

1. Kinematika

Bir avtomobil 0 dan 20 m/s gacha 5 soniyada tezlanadi.

a) Tezlanish qiymatini toping.

b) Shu tezlanish bilan avtomobil qancha masofa bosadi?

Berilgan: Avtomobil 0 dan 20 m/s gacha 5 soniyada tezlanadi.

Boshlang'ich tezlik:
 $v_0 = 0 \text{ m/s}$

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

Tezlanish: $a = ?$

Yakuniy tezlik:
 $v = 20 \text{ m/s}$
($\approx 72 \text{ km/soat}$)

0 m

S = ?

Masofa: $S = ?$

a) Tezlanish qiymatini topish:


$$a = \frac{v - v_0}{t} = \frac{20 - 0}{5} = 4 = 4 \text{ m/s}^2$$

$a = 4 \text{ m/s}^2$

b) Bosilgan masofani topish:

$$S = v_0 t + \frac{1}{2} at^2 = 0 \cdot 5 + \frac{1}{2} 4 \cdot 5^2$$
$$S = 0 + 2 \cdot 25 = 50 \text{ m}$$

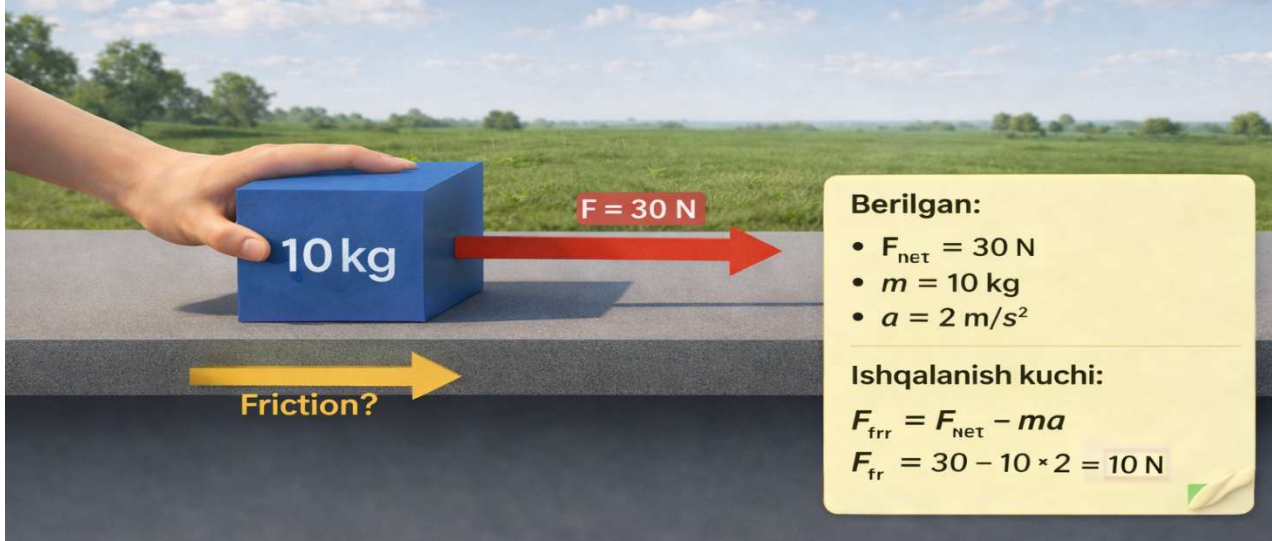
$S = 50 \text{ m}$

 **Javob: a) Tezlanish: 4 m/s² b) Bosilgan masofa: 50 metr**

2. Dinamika

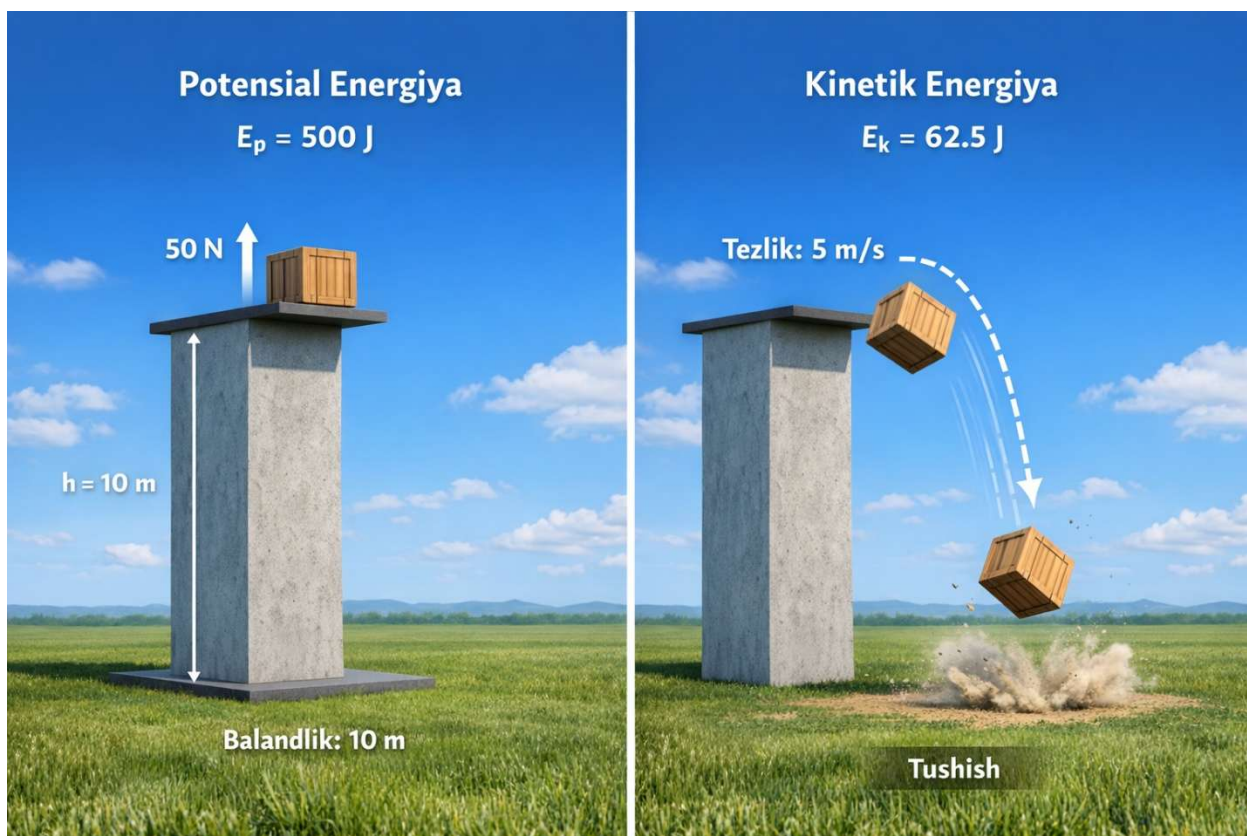
Og'irligi 10 kg bo'lgan jismini 30 N kuch bilan siljitish mumkin bo'lsa, ishqalanish kuchini toping, agar jismining tezlanishi 2 m/s^2 bo'lsa.

Og'irligi 10 kg bo'lgan jisminin 30 N kuch bilan sijitish mumkin bo'lsa, ishqalanish kuchini toping, agar jismining tezlanishi 2 m/s^2 bo'lsa.



3. Ish va energiya

Og'irligi 50 N bo'lgan yuk 10 m balandlikka ko'tarilsa, potensial energiyasini hisoblang. Shu yukning kinetik energiyasi, agar u erga tushganda tezligi 5 m/s bo'lsa, qancha bo'ladi?



