

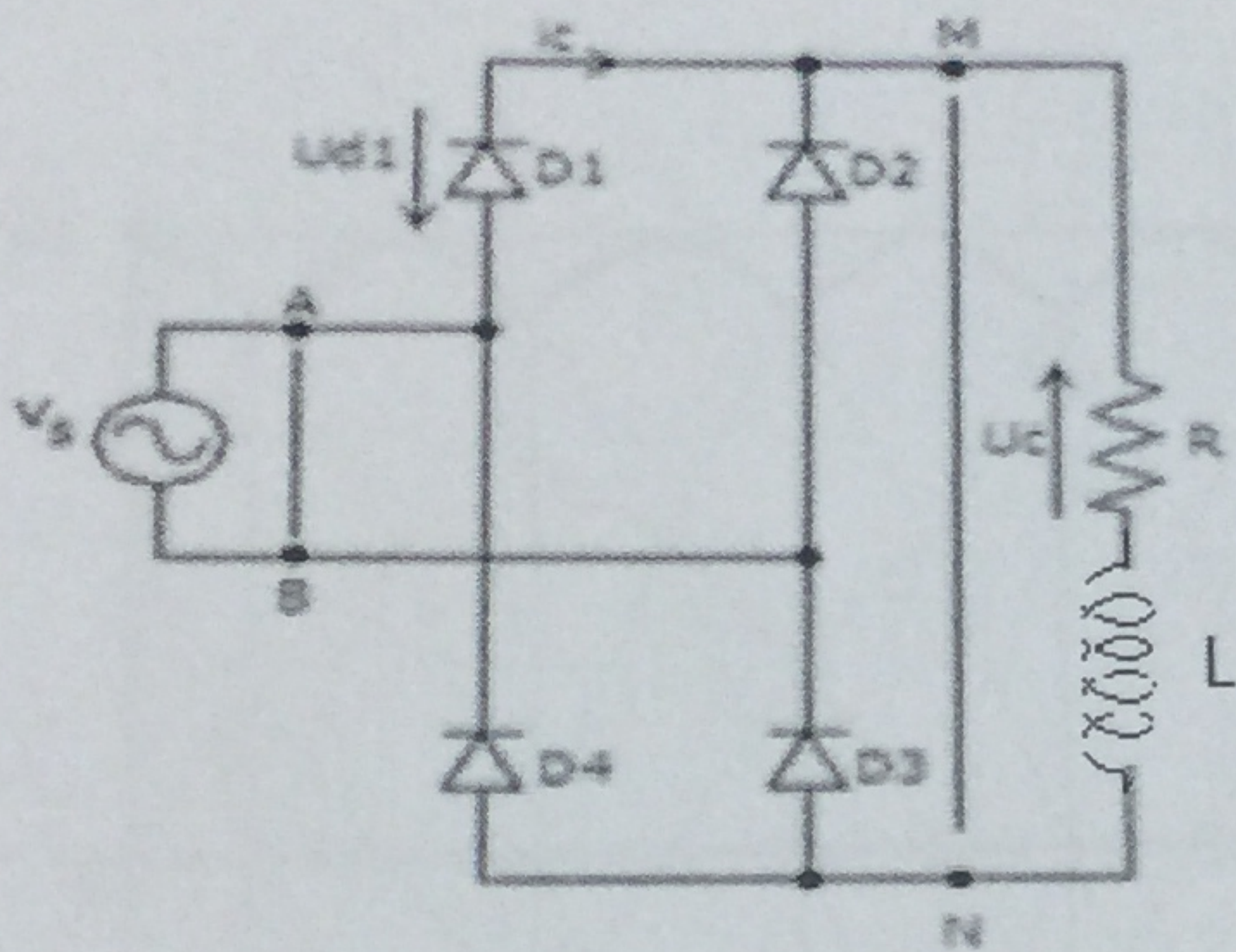
Corrigé type EMD1

Questions de cours :

