

A1  $q = \frac{\Delta V}{\Delta t} = -\frac{10}{4} = -2,5 \text{ V/s}$  (3)

A2  $\vec{F}_{12} = -\vec{F}_{21}$  (1)

A3  $F = F_g = \mu v = \mu mg \Rightarrow \mu = \frac{F}{mg}$  (1)

A4  $F \Delta t = \Delta p \Rightarrow \Delta t = \frac{\Delta p}{F} = \frac{10}{5} = 2 \text{ s}$  (2)

A5  $E = \frac{mv^2}{2} \Rightarrow v = \sqrt{\frac{2E}{m}} = \sqrt{\frac{2 \cdot 200}{1}} = 20 \text{ m/s}$  (2)

A6  $x = A \cos(\omega t + \phi_0) \Rightarrow \omega = \phi = 3 \text{ rad/s}$  (3)

A7  $F = k \Delta x \Rightarrow k = \frac{F}{\Delta x} = \frac{12}{2 \cdot 10^{-2}} = 600 \text{ N/m}$  (3)

A8 (3)

A9 (2)

A10  $Q = cm \Delta t = 640 \cdot 0,2 \cdot 20 = 2,56 \cdot 10^3 \text{ J}$  (2)

A11  $Q = \Delta U + A \Rightarrow A = Q - \Delta U = 3 - (-13) = 16 \text{ kJ}$  (4)

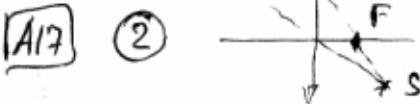
A12  $PV = \frac{m}{M} RT \Rightarrow m \sim \frac{P}{T}$  (3)

A13  $F = k \frac{q_1 q_2}{r^2} \sim \frac{q_1}{r^2} \Rightarrow$  (4)

A14  $u = \gamma R = 1,1 \cdot 3 = 3,3 \text{ (D)}$  (3)

A15  $F_A = \gamma B L \sin \alpha = \gamma B L \Rightarrow$  (1)

A16 (2)



A18 (3)

A19  $i = i_{\text{max}} \Rightarrow$  (1)

A20  ${}_{29}^{63}\text{Cu}$   $p = z = 29$   $n = A - z = 63 - 29 = 34$  (2)

A21 (1)

A22  ${}_{81}^{210}\text{Tl} \rightarrow 3 \cdot \beta + 4 \cdot \alpha + 2 \cdot X$

$A = 210 - 3 \cdot 0 - 4 \cdot 4 = 206$   
 $Z = 81 - 3 \cdot (-1) - 2 \cdot 2 = 82$  }  $\Rightarrow$  (1)

A23  $E_g = h \frac{c}{\lambda} = 6,6 \cdot 10^{-34} \frac{3 \cdot 10^8}{2 \cdot 10^{-7}} = 1 \cdot 10^{-19} \text{ (D)}$  (2)

A24  $T = 2\pi \sqrt{\frac{m}{k}} \Rightarrow$  (4)

A25  $P = nkT$   $n = \frac{P}{kT} \approx \frac{4 \cdot 10^5}{1,38 \cdot 10^{-23} \cdot 600} \approx 5 \cdot 10^{25} \text{ m}^{-3}$  (4)

B1

A	B	B
1	1	1

$A = P \Delta V > 0$   
 $P \Delta V = \gamma R \Delta T$   
 $\Delta U = \frac{\gamma}{2} \gamma R \Delta T$

B2

A	B
1	3

B3  $s = v_0 t + \frac{a t^2}{2}$   $v = v_0 + a t = 3200 \Rightarrow a = \frac{2200}{t}$   
 $\Rightarrow s = v_0 t + v_0 t = 2v_0 t \Rightarrow v_0 = \frac{s}{2t} = \frac{20}{4} = 5 \text{ m/s} \Rightarrow v = 15 \text{ m/s}$

B4



$PV = \gamma R T_1$   
 $P(V + S \Delta h) = \gamma R T_2$  }  $\Rightarrow P S \Delta h = \gamma R \Delta T$   
 $\Rightarrow \Delta T = \frac{P S \Delta h}{\gamma R} = \frac{(P_0 + \frac{mg}{S}) S \Delta h}{\gamma R} = 9,09 \text{ (D)}$

B5



$\gamma v^2 = m \frac{v^2}{R} = m \cdot \omega v \Rightarrow \omega = \frac{\gamma B}{m} \Rightarrow$   
 $\Rightarrow T = \frac{2\pi}{\omega} = 2\pi \frac{m}{\gamma B} \Rightarrow \frac{T_1}{T_2} = \frac{m_1 \gamma_2 B}{\gamma_1 B m_2} = 0,5$