Ω bo'lgan o'zgaruvchan tok zanjiridagi kuchlanishning amplituda qiymati 100 V , tebranish chastotasi 100 Hz . Zanjir dagi tok tebranishlari tenglamasini yozing. (Javobi: $2 \cos 200\pi t$).

Berilgan

$$R = 50 \Omega$$

$$U_0 = 100 \text{ V}$$

$$\nu = 100 \text{ Hz}$$

$$I(t) = ?$$

Formula

$$I = I_0 \cos(\omega \cdot t_0)$$

$$\omega = 2\pi\nu$$

$$I_0 = \frac{U_0}{R}$$

Xisoblash

$$\omega = 2 \cdot \pi \cdot 100 = 200\pi \frac{\text{rad}}{\text{s}}$$

$$I = \frac{100}{50} = 2 \text{ A}$$

$$I = 2 \cos(200 \cdot \pi \cdot t)$$

Zanjirdagi tok kuchi $8,5 \sin(628t + 0,325)$ qonuni bo'yicha o'zgaradi. Tok kuchining effektiv qiymatini, tebranishlar fazasi va chastotasini toping. (Javobi: $6,03 \text{ A}$; $0,325 \text{ rad}$; 100 Hz).

Berilgan

Formula

Xisoblash

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

$$I_{ef} = ? \quad \varphi = ? \quad \nu = ?$$

$$I_{ef} = \frac{I_m}{\sqrt{2}}$$

$$\varphi = \omega t + \varphi_0$$

$$\omega = 2\pi\nu$$

$$\text{bundan } \nu = \frac{\omega}{2\pi}$$

$$I_{ef} = \frac{8,5}{\sqrt{2}} = 6,03A$$

$$\varphi = \omega t + \varphi_0 = 628t + 0,325 =$$

$$\nu = \frac{628}{2 \cdot 3,14} = 100Hz$$

O'zgaruvchan tok zanjiriga ulangan kondensatordagi tok kuchi $0,03 \cos(314t + 1,57)$ qonuni bo'yicha o'zgaradi. kondensatordagi maksimal kuchlanish $60V$ bo'lsa, uning sio'imini aniqlang. (Javobi: $5,3 \mu F$).

Berilgan

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

$$U_0 = 60V$$

$$C = ?$$

Formula

$$i = I_m \cos(\omega \cdot t + \varphi_0)$$

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

$$I_0 = 0,03; \quad \omega = 314$$

$$I_0 = q_0 \omega \quad \text{bundan } q_0 =$$

$$C = \frac{q_0}{U_0}$$

Xisoblash

$$q_0 = \frac{0,03}{314} =$$

$$C = \frac{0,03}{314 \cdot 60} = 1,5 \cdot 10^{-6} F = 1,5 \mu F$$

Kuchlanishning effektiv qiymati $127V$ bo'lgan zanjirga induktivligi $0,16H$, aktiv qarshiligi 2Ω va sio'imi $64 \mu F$ bo'lgan kondensator ketmaket ulangan. Tokning chastotasi $200Hz$. Tok kuchining effektiv qiymatini toping.

Berilgan

$$U_0 = 127V$$

$$L = 0,16H$$

$$R = 2\Omega$$

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

$$\nu = 200Hz$$

$$I_{ef} = ?$$

Formula

$$I_{ef} = \frac{I_m}{\sqrt{2}}$$

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

$$\omega = 2\pi\nu$$

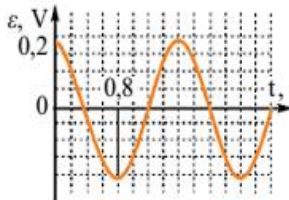
Xisoblash

$$\omega = 2\pi \cdot 200 = 400\pi$$

$$I_{ef} = \frac{127}{\sqrt{2^2 + (400\pi \cdot 0,16 - \frac{1}{400\pi \cdot 64})^2}}$$

Rasmda zanjirdagi eYukning vaqtga bo'liqlik grafigi keltirilgan. O'zgaruvchan tokning maksimal qiymatini, uning davrini, chastotasini toping. e(t) bo'lanish formulasini yozing.

Berilgan



Formula

$$\begin{aligned} \varepsilon &= \varepsilon_m \sin(2\pi \cdot \nu \cdot t + \varphi_0) \\ \varphi_0 &= \frac{\pi}{2}; T = 2 \cdot 0,8 = 1,6; \\ \nu &= \frac{1}{T} = \frac{10}{16} = \frac{5}{8} \\ \varepsilon_0 &= 0,2 \end{aligned}$$

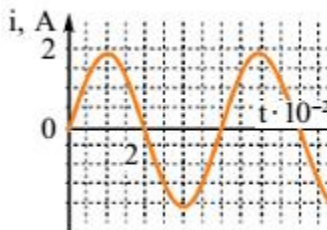
Xisoblash

$$\begin{aligned} \varepsilon &= 0,2 \sin\left(2\pi \cdot \frac{1}{1,6} \cdot t + \frac{\pi}{2}\right) \\ &= 0,2 \sin\left(\frac{5\pi}{4} t + \frac{\pi}{2}\right) \end{aligned}$$

$\varepsilon_0=? T=? H=?$

Rasmda zanjirdagi tok kuchining vaqtga bo'liqlik grafigi keltirilgan. O'zgaruvchan tokning maksimal qiymatini, uning davrini, chastotasini toping. i(t) bo'lanish formulasini yozing.