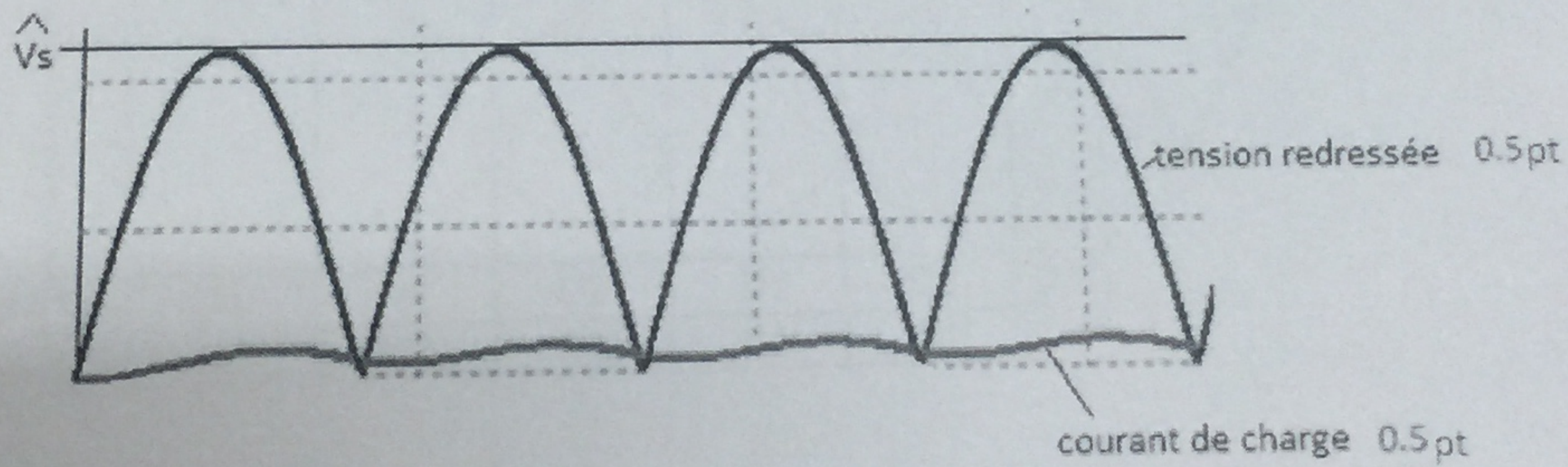
1- Les convertisseurs statiques :

- Redresseurs : Alternatif → Continu 0.5pt
- Onduleurs : Continu → Alternatif 0.5pt
- Hacheurs : Continu → Continu 0.5pt
- Gradateur : Alternatif → Alternatif 0.5pt
- Cycloconvertisseur : Alternatif → Alternatif 0.5pt