4. Harorat va issiqlik

500 g suv 20°C dan 80°C gacha qizdirildi. Suvning issiqlik sigʻimi 4200 J/(kg·°C). Sarflangan issiqlik miqdorini hisoblang.

Sarflangan Issiqlikmiqdori
 $Q = m \times c \times \Delta T$



$Q = 500 \text{ g} \times 4200 \text{ J}/(\text{kg} \cdot ^\circ\text{C}) \times 80^\circ\text{C} - 20^\circ\text{C}$
 $= 126,000 \text{ J}$

5. Gaz qonunlari

Bir qoplangan gazning bosimi $2 \cdot 10^5$ Pa, hajmi 4 L. Agar gazni izobarik sharoitda 6 L gacha kengaytirilsa, bosim qanday oʻzgaradi?

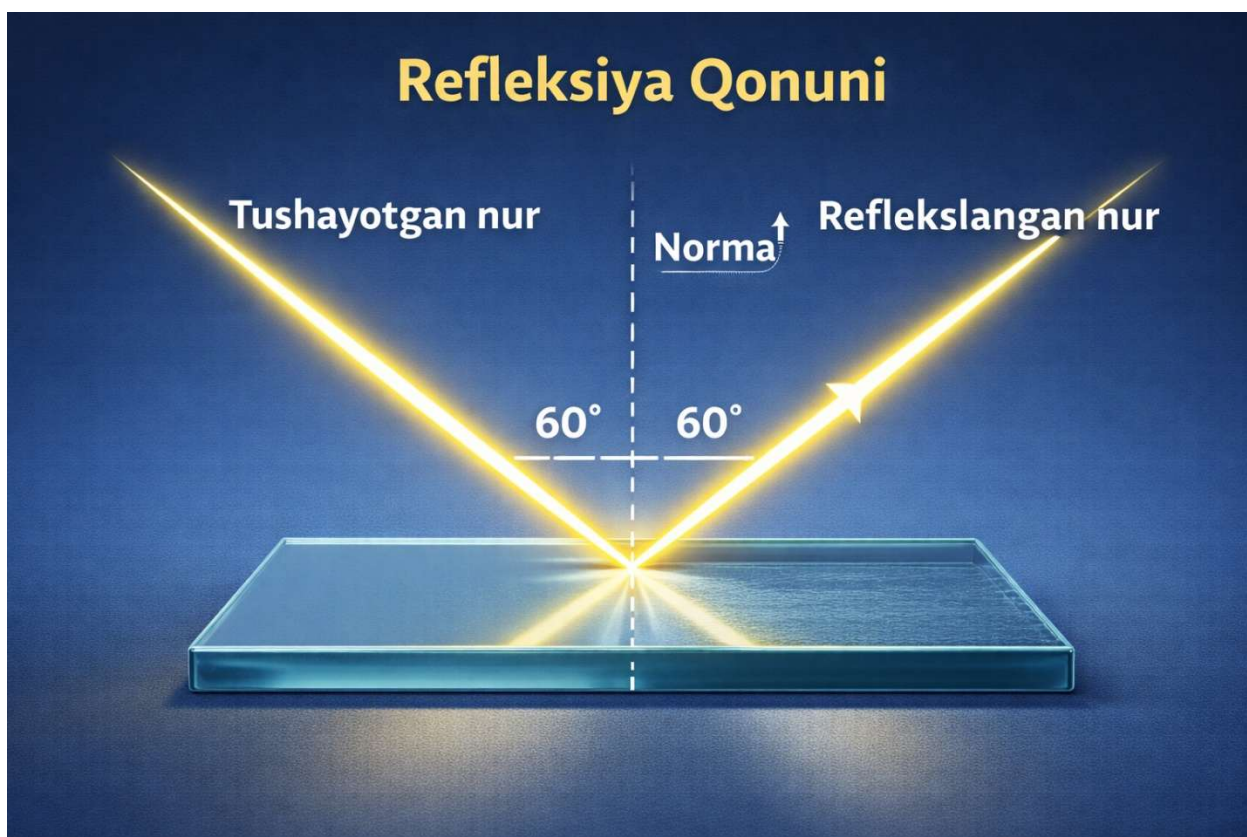
Bosim qanday oʻzgaradi?



