

# Домашняя работа

3.53

Дано:

Решение:

$$q = 100 \text{ нКл}$$

$$e = 1,5 \text{ см}$$

A-?

$$1. A = qU = q(\varphi_1 - \varphi_2)$$

$$\varphi_2 = 0 \Rightarrow A = q\varphi_1$$

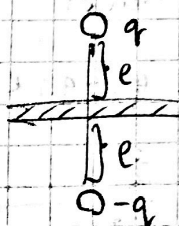
$$2. F = \frac{kq^2}{ue^2}$$

$$F = qE \Rightarrow E = \frac{kq}{ue^2}$$

$$\varphi_1 = \int_0^e E dl = \int_0^e \frac{kq dl}{ue^2} = \frac{kq}{4\pi\epsilon_0 ue^2} \int_0^e \frac{dl}{r^2} = -\frac{kq}{ue}$$

$$3. A = -q \cdot \frac{kq}{ue} = -\frac{kq^2}{ue} = -1500 \text{ Дж}$$

Ответ: 1500 Дж



3.59

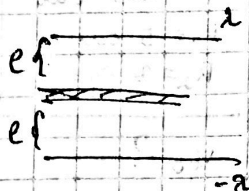
Дано:

Решение:

$$1. E = \frac{\lambda}{2\pi\epsilon_0 r}$$

$$\text{Уг. сила тяжения: } F = |\lambda E| = \frac{\lambda^2}{2\pi\epsilon_0 l}$$

$$2. F_n = \frac{\lambda^2}{2\pi\epsilon_0 l} \cdot \cos\varphi$$

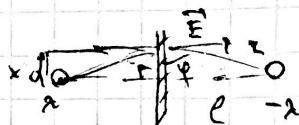


а) F-?

б) F(x)-?

$$E_n = \frac{\lambda}{2\pi\epsilon_0 r} \cdot \frac{\ell}{r} = \frac{\lambda\ell}{2\pi\epsilon_0 (r^2+x^2)}$$

$$\frac{\sigma}{2\epsilon_0} = \frac{\lambda\ell}{2\pi\epsilon_0 (r^2+x^2)} \Rightarrow \sigma = \frac{\lambda}{\pi (r^2+x^2)}$$



Orbitem. a)  $\sigma = \frac{\lambda^2}{4\pi\epsilon_0\ell}$

b)  $\sigma = \frac{\lambda\ell}{\pi (r^2+x^2)}$

3. b)

Dано:

$$q = 0,5 \cdot 10^6 \text{ ку}$$

$$\ell = 0,3 \text{ м}$$

$$q = 0,5 \cdot 10^6 \text{ ку}$$

$$\varphi = ?$$

Решение:

1.  $\varphi = \frac{kq}{\ell} = 1,5 \cdot 10^4 \text{ В}$

Orbitem:  $\varphi = 1,5 \cdot 10^4 \text{ В}$