

Note définitive
sur 20
19,93/20

Matière :

Appréciations expliquant la note chiffrée :

19,93

RÉSERVÉ AU SECRÉTAIRE

NOM DU CORRECTEUR ET SIGNATURE :

524547

ATC 28,5

ADC 27,5

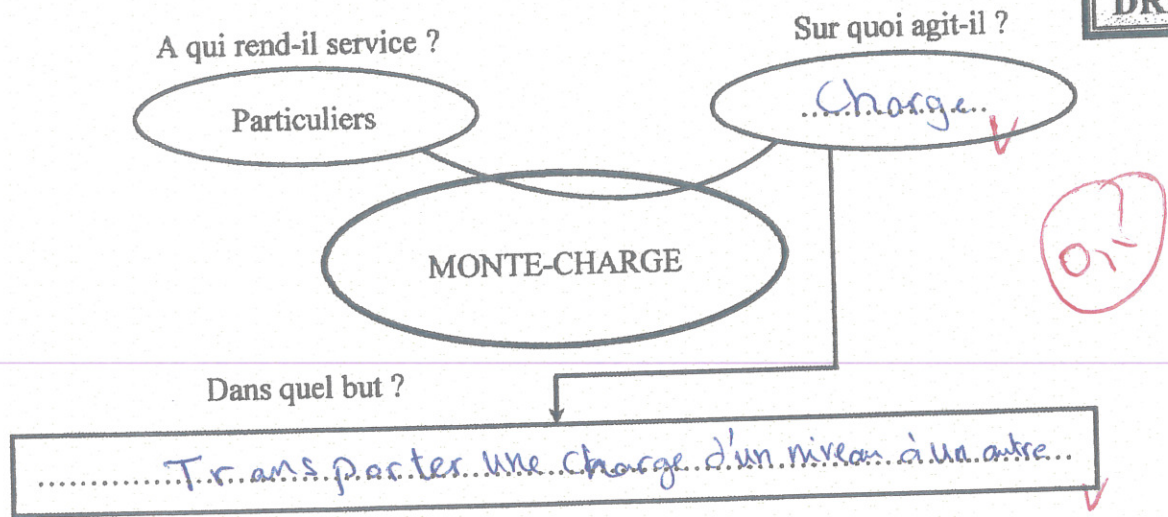
T 23,75

~~79,75~~
80

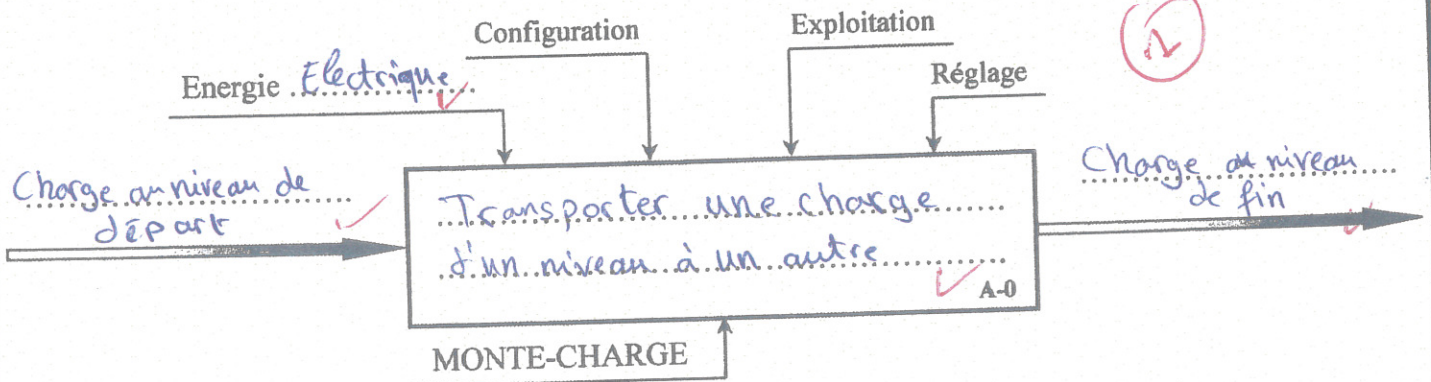
~~19,93~~
20

DREP 01

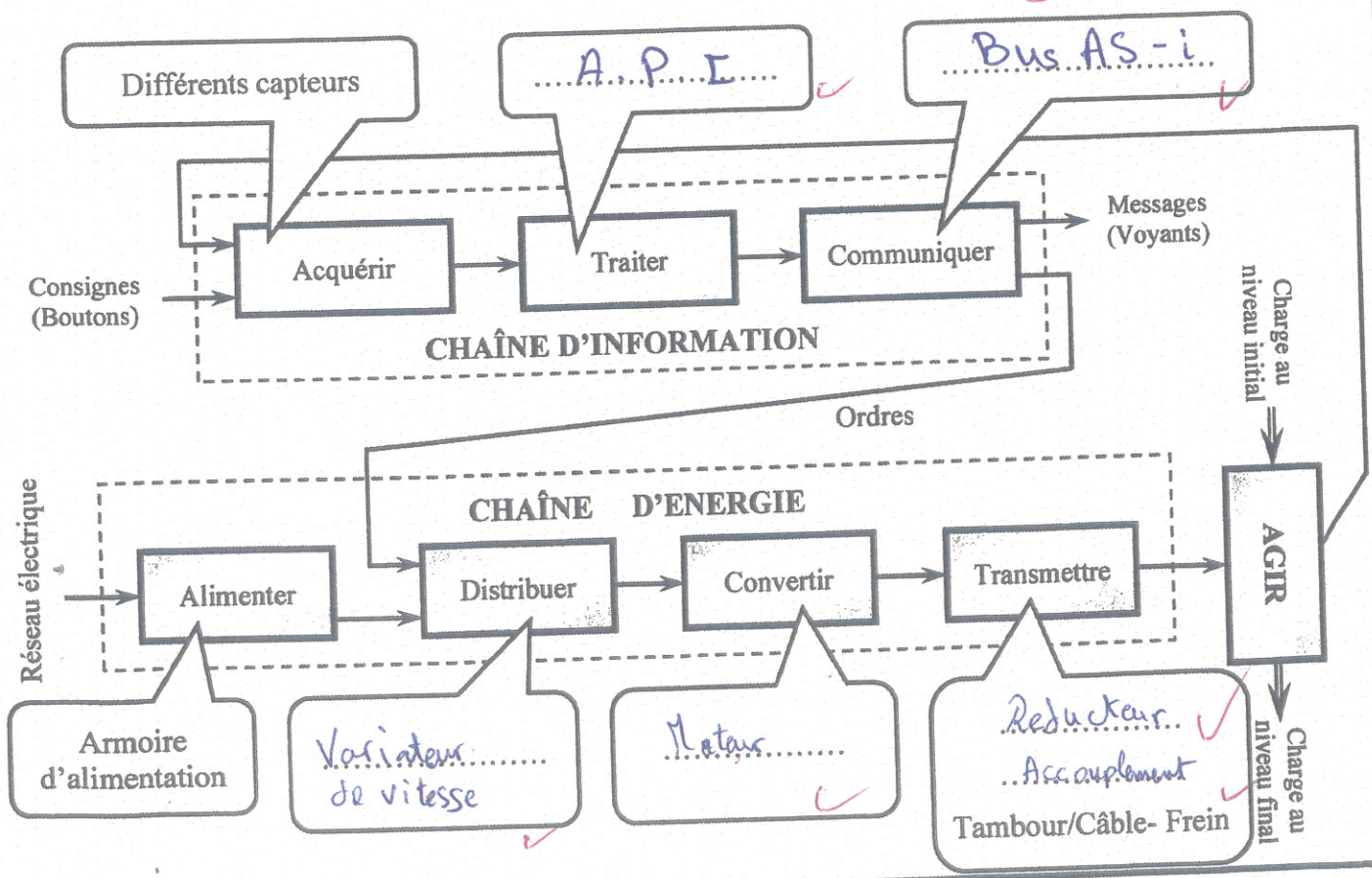
Q.1 -



Q.2 -

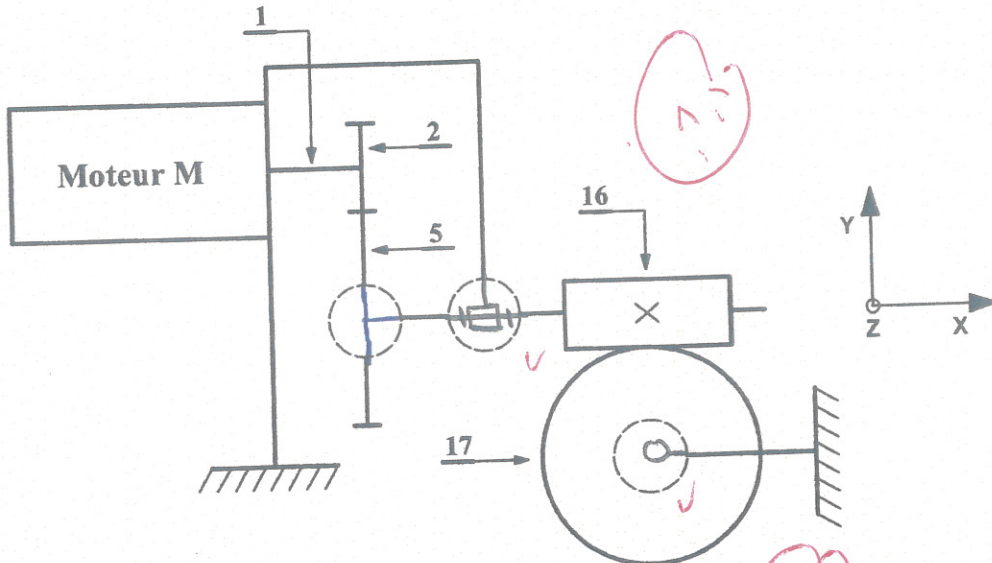


Q.3 -

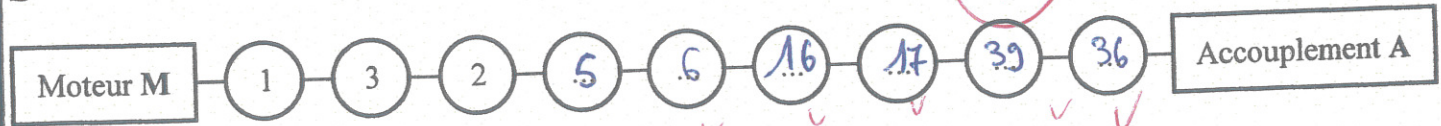


Q.4-

Liaison	Nom de la liaison	Translation d'Axe			Rotation d'axe		
		X	Y	Z	X	Y	Z
2 / 1	Encastrement	0	0	0	0	0	0