$P_1 \cdot V_1 = P_2 \cdot V_2 = 126,000 \text{ J}$

6. Optika

Yassi oynadan 60° burchak ostida yorug'lik kiradi. Kirish va chiqish burchagi teng bo'lsa, shu yorug'lik yo'nalishini chizing va refleksiya qonunini isbotlang.



7. Elektr energetikasi

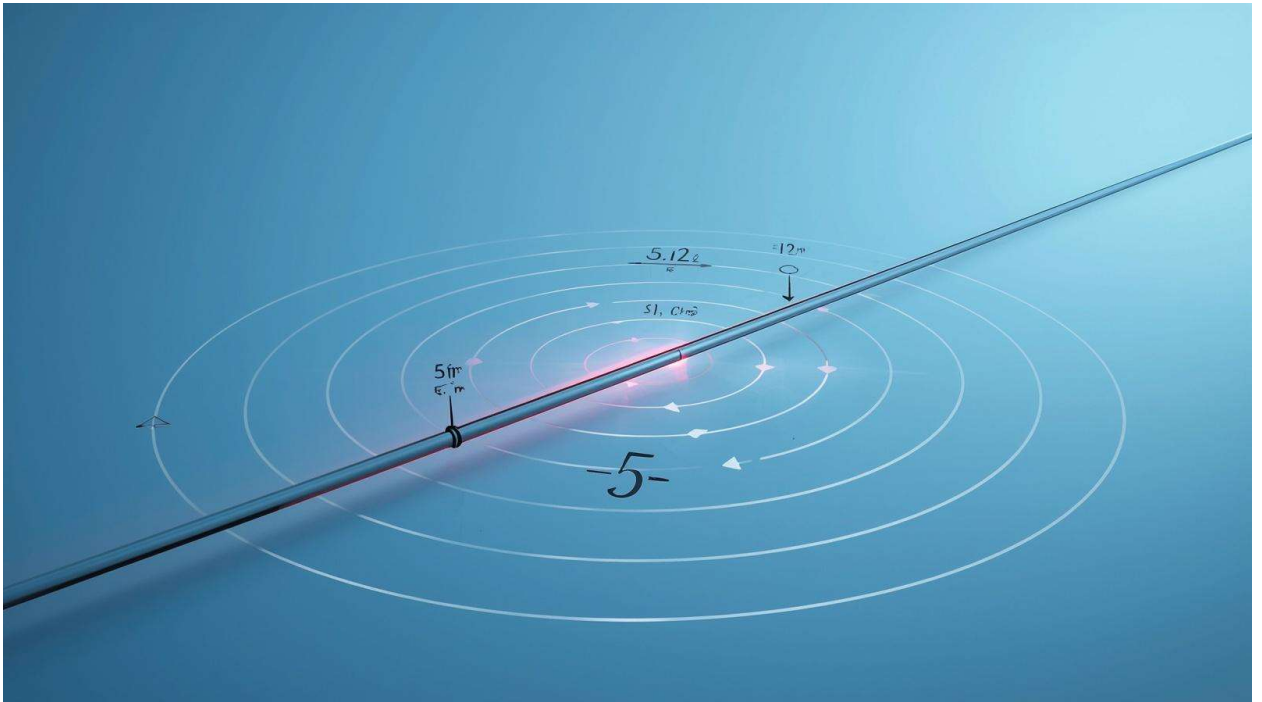
12 V kuchlanishli batareyadan 6Ω qarshilikdagi lampaga tok oqadi.

- Lampadan oqayotgan tokni toping.
- Lampaning iste'mol qilayotgan quvvatini hisoblang.