Berilgan



Formula

$$\begin{aligned} i &= I_m \cos\left(\frac{2\pi}{T} \cdot t + \varphi_0\right) \\ \varphi_0 &= \frac{\pi}{2}; T = 2 \cdot (t \cdot 10^{-2}) = 2 \cdot (2 \cdot 10^{-2}) \\ &= 4 \cdot 10^{-2} s \\ \nu &= \frac{1}{T} = \frac{1}{4 \cdot 10^{-2}} = \frac{100}{4} = 25 Hz \\ I_m &= 2 A \end{aligned}$$

Xisoblash

$$\begin{aligned} I &= 2 \cos\left(2\pi \cdot 25 t + \frac{\pi}{2}\right) \\ &= 2 \cos(50\pi t + \frac{\pi}{2}) \end{aligned}$$

$I_0=? T=? H=? I(t)=?$

Aktiv qarshiligi 50Ω bo'lgan o'zgaruvchan tok zanjiridagi kuchlanishning amplituda qiymati 100 V, tebranish chastotasi 100 hz. Zanjir dagi tok tebranishlari tenglamasini yozing. (Javobi: $2 \cos 200pt$).

Berilgan

Formula

Xisoblash

$$R = 50\Omega$$

$$U_0 = 100V$$

$$\nu = 100Hz$$

$$I(t) = ?$$

$$I = I_0 \cos(\omega \cdot t_0)$$

$$\omega = 2\pi\nu$$

$$I_0 = \frac{U_0}{R}$$

$$\omega = 2 \cdot \pi \cdot 100 = 200\pi \frac{rad}{s}$$

$$I = \frac{100}{50} = 2A$$

$$I = 2 \cos(200 \cdot \pi \cdot t)$$

O‘zgaruvchan tok zanjiriga ulangan kondensatordagi tok kuchi $0,03 \cos(314t + 1,57)$ qonuni bo‘yicha o‘zgaradi. kondensatordagi maksimal kuchlanish 60 V bo‘lsa, uning sio‘imini aniqlang. (Javobi: 5,3 mF).

Berilgan	Formula	Xisoblash
$I = 0,03 \cos(314t + 1,57)$	$i = I_m \cos(\omega \cdot t + \varphi_0)$	
$U_0 = 60V$	$I = 0,03 \cos(314t + 1,57)$	$q_0 = \frac{0,03}{314} =$
$C = ?$	$I_0 = 0,03; \quad \omega = 314$	$C = \frac{0,03}{314 \cdot 60} = 1,5 \cdot 10^{-6} F = 1,5 \mu F$
	$I_0 = q_0 \omega$ bundan $q_0 =$	
	$C = \frac{q_0}{U_0}$	

Foydalanilgan adabiyotlar:

1. Султонова Ў.Н. International Jurnal oh F CrossRef indexed. Independent learning of students on tihe bass of competence based approach isa guarentee of high efficiency.” Journal Impact Factor -:7.445 ; vol -:7 issue, 12 desember 2019 Res 7 (12) 16-22 Б. www.journalijar.com

2. Sultanova. O‘.N. “The Place of Competent Approach in Interdisciplinary Relations is a Guarantee of High Efficiency”. In IJICCE, Impact Factor -:7.488 Volume 9, Issue 5, May 2021. <http://ijirccce.com/admin/main/storage/app/pdf/Sx97XFNk9dc709DHPqRISxu4gNd3dfKKSZYTV5ug.pdf>

3. Sultanova O‘.N. “Based on students’ competency-based approach to physics colve experimental and graphical problems”. Impact Factor -7.472; In Volume 9, Issue 5, May, 2021. <https://internationaljournals.co.in/index.php/giirj/article/view/51/51>

4. Sultanova O‘.N. Technology for solving problems using graphical methods in mathematics lessons and circle lessons . Impact Factor -7.492; Vol. 10, Issue 11, November-:2020й,2265-2275.Б

5. Ў.Н.Султонова “утройство для контроля физико-химических параметров питьевой воды”. “техника ва технологик фанлар соҳаларининг инновацион масалалари” мавзусидаги халқаро илмий-техник анжумани.-.: 2020 йил 22 сентябрь. -с. 393-395 б.