5 / 16	Encastrement.....	0	0	0	0	0	0
16 / {9 + 25}	Pivot.....	0	0	0	1	0	0
17 / 36	Encastrement.....	0	0	0	0	0	0
36 / {29 + 40}	Pivot.....	0	0	0	0	0	1



Q.5-



Q.6-

Écrou à encache {35 B4}, Epaulement de 36, Clavette 39

Q.7-

ona $V = \frac{D_T}{2} \cdot \omega_T \Rightarrow \omega_T = \frac{2}{D_T} \cdot V = \frac{2}{280 \times 10^{-3}} \cdot 0,2 = 1,43 \text{ rad/s}$

et on a $N_T = \frac{60 \omega_T}{2\pi} = \frac{60 \times 1,43}{2\pi} = 13,64 \text{ tr/min}$

Q.8-

$$\omega_T = \frac{2\pi N_T}{60} = \frac{2\pi \times 14}{60} = 1,47 \text{ rad/s}$$

1,47

Q.9-

$$P_n = P \cdot V = m \cdot g \cdot V = 1000 \times 10 \times 0,2 = 20000 \text{ W} = 2 \text{ kW}$$

✓

2

Q.10-

$$\text{on a. } P_n = C_T \cdot \omega_T \Rightarrow C_T = \frac{P_n}{\omega_T} = \frac{2000}{1,47} = 1360,54 \text{ Nm}$$

1360,54

Q.11-

$$P_M = \frac{P_n}{\eta_g} = \frac{P_n}{\eta_R \cdot \eta_A \cdot \eta_T} = \frac{2000}{0,64 \times 0,8 \times 1} = 3906,25 = 3,91 \text{ kW}$$

3,91

Q.12-

$$N_M = \frac{N_T}{\eta_g} = \frac{N_T}{\eta_R} = \frac{13,64}{1,170} = \frac{980 \text{ tr/min}}{1,170} = 954,8 \text{ tr/min}$$