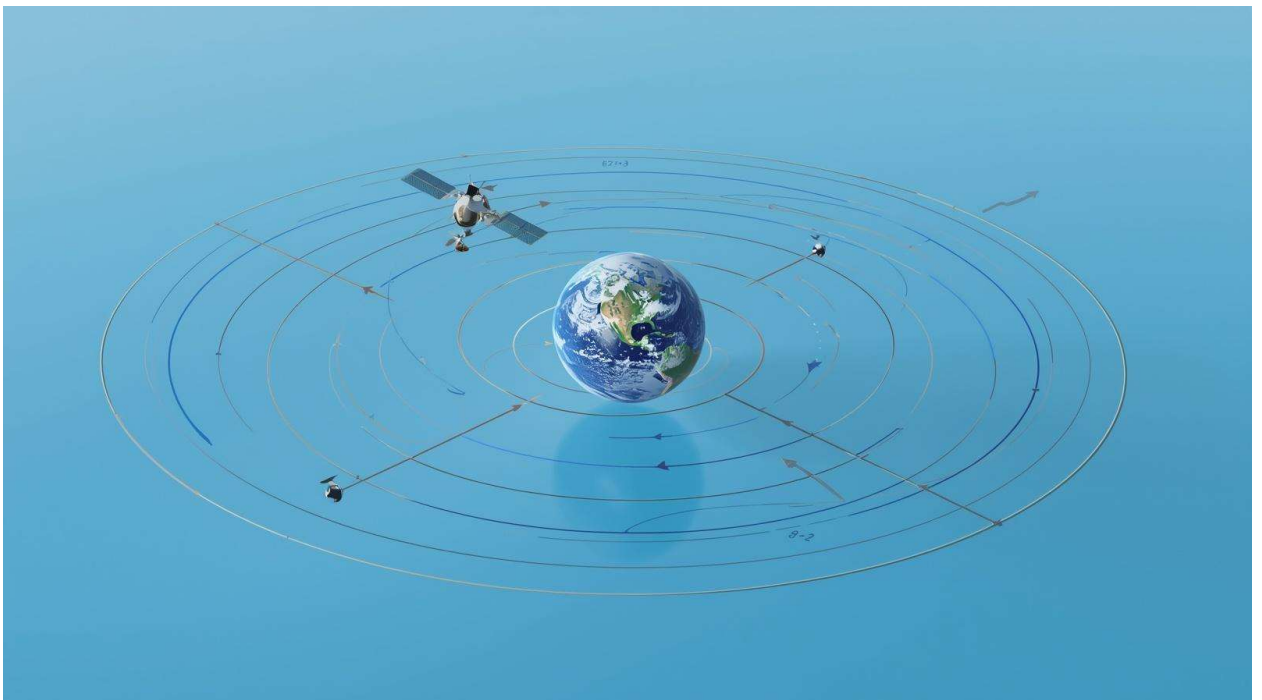
8. Magnit maydon

Uzun sim orqali 5 A tok oqadi. Sim atrofida 0,1 m radiusdagi aylana bo'lsa, magnit induktsiyasini toping.