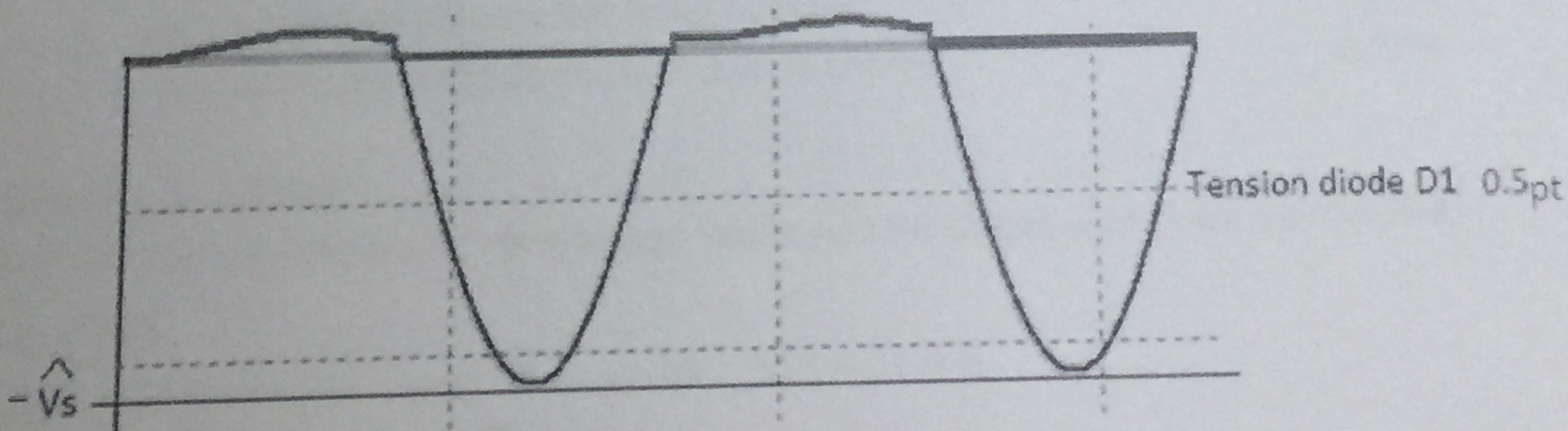
2-Montage PD2 (redresseur monophasé double alternance PD2 « pont parallèle double à 4 diodes »)



