

1-5、ACBAB 6-10、DDCBD 11-13、CCD 14、CD 15、BD

16-I (1) B; (2) B; (3) 远大于; 系统误差; C; (4) $\frac{x_6 - x_4}{10T}$; A (公众号: 浙考物理)

16-II (1) C; (2) 0.50; 3.1

16-III. C; 3; 1.8

17 (1) 不可逆; 不变

$$(2) p_1 V_1 = p_2 \times 2V_1$$

$$p_2 = 1.02 \times 10^5 \text{ Pa}$$

$$F = p_2 S - p_1 S = 10 \text{ N}$$

$$(3) \frac{V_1}{T_1} = \frac{V_3}{T_3}$$

$$V_3 = 1.75 \times 10^{-3} \text{ m}^3$$

$$W = -p_2(V_3 - 2V_1) = -25.5 \text{ J}$$

$$\Delta U = W + Q$$

得: $Q = 89.3 \text{ J}$

$$18 (1) \textcircled{1} mgh = \frac{1}{2} mv_c^2$$

$$m \frac{v_c^2}{R} = ma$$

$$a = 16 \text{ m/s}^2$$

$\textcircled{2} mg \cos \theta \mu_2 < mg \sin \theta$, 物体无法在DE上静止

$$mgh - mg(R - R \cos \theta) = mg \cos \theta \mu_1 s + mg \cos \theta \mu_2 s$$

$$s_{\text{总}} = 2s = 2 \text{ m}$$

$$\textcircled{3} \frac{1}{2} a_{\text{上}} t_{\text{上}}^2 = \frac{1}{2} a_{\text{下}} t_{\text{下}}^2$$

$$a_{\text{上}} = g \sin \theta + g \cos \theta \mu_1$$

$$a_{\text{下}} = g \sin \theta - g \cos \theta \mu_2$$

得: $\frac{t_{\text{上}}}{t_{\text{下}}} = \sqrt{\frac{a_{\text{下}}}{a_{\text{上}}}} = 1:2$

$$(3) mgh - mg(R - R \cos \theta) - mg \sin \theta L - mg \cos \theta \mu_1 L = \frac{1}{2} mv_F^2$$

$$v_F = 2 \text{ m/s}$$

$$mv_F = 2mv$$

$$mg\mu_1 \times 2l = \frac{1}{2} mv_F^2 - \frac{1}{2} \times 2mv^2$$

$$\text{得: } l = 0.2 \text{ m}$$

$$18 (1) mg = k\Delta x_0 \quad (\text{公众号: 浙考物理})$$

$$\text{得: } \Delta x_0 = \frac{mg}{k}$$

$$(2) I = \frac{B(2\pi r)v_0}{R}$$

$$F = I \times 2\pi r B = \frac{B^2(2\pi r)^2 v_0}{R}$$

$$(3) Q_{\text{总}} + mgA_1 = \frac{1}{2} mv_0^2 + \frac{1}{2} k\Delta x_0^2 - \frac{1}{2} k(\Delta x_0 - A_1)^2$$

$$Q_{\text{总}} = \frac{1}{2} mv_0^2 - \frac{1}{2} kA_1^2$$

$$Q = \frac{1}{3} Q_{\text{总}} = \frac{1}{6} mv_0^2 - \frac{1}{6} kA_1^2$$

$$(4) \text{设向上为正}$$

$$I_{\text{弹}} + I_{\text{安}} - mg(t_2 - t_1) = 0 - 0$$

$$I_{\text{安}} = 3\bar{I}(2\pi r)Bt = 3 \frac{B(2\pi r)\bar{v}}{R} (2\pi r)Bt = \frac{12B^2\pi^2 r^2(A_1 - A_2)}{R}$$

$$\text{得: } I_{\text{弹}} = mg(t_2 - t_1) - \frac{12B^2\pi^2 r^2(A_1 - A_2)}{R}$$

$$20 (1) r = \frac{mv_0}{eB}$$

$$d = 2r = \frac{2mv_0}{eB}$$

$$(2) Ue = \frac{1}{2} mv^2 - \frac{1}{2} mv_0^2$$

$$\text{得: } v = \sqrt{2}v_0$$

$$v \sin r = v_0 \sin \theta$$

$$n = \frac{\sin \theta}{\sin r} = \sqrt{2}$$

(3) 加反向电压

$$Ue \geq \frac{1}{2} m(v_0 \cos \theta)^2$$

$$U \geq \frac{m(v_0 \cos \theta)^2}{2e}$$

(4) ①全部打中 $U \geq 0$ (公众号: 浙考物理)

$$Ue \geq \frac{1}{2} mv_y^2 - \frac{1}{2} m(v_0 \cos \theta)^2$$

$$F = 2Nmv_y$$

$$\text{得: } F = 2Nm \sqrt{\frac{3}{4} v_0^2 + \frac{2Ue}{m}}$$

②全部打不中: 临界情况为出射角为 60° 打到 D 点

$$Ue = \frac{1}{2} mv_y^2 - \frac{1}{2} m(v_0 \cos \theta)^2$$

$$v_x = \frac{1}{2} v_0$$

$$v_y = \frac{v_x}{\frac{\sqrt{3}}{2}} = \frac{\sqrt{3}}{6} v_0$$

$$\text{得: } U = -\frac{mv_0^2}{3e} \quad \therefore \text{当 } U < -\frac{mv_0^2}{3e} \text{ 时, } F = 0$$

③当 $-\frac{mv_0^2}{3e} \leq U < 0$ 时, 仅一束粒子能打到

$$Ue = \frac{1}{2} mv_y^2 - \frac{1}{2} m(v_0 \cos \theta)^2$$

$$F = Nmv_y = Nm \sqrt{\frac{3}{4} v_0^2 + \frac{2Ue}{m}}$$