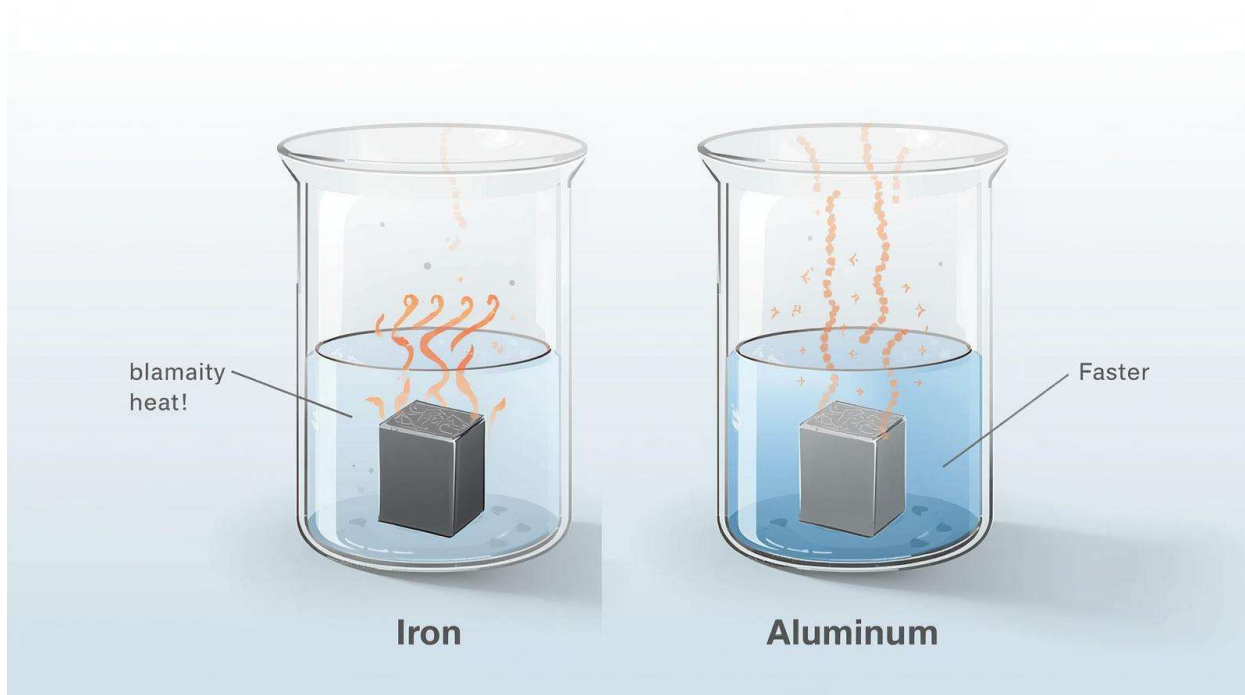
9. Orbital harakat

Yer atrofida radiusi 7000 km bo'lgan sun'iy yo'ldosh aylanmoqda. Yerning tortishish tezlanishi $9,8 \text{ m/s}^2$. Sun'iy yo'ldoshning orbital tezligini toping.



10. Qiyosiy fikrlash

Agar ikkita o'xshash haroratdagi metall bloklardan biri temirdan, ikkinchisi alyuminiydan bo'lsa, qaysi biri suvni tezroq qizdiradi, va nima uchun?



1. Kinematika

Topshiriq: Avtomobil 0 dan 20 m/s gacha 5 soniyada tezlanadi.

Formulalar:

- Tezlanish: $a = \frac{v-v_0}{t}$
- Masofa: $s = v_0 t + \frac{1}{2} a t^2$

Yechim:

- Tezlanish: $a = \frac{20-0}{5} = 4 \text{ m/s}^2$
- Masofa: $s = 0 + \frac{1}{2} \cdot 4 \cdot 5^2 = 2 \cdot 25 = 50 \text{ m}$

2. Dinamika

Topshiriq: Og'irligi 10 kg bo'lgan jismini 30 N kuch bilan siljitish, tezlanish 2 m/s².

Formulalar:

- Ishqalanish kuchi: $F_{\text{ishq}} = F_{\text{tashqi}} - ma$

Yechim:

- Og'irligi: $m = 10\text{kg}$, $F = 30\text{N}$, $a = 2\text{m/s}^2$
 - $F_{\text{ishq}} = 30 - 10 \cdot 2 = 30 - 20 = 10\text{ N}$
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3. Ish va energiya

Topshiriq: Yuk 50 N, balandlik 10 m, tushganda 5 m/s tezlik.

