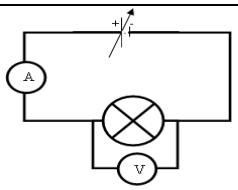
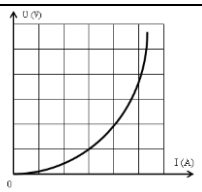
المادة: الفيزياء الشهادة: المتوسطة الفرع: نموذج رقم 2 المدّة : ساعة واحدة	الهيئة الأكاديميّة المشتركة قسم : العلوم	المركز التربوي للبحوث والإنماء

أسس التصحيح (تراعي تعليق الدروس والتوصيف المعدّل للعام الدراسي 2016-2017 وحتى صدور المناهج المطوّرة)

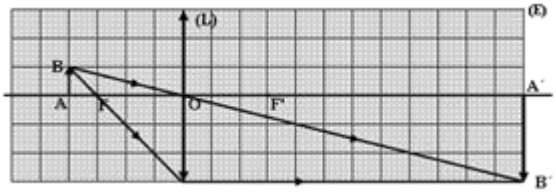
Exercice 1 (4 points)

Question	Réponse	Note
1.	(a) Alternative. Le symbole de la tension est ~	1
2.	(c) 1100 W. 1,1 kW = 1,1 × 1000 = 1100 W	1
3.	(a) 5 A. I = P/U = 1100/220 = 5 A	1
4.	(b) 6 A. Cette valeur est légèrement supérieure à 5 A.	1

Exercice 2 (6 points)

Question	Réponse	Note
1.		2½
2.1		2
2.2	Non. La courbe n'est pas une droite passant par l'origine.	1½

Exercice 3 (6 points)

Question	Réponse	Note
1.	Reproduction.	½
2.		1½
3.	Figure. L'intersection entre le rayon émergent et l'écran.	½ + ½
4.	Tracé de (A'B').	½
5.	Nature : Réelle. Grandeur : 3 cm.	1
6.	Oui. L'image est réelle et plus grande que l'objet.	½ + 1

Exercice 4 (4 points)

Question	Réponse	Note
1.	Les Liquides transmettent intégralement toute variation de pression.	1
2.	$P = F_1 / A_1 = 1/0,01 = 100$ Pa	1½
3.	$F_2 = P \times A_2$ P est constante d'après le théorème de Pascal donc $F_2 = 100 \times 0,5 = 50$ N.	1½

1) Calculation of voltages

1-1) Show that $U_{AC} = 20$ V.

1-2) Indicating the law used, Calculate the voltage U_{AB} knowing that $U_{BC} = 12$ V.

2) Calculation of currents

Given:

I_1 is the electric current carried by the electric component D_1;

I_3 is the electric current carried by the electric component D_3.

The electric current carried by the battery is I = 10 mA.

The electric current carried by the electric component D_2 is $I_2 = 3$ mA.

Indicating the laws used, calculate I_1 then I_3.

Exercise 3 (4 points) Equilibrium of a solid body

(S) is a solid body of mass m = 300 g.

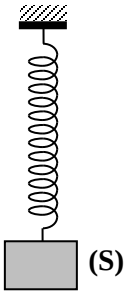
Given:

Gravitational acceleration: g = 10 N/kg

Stiffness constant of the spring: k = 2 N/cm

The solid (S) is suspended from the free end of the spring as shown in the figure (Doc 1).

The solid (S) is in equilibrium under the action of its weight $\vec{W}$ of magnitude W and another force.



(Doc 1)

1) Give the name of the other force exerted on (S).

2) Specify the vector relation between the two forces exerted on (S).

3) Calculate the value of each of these two forces.

4) Calculate the elongation ΔL of the spring.

Exercise 4 (4 points) Archimedes upthrust

(S) is a solid body of weight W = 3 N and volume V = 100 cm^3.

Given:

Gravitational acceleration: g = 10 N/kg

Density of water: $\rho = 1\,000$ kg/m^3

The solid (S) is completely immersed in water.

1) Calculate the magnitude F of the Archimedes upthrust exerted by the water on (S).

2) The solid (S) is left to itself.

2-1) Compare W to F. Deduce if (S) sinks or floats at the surface of the water.

2-2) Calculate, in this case, the magnitude W_{app} of the apparent weight of (S).

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Exercise 1 (6 points) Image given by a converging lens

Question	Answer	Mark
1	*« Figure »*	1
2	F is the point symmetric to F' with respect to O. *«indicate the point F on the graph»*	½ ½
3	$f = \overline{OF'}$ $f = 2 \times 5 = 10\,cm$	½ ½
4-1	From point B, we draw a ray that passes through point O. This ray emerges from point O of the lens without deviation. From point B, we draw a ray parallel to the optical axis, which is incident on the lens. This ray emerges from the lens bent and passes through point F'. Both emerging rays meet at point B'. From B', we construct a perpendicular line to the optical axis. This line intersects the optical axis at point A'.	½ ½ ½
4-2	A'B' is a real image because it forms on the side of the emerging rays.	½ ½
4-3	$d = 3 \times 5 = 15\,cm$	½

Exercise 2 (6 points) Laws of voltages and laws of currents

Question	Answer	Mark
1-1	Law of uniqueness of voltages: $U_{AC} = U_{PN} = 20$ V or Law of addition of voltages: $U_{AC} = U_{AP} + U_{PN} + U_{NC} = 0 + U_{PN} + 0 = U_{PN} = 20$ V	½ ¾ ½ ¾
1-2	Law of addition of voltages: $U_{AC} = U_{AB} + U_{BC} \Rightarrow U_{AB} = U_{AC} - U_{BC}$ therefore $U_{AB} = 20 - 12 = 8$ V	½ ½ ¾
2	Law of uniqueness of currents: $I_1 = I_2 = 3$ mA Law of addition of currents: $I = I_1 + I_3 \Rightarrow I_3 = I - I_1$ therefore $I_3 = 10 - 3 = 7$ mA	½ ¾ ½ ½ ¾

Exercise 3 (4 points) **Equilibrium of a solid body**

Question	Answer	Mark
1	The tension $\vec{T}$ of the spring.	½
2	(S) is in equilibrium, $\vec{T}+\vec{W}=\vec{0}$.	½
3	W = m.g $\Rightarrow$ W = 0.3 x 10 = 3 N $\vec{T}=-\vec{W} \Rightarrow$ T = W = 3 N	½ ½ ½
4	Hooke's law : T =k.ΔL $\Delta L=\frac{T}{k} \Rightarrow \Delta L=\frac{3}{2}=1.5\,cm$	½ ½ ½

Exercise 4 (4 points) **Archimedes upthrust**

Question	Answer	Mark
1	$F = \rho.V_{immersed}.g$ but $V_{immersed}$ = V because (S) is completely immersed in water therefore F = ρ.V.g $F = 1\,000 \times 100 \times 10^{-6} \times 10 = 1$ N	½ ½ ½ ½
2-1	W > F therefore (S) sinks.	½ ½
2-2	$W_{app} = W - F$ $W_{app} = 3 - 1 = 2$ N	½ ½