TOSHKENT KIMYO-TEXNOLOGIYA INSTITUTI
SHAHRISABZ FILIALI

FIZIKA
Fanidan amaliy mashg'ulot

Tokning ishi va quvvati. Joul -Lens qonuni. Kirxgoff qoidalari

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1. 19.26.Akkumulyatorlar batareyasining EYuK ε=12V, qisqa tutashuv- ning tok kuchi I=5A. Shunday batareyaga ulangan tashqi zanjirda qanday eng katta quvvat P_{max} olish mumkin?

Berilgan

ε=12V

$I_{q.t}$=5A

P-?

Yechilishi

$$r = \frac{\varepsilon}{I_{q.t}}$$

$$I = \frac{\varepsilon}{R+r} = \frac{\varepsilon}{2r} = \frac{\varepsilon\, I_{q.t}}{2\,\varepsilon} = \frac{I_{q.t}}{2}$$

$$P = IU = I^2R = I^2r = \frac{I_{q.t}^2}{4} \cdot \frac{\varepsilon}{I_{q.t}} = \frac{I_{q.t}\,\varepsilon}{4}$$

$$P = \frac{5 \cdot 12}{4} = 15\text{Vt}$$

2. 19.25. Ketma-ket ulangan lampochka va reostat tok manbaiga tutashtirilgan. Lampochka qisqichlaridagi kuchlanish U=40 V, reostatning qarshiligi R=10 Ω. Tashqi zanjir P=120 Vt quvvat iste’mol qiladi. Zanjirdagi tok kuchi I topilsin.

Berilgan

U=40 V

R=10 Ω

P=120 Vt

I-?

Yechilishi

$P= I^2R_e$

$R_1=\frac{U}{I}$

$R_e=R+R_1$

$P= I^2(R+\frac{U}{I})= I^2R+IU$

$I^2R+IU-P=0$

$10\ I^2+40I-120=0$

$I^2+4I-12=0$

$I=2A$

3. 19.30. Elektr qaynatgichning o’rami ikki bo’limga ega. Agar faqat birinchi bo’lim ulansa, unda suv t_1=15 min da qaynaydi. Faqat ikkinchisi ulanganda esa $t_2 = 30$ min da qaynaydi. Agar ikkala bo’lim ham ketma-ket; parallel ulansa suv necha minutdan keyin qaynaydi?

Berilgan

t_1= 15 min

t_2= 30 min

a) t_{kk}-?

b) t_{pp}-?

Yechilishi

$Q = \frac{U^2}{R} t$

a) $Q = \frac{U^2}{R_{1+}\, R_2} t$

$Q = \frac{U^2}{R_1} t_1$; $Q = \frac{U^2}{R_2} t_2$

$\frac{U^2}{R_1} t_1 = \frac{U^2}{R_2} t_2$; $R_1 = \frac{t_1 R_2}{t_2}$

$Q = \frac{U^2}{\frac{t_1}{t_2} R_2 + R_2} t_{kk} = \frac{U^2}{R_2(\frac{t_1}{t_2}+1)} t_{kk}$; $\frac{U^2}{R_2} t_2 = \frac{U^2}{R_2(\frac{t_1}{t_2}+1)} t_{kk}$

$t_{kk} = t_1 + t_2$; t_{kk}= 15 min + 30 min = 45 min

b) $t_{pp} = \frac{t_1 \cdot t_2}{t_1 + t_2} = \frac{15 \cdot 30}{15+30}$ =10 min

Topshiriq

1. Akkumulyatorlar batareyasining EYuK ε=12V, qisqa tutashuvning tok kuchi I= **n** A. Shunday batareyaga ulangan tashqi zanjirda qanday eng katta quvvat P_{max} olish mumkin?
2. EYuK ε=2V va ichki qarshiligi r= **n** Ω bo'lgan akkumulyatorlar batareyasiga o'tkazgich uladilar. 1) Unda ajraladigan quvvat maksimal bo'lishi uchun lozim bo'ladigan o'tkazgichning R qarshiligi, 2) bu holda o'tkazgichda ajraladigan quvvat P aniqlansin.
3. Batareyaning EYuK ε=20 V. Tashqi zanjirning qarshiligi R=2 Ω, tok kuchi I= 4A. Batareyaning FIK topilsin. Tashqi qarshilik R ning qanday qiymatida FIK 99% ga teng bo'ladi.

Izoh**:** **n** sonining o'rniga har bir talaba o'zining jurnaldagi nomerini masalaga qo'yib ishlaydi.