Corrigé type
examen Physique appliquée

Exercice 1 (6)

AB objet réel, lentille convergente,
image sur écran → réelle renversée

$\gamma = \frac{\overline{A'B'}}{\overline{AB}}$; $\overline{AB} > 0$, $\overline{A'B'} < 0$ (2)

$\gamma = -3 = \frac{\overline{A'B'}}{\overline{AB}} \Rightarrow \overline{A'B'} = -3 \times \overline{AB} = -3 \times 2 = -6\,cm$

$\gamma = \frac{\overline{A'B'}}{\overline{AB}} = \frac{\overline{OA'}}{\overline{OA}} = -3 \Rightarrow \overline{OA'} = -3 \cdot \overline{OA} = -3(-4) = 12$

$\overline{OA'} = 12\,cm$ (2)

$\frac{1}{\overline{OA'}} - \frac{1}{\overline{OA}} = \frac{1}{f'} \Rightarrow \frac{\overline{OA} - \overline{OA'}}{\overline{OA'} \times \overline{OA}} = \frac{1}{f'}$

$f' = \frac{\overline{OA'} \times \overline{OA}}{\overline{OA} - \overline{OA'}} = \frac{12 \times (-4)}{-4 - 12} = \frac{48}{16} = 3\,cm$ (2)

Exercice 2 (6)

la loi de Beer-Lambert

$$A = \varepsilon C l$$ (3)

A : Absorbance,
ε : coefficient d'absorption moléculaire
: coefficient d'extinction molaire
C : concentration de la substance mol/l
l : trajet optique (cm)

2) $A = \varepsilon C l \Rightarrow C = \frac{A}{\varepsilon \cdot l}$

$C = \frac{1,8}{4500 \times 1} = 4 \times 10^{-4}$ mol/l (1,5)

3) $C_0 V_0 = C V \Rightarrow C_0 = \frac{C \times V}{V_0}$ (1,5)

$C_0 = \frac{C \cdot V}{V_0} = \frac{4 \times 10^{-4} \times 100}{5} = 8 \times 10^{-3}$ mol/l

exercice 3 (5)

1) D_1 : $P_1 = V I_1 \times \cos\varphi_1 = 230 \times 5 \times 0,8 = 920$ Watt

$Q_1 = V I_1 \times \sin\varphi_1 = 230 \times 5 \times 0,6 = 690$ VAR (1)

D_2 : $P_2 = V I_2 \cos\varphi_2 = 230 \times 10 \times 0,7 = 1610$ Watt

$Q_2 = V I_2 \sin\varphi_2 = 230 \times 10 \times 0,71$ 1633 VAR (1)

2) $P_T = P_1 + P_2 = 920 + 1610 = 2530$ Watt

$Q_T = Q_1 + Q_2 = 690 + 1633 = 2323$ VAR (1)

$S_T = \sqrt{P_T^2 + Q_T^2} = \sqrt{(2530)^2 + (2323)^2}$ (1)

$= 3434,71$ V.A

3) $S_T = V \cdot I \Rightarrow I = \frac{S_T}{V} = \frac{3434,71}{230} =$

$I = 14,93$ A (1)

Exercice 4 (3)

$Q_1 + Q_2 = 0$

$Q_1 = m_g \times L_f + m_g C_p (T_{eq} - 0)$

$Q_2 = m_e C_p (T_{eq} - 30°)$ } (1)

$m_g L_f + m_g C_p (T_{eq} - 0) + m_e C_p (T_{eq} - 30°) = 0$

$T_{eq} (m_g + m_e) C_p - m_e C_p \times 30° + m_g L_f = 0$

$$T_{eq} = \frac{m_e C_p \times 30 - m_g L_f}{(m_g + m_e) C_p} \quad (1)$$

$$= \frac{160 \times 4,18 \times 30 - 40 \times 352}{(40 + 160) \times 4,18} \approx 7,16 \approx 7,2°C$$

(1)

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