0.5pt

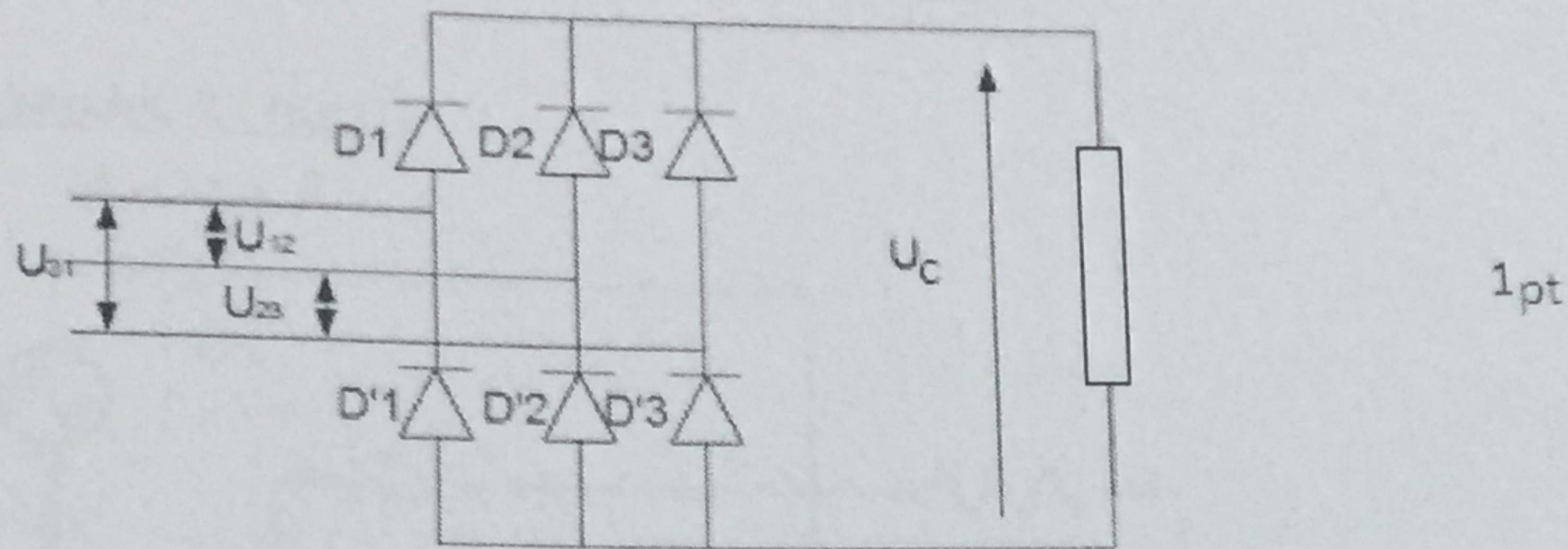


Courant diode D1 0.5pt

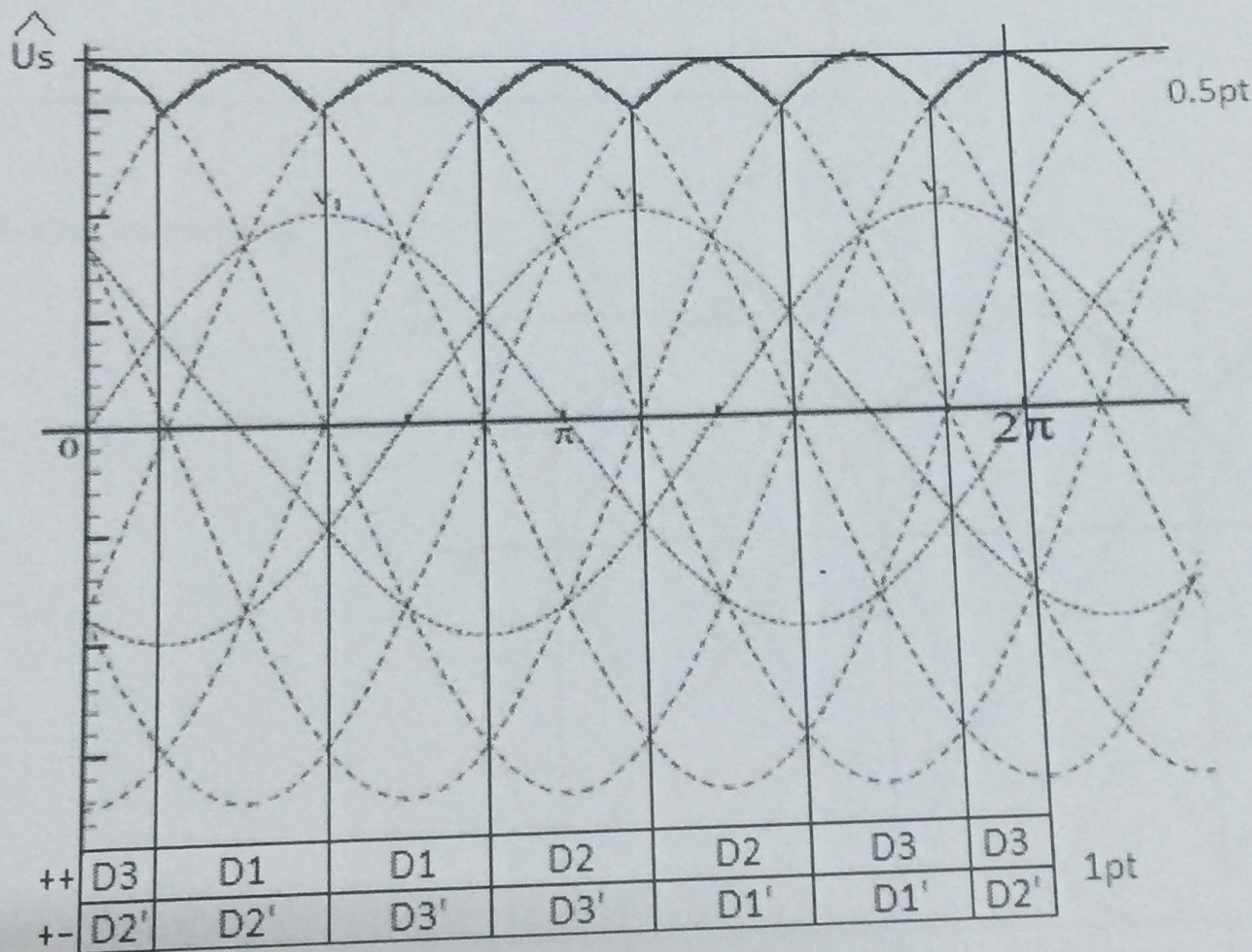




3-Montage PD3 (redresseur triphasé double alternance PD3 « pont parallèle double à 6 diodes »)