954,8

Q.13-

$$C_{Fmin} = C_M = \frac{P_M}{\omega_M} = \frac{P_M}{\frac{2\pi N_M}{60}} = \frac{60 \times 4000}{2\pi \times 965} = 39,58 \text{ Nm}$$

$$\text{done } C_F \geq 39,58 \text{ Nm}$$

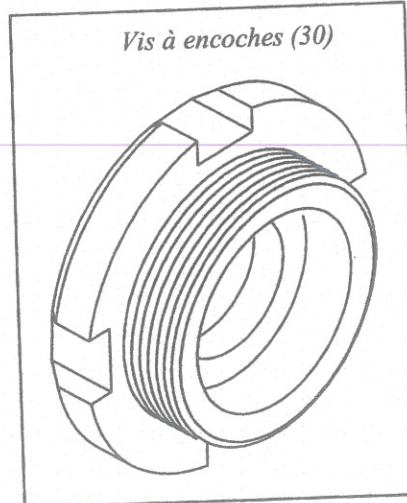
✓

39,58

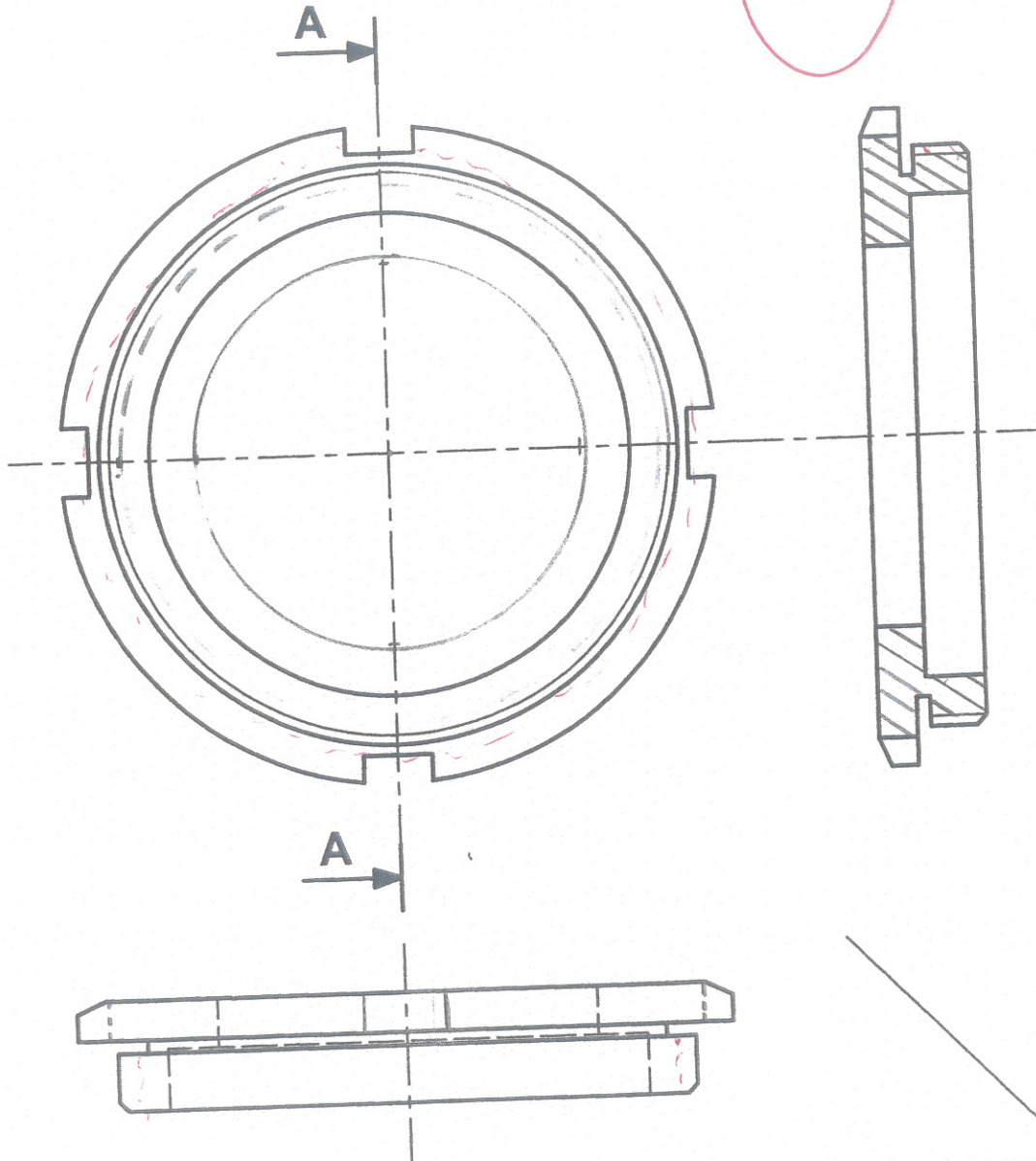
Q.14 -

- Vue de face ;
- Vue de gauche en coupe A-A (sans traits cachés) ;
- Vue de dessus.

