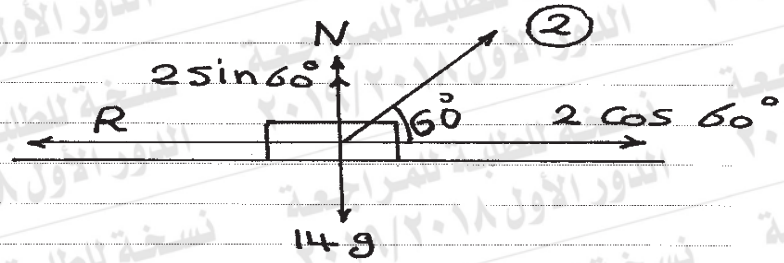
**1-**

b) 2,45 m/sec$^2$ nach oben der Ebene (1)

**2-**

c) 0.4 (1)

**3-**




$2\cos 60° - R = ma$ (½)

$2 \times \frac{1}{2} \times 9.8 - 0.95 \times 9.8 = 14a$

$\therefore a = 0.035 \text{ m/sec}^2$ (½)

$S = V_0 t + \frac{1}{2} a t^2$

$= \frac{1}{2} \times 0.035 \times (60)^2$

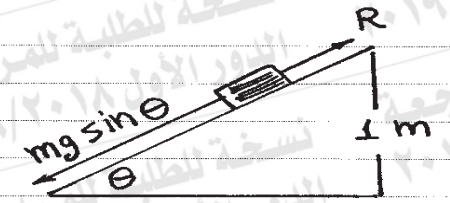
$= 63 \text{ m}$ (½)

$W = F \times S \times \cos 60°$

$= 2 \times 9.8 \times \frac{1}{2} \times 63$

$= 617.4 \text{ joule}$ (½) (2)

**4-**




$T - T_0 = W$ (½)

$\frac{1}{2} m v^2 - \text{null} = (mg\sin\theta - R)s$ (½)

$\frac{1}{2} \times 0.3 v^2 = 0.3 \times 9.8 \times \frac{1}{5} \times s - R \cdot s$ (½)

$\frac{1}{2} \times 0.3 v^2 = 0.3 \times 9.8 - 1.59$ (½)

$\therefore v^2 = 9$ (½) $\quad \therefore v = 3\ m/sec$ (½)

(3)

**Andere Lösung:**

$\therefore mg\sin\theta - R = ma$ (½)

$0.3 \times 9.8 \times \frac{1}{5} - R = 0.3a$ (½)

$0.3 \times 9.8 - Rs = 0.3as$ (½)

$0.3 \times 9.8 - 1.59 = 0.3as$

$as = 4.5$ (½)

$v^2 = v_0^2 + 2as$

$v^2 = 9$ (½) $\quad \therefore v = 3\ m/sec$ (½)

(3)

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**5-**

d) $10^{-1}$ (1)

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**6-**

d) 99 (1)

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**7-**

(9) ∴ Das Auto bewegt sich mit einer regelmäßigen Geschwindigkeit.

$\therefore F = R = 150 \times 2$

$F = 300$ Kg.wt (1/2)

$V = 108 \times \frac{5}{18}$

$V = 30$ m/sec (1/2)

die Leistung $= F \times V$

$= 300 \times 30$

$= 9000$ Kg.wt.m/sec (1/2)

die Leistung $= \frac{9000}{75} = 120$ Pferden (1/2)

(2)

(b) $\vec{r} = (3t^2+2)\hat{i} + (2t^2+1)\hat{j}$

$\vec{s} = \vec{r} - \vec{r_o}$

$= (3t^2)\hat{i} + (2t^2)\hat{j}$ ½

Die Änderung der Potenzialenergie $= -W$

$= -(\vec{F} \cdot \vec{s})$ ½

$= -(6, 2) \cdot (3t^2, 2t^2)$

$= -22t^2$ ½ , $t = 2$

$= -22 \times 4$

$= -88$ joule ½

2

**8-**

d) 32 (1)

**9-**

c) 35 (1)

**10-**

**7 – Die Masse des stillstehenden Zugswaggons $M_1$**

$m_1 = 10\ tons = 10^4\ kg$ , $v_1 = 20\ m/sec$

$m_2 = 10\ tons = 10^4\ kg$ , $v_2 = 0$

**Die Masse des stillstehenden Zugswaggons $M_2$**

(i): $m_1 v_1 + m_2 v_2 = (m_1 + m_2) v'$

$10 \times 20 + 10 \times 0 = (10 + 10) v'$ (1/2)

$\therefore v' = 10\ m/sec$ (1/2)

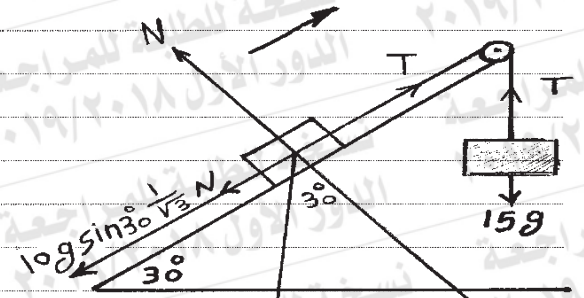
**ii) die verlorenere kinetische Energie**

$= \frac{1}{2} \times 10^4 \times 20^2 - \frac{1}{2} \times 2 \times 10^4 \times 10^2$ (1/2)

$= 10^6$ joule (1/2)

(2)