1pt



0.5pt

1pt

4- On utilise la Diode de Roue Libre (DRL) pour :

- Eliminer la tension négative (effet bobine) 0.25pt
- Assurer la continuité du courant dans la charge 0.25pt

**Exercice 1 : (3pts)**

Une demi-onde sinusoïdale → montage redressement simple alternance monophasé

$I_{moy} = 10A$

0.5pt

$I_{moy} = I_{max} / \pi \rightarrow I_{max} = I_{moy} \cdot \pi \rightarrow I_{max} = 10 * 3.14 = 31.4 A$

0.5pt

$I = I_{max} / 2 \rightarrow I = 31.4 / 2 = 15.7A$

0.5pt

$Pd_{moy} = V_0 * I_{moy} + r_d I^2$

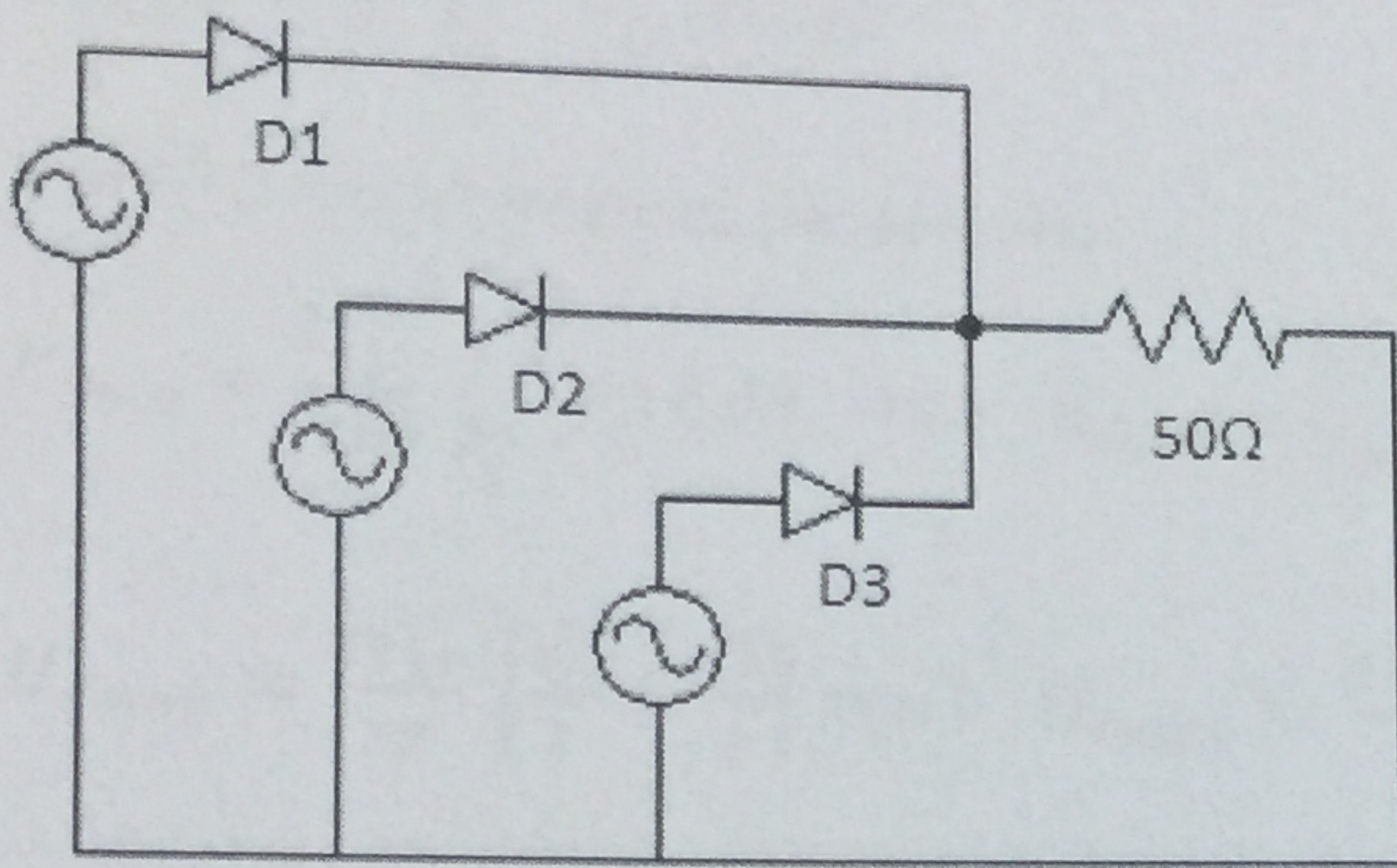


$V_0=1.2V$  ;  $r_d= \Delta V/\Delta I \rightarrow$  (à partir de la caractéristique)  $r_d= 2.4-1.2/60-0=0.02\Omega$   
 A.N)  $P_{d_{moy}}= 1.2*10+0.02*15.7^2=16.93 W$