Nota : il sera tenu compte de la représentation et du respect des règles du dessin.



30
71



Q.15-

Couplage étoile

Q.16-

6 pôles $\Rightarrow p = 3$, on a $n_s = \frac{60f}{p} = \frac{60 \times 50}{3} = 1000 \text{ tr/min}$

Q.17-

$g = \frac{n_s - n}{n_s} = \frac{1000 - 960}{1000} = 0,04 = 4\%$

Q.18-

$P = \sqrt{3} U \cdot I \cos \phi = \sqrt{3} \cdot 400 \times 9,4 \times 0,76 = 4949,51 \text{ W}$

Q.19-

$\eta = \frac{P}{P_u} = \frac{4949,51}{6000} \quad \eta = \frac{P_{mV}}{P} = \frac{4000}{4949,51} = 0,81$

Q.20-

on a $P_{mV} = C_{mV} \omega_{mV} \Rightarrow C_{mV} = \frac{P_{mV}}{\omega_{mV}} = \frac{P_{mV}}{\frac{2\pi \cdot N_{mV}}{60}} = \frac{60 \times 4000}{2\pi \times 960} = 39,79 \text{ Nm}$

Q.21-

$a = \frac{C_{mV} - C_{u0}}{n_V - n_s} = \frac{39,78 - 0}{960 - 1000} = -0,99 \frac{\text{N.m.s}}{\text{tr}}$

on a $0 = -0,99 \times n_s + b \Rightarrow b = 0,99 \times n_s = 0,99 \times 1000 = 990 \text{ Nm}$

Q.22-

$C_r = -0,99 \times n + 990 \Rightarrow -0,99n = C_r - 990$
 $\Rightarrow n = \frac{C_r - 990}{-0,99} = \frac{36 - 990}{-0,99} = 963,64 \text{ tr/min}$

Q.23-

on a $g_1 = \frac{n_{s1} - n_1}{n_{s1}} \Rightarrow n_{s1} \cdot g_1 = n_{s1} - n_1 \Rightarrow n_{s1} (g_1 - 1) = -n_1$

$\Rightarrow n_{s1} = \frac{-n_1}{g_1 - 1} = \frac{-570}{0,05 - 1} = 600 \text{ tr/min}$

Q.24-

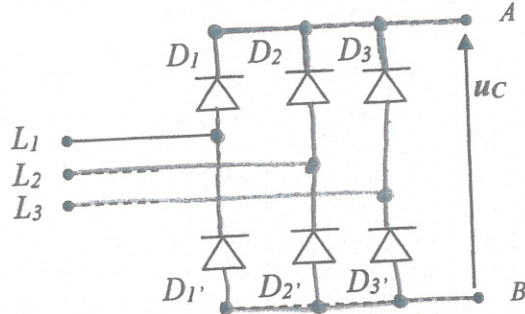
on a $f_1 = \frac{p \cdot n_{s1}}{60} = \frac{3 \times 600}{60} = 30 \text{ Hz}$

Q.25-

on a $p_0 \text{ kr } n_{s0} = 1000 \text{ tr/min}$, $\frac{U}{f} = \frac{400}{50} = 8 \text{ V/Hz} \Rightarrow \frac{U_1}{f_1} = 8 \text{ V/Hz}$

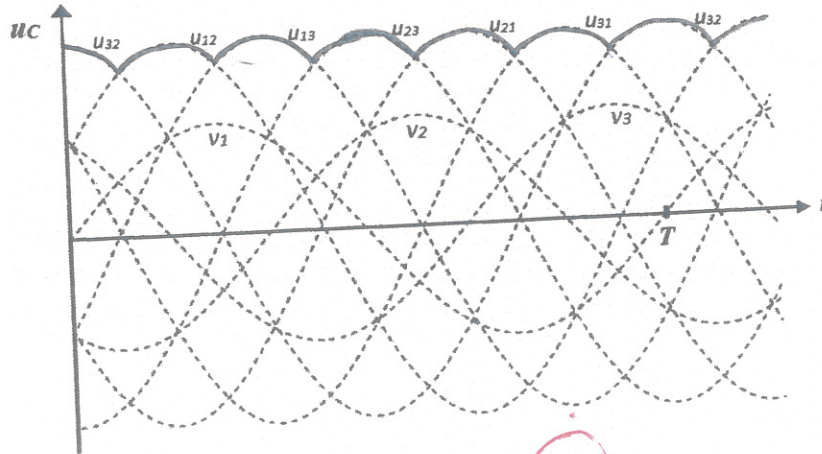
$\Rightarrow U_1 = 8 \times f_1 = 8 \times 30 = 240 \text{ V}$

Q.26 -



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Q.27 -



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Q.28 -

$f' = 6f = 6 \times 50 = 300 \text{ Hz}$

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Q.29 - Cocher la bonne réponse

Passe-bande

Passe-bas

Passe-haut

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Q.30 -

Continue - Alternatif

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Q.31 - Cocher la bonne réponse

Symétrique

Décalée

M.L.I.