Formulalar:

- Potensial energiya: $E_p = mgh$
- Kinetik energiya: $E_k = \frac{1}{2}mv^2$

Yechim:

- Massa: $m = F/g = 50/9,8 \approx 5,10\text{ kg}$
 - Potensial energiya: $E_p = 5,10 \cdot 9,8 \cdot 10 \approx 500\text{ J}$
 - Kinetik energiya: $E_k = 0,5 \cdot 5,10 \cdot 5^2 = 0,5 \cdot 5,10 \cdot 25 \approx 63,75\text{ J}$
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4. Harorat va issiqlik

Topshiriq: 500 g suv $20^\circ\text{C} \rightarrow 80^\circ\text{C}$, $c = 4200\text{ J/kg}\cdot^\circ\text{C}$

Formula: $Q = mc\Delta T$

Yechim:

- $m = 0,5\text{kg}$, $\Delta T = 80 - 20 = 60^\circ\text{C}$
 - $Q = 0,5 \cdot 4200 \cdot 60 = 126000\text{ J}$
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5. Gaz qonunlari

Topshiriq: Bosim $P_1 = 2 \cdot 10^5\text{Pa}$, hajm $V_1 = 4\text{L} \rightarrow V_2 = 6\text{L}$ izobarik sharoit.

Izobarik sharoitda bosim o'zgarmaydi:

- $P_2 = P_1 = 2 \cdot 10^5\text{ Pa}$
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6. Optika

Topshiriq: Yassi oynaga 60° ostida tushgan nurlaning refleksiya.

Formula: $\theta_i = \theta_r$ (kirish burchagi = chiqish burchagi)

Yechim:

- Kirish burchagi: 60°
- Chiqarish burchagi: $\theta_r = 60^\circ$

(Chizma: Yassi oynaga tushgan nurlar kirish burchagi 60° , aks burchak ham 60°)

7. Elektr energetikasi

Topshiriq: 12 V, 6 Ω lampada tok va quvvat.

Formulalar:

- Tok: $I = \frac{U}{R}$
- Quvvat: $P = U \cdot I$

Yechim:

- $I = 12/6 = 2$ A
 - $P = 12 \cdot 2 = 24$ W
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8. Magnit maydon

Topshiriq: Uzun sim, $I = 5$ A, radius $r = 0,1$ m.

Formula (Biot-Savart): $B = \frac{\mu_0 I}{2\pi r}$, $\mu_0 = 4\pi \cdot 10^{-7}$ H/m

Yechim:

- $B = \frac{4\pi \cdot 10^{-7} \cdot 5}{2\pi \cdot 0,1} = \frac{2 \cdot 10^{-6} \cdot 5}{0,1} = 10^{-5} \cdot 10 = 10^{-5}$ T

(Aniq: $B = 10^{-5}$ T yoki 0,01 mT)

9. Orbital harakat

Topshiriq: Radius $r = 7000$ km, $g = 9,8$ m/s².

Formula: Orbital tezlik: $v = \sqrt{gr}$

Yechim:

- $r = 7000 \text{ km} = 7 \cdot 10^6 \text{ m}$
 - $v = \sqrt{9,8 \cdot 7 \cdot 10^6} = \sqrt{6,86 \cdot 10^7} \approx 8280 \text{ m/s}$
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10. Qiyosiy fikrlash

Topshiriq: Temir vs alyuminiy, suvni qizdirish tezligi.

Tushuntirish:

- $Q = mc\Delta T$, shuning uchun **issiq suvga kamroq issiqlik beradigan** metall tezroq qizdiradi.
- Temirning issiqlik sig'imi $c_{\text{Fe}} \approx 450 \text{ J}/(\text{kg} \cdot ^\circ\text{C})$, alyuminiy $c_{\text{Al}} \approx 900 \text{ J}/(\text{kg} \cdot ^\circ\text{C})$
- **Natija:** Temir suvni tezroq qizdiradi, chunki uning issiqlik sig'imi kamroq.