0.5pt  
 1pt

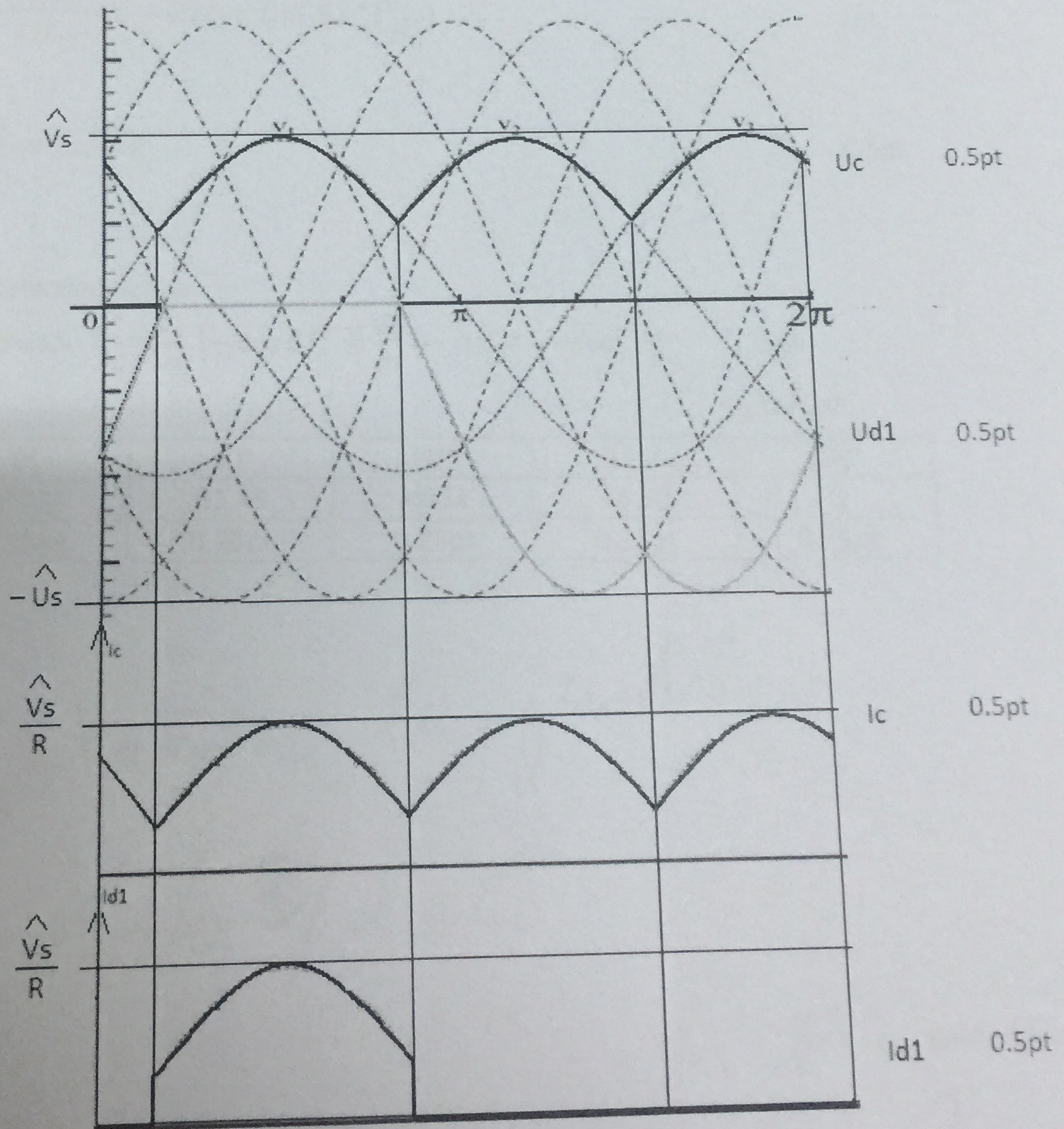
**Exercice 2 : (6pts)**

1- Montage P3



0.5pt

2- Chronogrammes



0.5pt

0.5pt

0.5pt

0.5pt



3-  $V_{rrm} > U_s * \sqrt{2} = 561V$  (avec  $U_s = V_s * \sqrt{3}$ )

1pt

4-  $U_{cmoy}, I_{cmoy}$  ?

$$U_{cmoy} = \frac{1}{T} \int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} V_{1s}(\theta) d\theta$$

$T = \frac{2\pi}{3}$  (Trois alternances par période)

$$U_{cmoy} = \frac{3\widehat{V}_{1s}}{2\pi} \int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} \sin \theta d\theta \implies U_{cmoy} = \frac{3\widehat{V}_{1s}}{2\pi} [-\cos \theta]_{\frac{\pi}{6}}^{\frac{5\pi}{6}}$$

$$U_{cmoy} = \frac{3\widehat{V}_{1s}}{2\pi} \left[ \frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} \right] \implies U_{cmoy} = \frac{3 * \sqrt{3} \widehat{V}_{1s}}{2\pi}$$

1pt

A.N)  $U_{cmoy} = \frac{3 * \sqrt{3} * 230 * \sqrt{2}}{2 * 3.14} = 270 V (\approx 0.83 * \widehat{V}_{1s})$

1pt

$$I_{cmoy} = \frac{U_{cmoy}}{R}$$

A.N)  $I_{cmoy} = \frac{269}{50} = 5.38A$

0.5pt

**Exercice 3 : (3pts)**

- Montage simple alternance

$$\bar{V}_c = \frac{\widehat{V}_s}{2\pi} \int_{\alpha}^{\pi} \sin \theta d\theta \implies \bar{V}_c = \frac{\widehat{V}_s}{2\pi} [-\cos \theta]_{\alpha}^{\pi} = \frac{\widehat{V}_s}{2\pi} [-\cos \pi - (-\cos \alpha)]$$

1pt

$$\bar{V}_c = \frac{\widehat{V}_s}{2\pi} (1 + \cos \alpha)$$

0.75pt

$\alpha$	$0^\circ$	$30^\circ$	$90^\circ$	$135^\circ$	$180^\circ$
$\bar{V}_c$ (V)	99.085	92.45	49.54	14.50	0
	0.25pt	0.25pt	0.25pt	0.25pt	0.25pt

Consolidation de jeudi  
 20/09/2018

M. Maman