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Q.32 -

Transistor

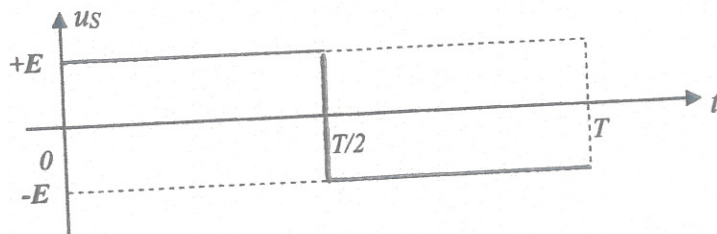
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Q.33 -

$f = \frac{1}{T} = \frac{1}{20 \times 10^{-3}} = 50 \text{ Hz}$

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Q.34 -



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Q.35 -

$U_s = \sqrt{\frac{1}{T} \int_0^T u_s^2 dt} \Rightarrow U_s = \sqrt{\frac{1}{T} \int_0^{T/2} E^2 dt + \frac{1}{T} \int_{T/2}^T E^2 dt} = \sqrt{\frac{1}{T} \times E^2 \times T} = \sqrt{E^2} = E$ alors $U_s = E$

Q.36-

On a, en plain charge : $\frac{U_{AB}}{E} = 2 \text{ mV/V} \Rightarrow U_{AB} = 2 \text{ mV/V} \cdot E$

$\Rightarrow U_{AB} = 2 \text{ mV/V} \cdot 10 \text{ V} = 20 \text{ mV}$

1,5

Q.37-

On a $U_{AB} = E \frac{\Delta R}{R} = E \cdot K \cdot m \Rightarrow K = \frac{U_{AB}}{E \cdot m}$

$\Rightarrow K = \frac{20 \times 10^{-3}}{10 \times 1000} = 2 \times 10^{-6} \text{ kg}^{-1} = 2 \text{ mg}^{-1}$

1,5

Q.38-

$U_{AB} = E \frac{\Delta R}{R} = E \cdot K \cdot m = 10 \times 2 \times 10^{-6} \cdot m = 2 \times 10^{-5} \cdot m$

1,5

Q.39-

$S_s = 150\% \cdot 1000 \text{ kg} = 1500 \text{ kg}$

$C_R = 300\% \cdot 1000 = 3000 \text{ kg}$

2

Q.40-

$V^- = \frac{U_2 \cdot R_3 + U_3 \cdot R_1}{R_3 + R_1}$, $V^+ = \frac{U_1 \cdot R_2}{R_2 + R_4}$, $V^+ = V^-$

$\Rightarrow \frac{U_2 R_3 + U_3 R_1}{R_3 + R_1} = \frac{U_1 R_2}{R_2 + R_4} \Rightarrow U_2 R_3 + U_3 R_1 = U_1 R_2 \Rightarrow U_3 R_1 = R_2 (U_1 - U_2)$

$\Rightarrow U_3 = \frac{R_2}{R_1} (U_1 - U_2)$

2

Q.41-

$U_3 = U_1 - U_2 = 5 \text{ V}_B - 50 \text{ V}_A = 5 \text{ V}_A + 50 \text{ V}_B = V_A (-101) + V_B (101)$

$U_3 = -101 (V_A - V_B) = -101 U_{AB}$

$U_3 = -101 U_{AB} = -101 \times 2 \times 10^{-5} \text{ m} = 2,02 \times 10^{-3} \text{ m}$