**11-**




$15 \times 980 > 10 \times 980 \times \frac{1}{2}$

**Der Körper der Masse von 10g bewegt sich nach oben der Ebene.**
**die Gleichung der Bewegung lautet:**

$15 \times 980 - T = 15a$ (1/2)

$T - 10 \times 980 \times \frac{1}{2} - 10 \times 980 \times \frac{\sqrt{3}}{2} \times \frac{1}{\sqrt{3}} = 10a$ (1)

**Durch Addieren** $4900 = 25a$

$\therefore a = 196 \ cm/sec^2$ (1/2)

$S = v_0 t + \frac{1}{2} a t^2$

$98 = \frac{1}{2} \times 196 t^2$

$\therefore t = 1 \ sec$ (1/2)

$V = V_0 + at$

$= 196 \times 1$

$V = 196 \ cm/sec$ (1/2)

(3)

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**12-**

b) $]0\,,2[\ \cup\ ]4\,,\infty[$ (1)

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**13-**

c) $t^3 - t^2 + 1$ (1)

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**14-**

$V_1 = -9$ m/sec

$V_2 = 7.2 \times \frac{5}{18} = 2$ m/sec (½)

$I = m(V_2 - V_1)$

$= \frac{100}{1000}[2-(-9)] = 1.1$ Kg.m/sec (½)

$I = F.t$

$1.1 = F \times \frac{1}{10}$

$\therefore F = 11$ N (½)

**Der Druck der Kugel auf der Wand = F = 11 Newton**

$= 11$ N (½)

(2)

---

**15-**

$\therefore a = v \cdot \frac{dv}{dx}$ ½

$\therefore \frac{3}{8} x^2 \, dx = v \, dv$

$\therefore \frac{3}{8} \int_0^x x^2 \, dx = \int_0^v v \, dv$ ½

$\therefore \left[\frac{1}{2} v^2\right]_0^v = \left[\frac{1}{8} x^3\right]_0^x$ ½

$\therefore \frac{1}{2} v^2 = \frac{1}{8} x^3$ ½

$\therefore v^2 = \frac{1}{4} x^3$

(i) **bei** $x = 2$

$\therefore v^2 = 2 \quad \therefore v = \pm\sqrt{2}$ m/sec ½

(ii) **bei** $v = 4$

$\therefore 16 = \frac{1}{4} x^3$

$\therefore x^3 = 64$

$\therefore x = 4$ m ½

3

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**16-**

b) $5\sqrt{30}$ (1)

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**17-**

d) 1 Joule (1)

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**18-**

(a) $\vec{F} = (a+2)\hat{i} + (b+3)\hat{j} + (3-e)\hat{k}$ ½

$\vec{S} = t\hat{i} + (\frac{1}{2}t^2 + t)\hat{j} + 5\hat{k}$

$\vec{V} = \hat{i} + (t+1)\hat{j}$ ½

$\vec{a} = \hat{j}$ ½

$\vec{F} = m\vec{a}$ (3)

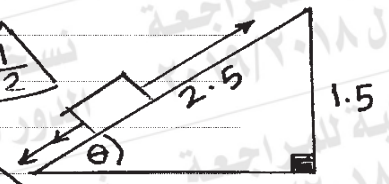
$\therefore \vec{j} = (a+2)\hat{i} + (b+3)\hat{j} + (3-e)\hat{k}$

$\therefore a + 2 = 0 \quad \therefore a = -2$ ½

$b + 3 = 1 \quad \therefore b = -2$ ½

$3 - e = 0 \quad \therefore e = 3$ ½

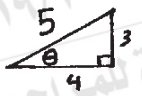
(b)




$$-\frac{1}{2}N - mg\sin\theta = ma \quad \left(\frac{1}{2}\right)$$

$$-\frac{1}{2}mg\cos\theta - mg\sin\theta = ma \quad \left(\frac{1}{2}\right)$$

$$-\frac{1}{2}\times 9.8\times\frac{4}{5} - 9.8\times\frac{3}{5} = a \quad \left(\frac{1}{2}\right)$$




$$a = -9.8 \text{ m/sec} \quad \left(\frac{1}{2}\right)$$

$$V^2 = V_o^2 + 2as$$

$$0 = V_o^2 + 2\times(-9.8)\times 2.5 \quad \left(\frac{1}{2}\right)$$

$$\therefore V_o = 7 \text{ m/sec} \quad \left(\frac{1}{2}\right) \quad (3)$$

**Andere Lösung:**

$$T - T_o = W \quad \left(\frac{1}{2}\right)$$

$$0 - \frac{1}{2}mV_o^2 = -mgs\sin\theta - \mu_k N s \quad \left(\frac{1}{2}\right)$$

$$\frac{1}{2}mV_o^2 = mgs\sin\theta + \mu_k N s$$

$$\frac{1}{2}mV_o^2 = mgs\sin\theta + \frac{1}{2}mgs\cos\theta \quad \left(\frac{1}{2}\right)$$

$$\frac{1}{2}V_o^2 = 9.8\times 2.5\times\frac{3}{5} + \frac{1}{2}\times 9.8\times\frac{4}{5}\times 2.5 \quad \left(\frac{1}{2}\right)$$

$$V_o^2 = 49 \quad \left(\frac{1}{2}\right)$$

$$V_o = 7 \text{ m/sec} \quad \left(\frac{1}{2}\right) \quad (3)$$

(تراعى الحلول الأخرى)

(انتهت الإجابة وتراعى الحلول الأخرى)