2

Q.42 -

$$V^+ = 0, V^- = \frac{U_4}{R_{10}} + \frac{U_3}{R_9} + \frac{U_{RF1}}{R_9}, V^+ = V^- \Rightarrow \frac{U_4}{R_{10}} + \frac{U_3}{R_9} + \frac{U_{RF1}}{R_9} = 0$$

$$\Rightarrow \frac{U_4}{R_{10}} + \frac{U_3}{R_9} + \frac{U_{RF1}}{R_9} = 0 \Rightarrow \frac{U_4}{R_{10}} = -\frac{1}{R_9} (U_3 + U_{RF1})$$

$$\Rightarrow U_4 = -\frac{R_{10}}{R_9} (U_3 + U_{RF1})$$

2

Q.43 -

$$U_4 = -\frac{R_{10}}{R_9} (U_3 + U_{RF1}) = -\frac{R_{10}}{R_9} (-2,02 \times 10^{-3} + 0,404)$$

$$U_4 = -\frac{R_{10}}{R_9} (-2,02 \times 10^{-3} (m_0 + m_c) + 0,404) = -\frac{R_{10}}{R_9} (-2,02 \times 10^{-3} \times 200 + -2,02 \times 10^{-3} m_c + 0,404)$$

$$U_4 = -\frac{R_{10}}{R_9} (-0,404 + 0,404 - 2,02 \times 10^{-3} m_c) = \frac{R_{10}}{R_9} \times 2,02 \times 10^{-3} m_c$$

1

Q.44 -

$$U_4 = 2,02 \times 10^{-3} \frac{R_{10}}{R_9} \times m_c \Rightarrow R_{10} = \frac{U_4 \times R_9}{2,02 \times 10^{-3} \cdot m_c} = \frac{5V \times 22}{2,02 \times 10^{-3} \times 800} = 68,06 k\Omega$$

1,5

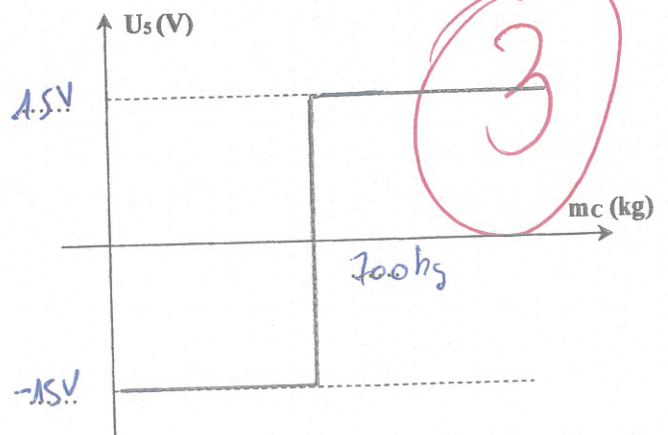
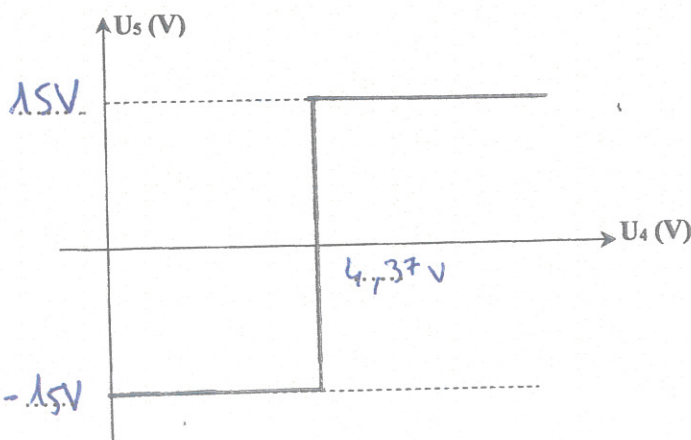
Q.45 -

$$m_c > 700 kg \Rightarrow U_4 > U_{RF2} \Rightarrow U_{RF2} = 2,02 \times 10^{-3} \times 700 \times \frac{R_{10}}{R_9}$$

$$U_{RF2} = 2,02 \times 10^{-3} \times \frac{68}{22} \times 700 = 4,37 V$$

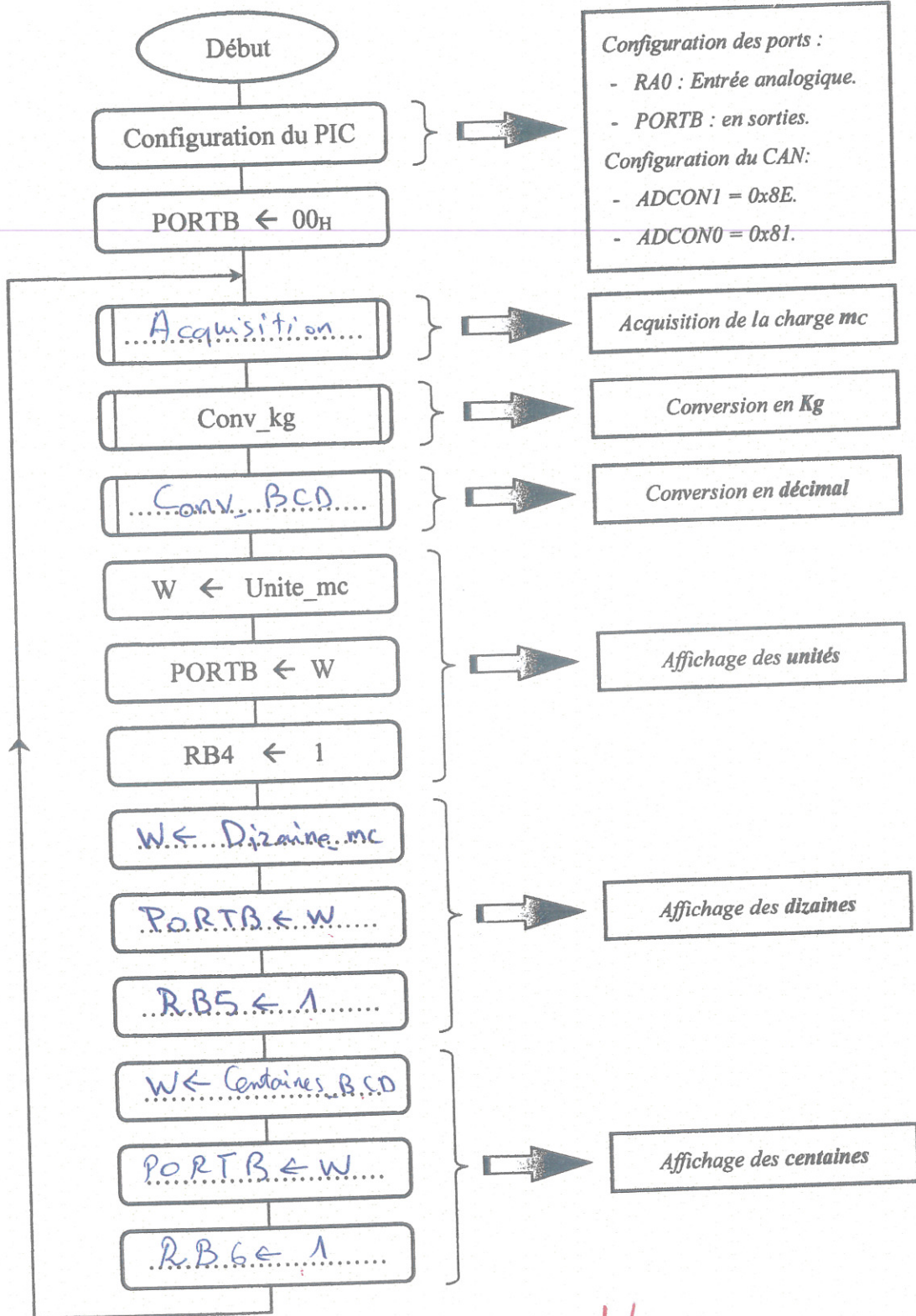
1,5

Q.46 -



3

Q.47 -



4

Q.48 -

```

BCF      STATUS, 6      ;
BSF     STATUS, 5      ; accès à la BANK 1
CLRF    PORTB          ; PORTB en sortie
MOVLW   0x01          ; Mot de commande du registre TRISA
MOVWF   TRISA          ; RA0 en entrée
MOVLW   0x8E          ; Mot de commande du registre ADCON1
MOVWF   ADCON1        ; Configuration du CAN interne
BCF     STATUS, 5      ; Retour en banque mémoire 0
MOVLW   0x81          ; Mot de commande du registre ADCON0
MOVWF   ADCON0        ; Configuration du CAN interne
CLRF    PORTB          ; Initialisation des sorties
Loop    CALL    Acquisition ; appel du sous-programme "Acquisition"
        CALL    Conv_kg...
        CALL    Conv_BCD    ; appel du sous-programme "Conv_BCD"
        MOVF    Unite_mc, W
        MOVWF   PORTB...
        BSF    PORTB, 4
        MOVF    Dizaine_mc, W
        MOVWF   PORTB...
        BSF    PORTB, 5
        MOVF    Centaine_mc, W ; Lecture de la valeur des centaines
        MOVWF   PORTB          ; Ecriture des centaines dans le PORTB
        BSF    PORTB, 6          ; Affichage des centaines
        GOTO   Loop            ;
  
```

5