UE4 – PACES

Dev 1

* **QCM 1 : C**

$p(\text{Blanc}) = p(\text{Blanc} \cap \text{unicolore}) + p(\text{Blanc} \cap \text{pie})$

$= p(\text{Blanc} \cap \text{unicolore}) + p(\text{pie})$

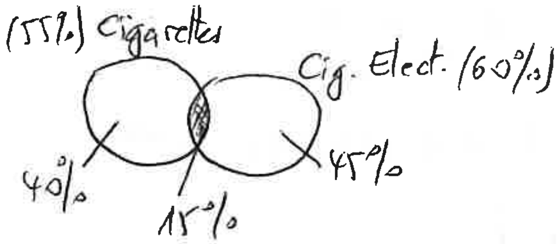
$0{,}65 = x + 0{,}20$

$x = 0{,}65 - 0{,}20 = 0{,}45$

* **QCM 2 : E**

$p(\text{unicolore}) = 1 - p(\text{pie}) = 1 - 0{,}20 = 0{,}80$

* **QCM 3 : C**



* **QCM 4 : D**

$p(\text{Cig.} \cup \text{Cig. Elect.}) = \left| \begin{array}{l} p(\text{Cig.}) + p(\text{Cig. Elect.}) \\ - p(\text{Cig.} \cap \text{Cig. Elect.}) \end{array} \right.$

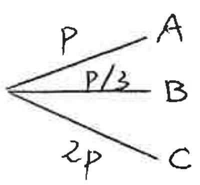
$= 0{,}40 + 0{,}45 - 0{,}15 = 0{,}70$

* **QCM 5 : D**

$C_{70}^{3} = \dfrac{70!}{3!\,(70-3)!} = \dfrac{70!}{3!\;67!} = \dfrac{1}{3!} \cdot \dfrac{70!}{67!}$

$= \dfrac{1}{3!} \cdot 68.69.70 = 54\,740$

* **QCM 6 : C E**



$p + \dfrac{p}{3} + 2p = 1$

$10\dfrac{p}{3} = 1 \Leftrightarrow p = \dfrac{3}{10}$

$p(A) = 0{,}3 \quad p(B) = 0{,}1 \quad p(C) = 0{,}6$

* **QCM 7 : A**

$p(A/B) = \dfrac{p(A \cap B)}{p(B)}$

$p(B/A) = \dfrac{p(B \cap A)}{p(A)}$

$p(A \cap B) = p(A/B) \cdot p(B) = p(B \cap A) = p(B/A) \cdot p(A)$

$p(A/B) = \dfrac{p(A \cap B)}{p(A)} \cdot \dfrac{p(A)}{p(B)}$

* **QCM 8 : A D**

$p(\bar{A}) = 1 - p(A)$

* **QCM 9 : A D E**

* **QCM 10 : A B E**

* **QCM 11 : A C**

$p(C_B(A)) = p(A \cup B) - p(A)$

* **QCM 12 : A E**

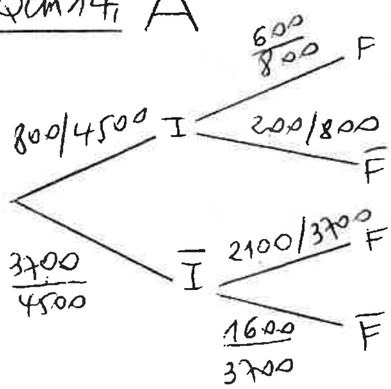
* **QCM 13 : D**

$X \rightsquigarrow B(N\,;p) = B(2\,;0{,}01)$

$p(X = k) = C_2^k \cdot 0{,}01^k \cdot 0{,}99^{2-k}$

$p(X \geq 1) = 1 - p(X = 0) = 1 - 0{,}99^2 = 0{,}02$

* **QCM 14 : A**



$p(I/F) = \dfrac{p(I) \cdot p(F/I)}{p(F)}$

$= \dfrac{p(I) \cdot p(F/I)}{p(I) \cdot p(F/I) + p(\bar{I}) \cdot p(F/\bar{I})}$

*** Qcm15. A**

$$p(I/F) = \frac{p(I).\,p(F/I)}{p(F)} = \frac{p(I).\,p(F/I)}{p(I).\,p(F/I) + p(\bar{I}).\,p(F/\bar{I})}$$

*** Qcm16. B**

$X \sim B(4\,;\,1/2)$

$p(X=k) = C_4^k .\, 0{,}5^k .\, 0{,}5^{4-k}$

$p(X=3) = C_4^3 .\, 0{,}5^3 .\, 0{,}5^1 = 0{,}25$

*** Qcm17. C**

$$p(A \cup B) = p(A) + p(B) - p(A \cap B) = p(A) + p(B) - p(A).\,p(B)$$

*** Qcm18. A**

$X \sim P(\lambda = 1)$

$p(X=k) = e^{-\lambda} .\, \frac{\lambda^k}{k!} = \frac{e^{-1}}{k!}$

$$p\big((X_1=0) \cap (X_2=0) \cap (X_3=0)\big) = p(X=0)^3 = (e^{-1})^3 = e^{-3}$$

*** Qcm19. C**

$X \sim B(20\,;\,0{,}03)$

$p(X=k) = C_{20}^k .\, 0{,}03^k .\, 0{,}97^{20-k}$

$p(X \geq 1) = 1 - p(X=0) = 1 - 0{,}97^{20}$

*** Qcm20. A**

$X \sim B(5\,;\,0{,}03)$

$p(X=k) = C_5^k .\, 0{,}03^k .\, 0{,}97^{5-k}$

$p(X \leq 2) = p(X=0) + p(X=1) + p(X=2) \approx 1$

*** Qcm21. AC**

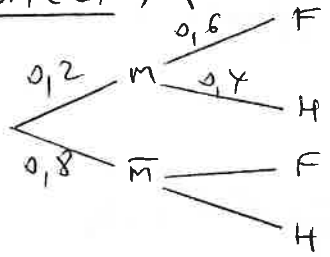
$X \sim P(\lambda) = P(3)$

$p(X=k) = e^{-\lambda} .\, \frac{\lambda^k}{k!} = e^{-3} .\, \frac{3^k}{k!}$

$\begin{cases} p(X=0) = 0{,}05 \\ p(X=1) = 0{,}15 \end{cases}$ $\begin{cases} p(X=2) = 0{,}225 \\ p(X=3) = 0{,}225 \end{cases}$

$$p(X \geq 4) = 1 - \big[p(X=0) + p(X=1) + \dots + p(X=3)\big] = 0{,}35$$

*** Qcm22. A**



$p(H \cap m) = p(m).\,p(H/m) = 0{,}08$

*** Qcm23. E**

	F	H	Tot.
m	0,12	0,08	0,20
$\bar{m}$	0,40	0,40	0,80
Tot.	0,52	0,48	1

$$p(\bar{m}/F) = \frac{p(\bar{m} \cap F)}{p(F)} = 0{,}77$$

*** Qcm24. D**

$X \sim B(3\,;\,0{,}80)$

$p(X=k) = C_3^k .\, 0{,}8^k .\, 0{,}2^{3-k}$

$p(X \geq 2) = 1 - \big(p(X=0) + p(X=1)\big) = 0{,}896$

*** Qcm25. AB**

$Se = p(T^+/m)$ $\quad$ $Sp = p(T^-/\bar{m})$

*** Qcm26. ABCD**

$VPP = \frac{VP}{VP + FP}$ $\quad$ $VPN = \frac{VN}{VN + FN}$

* **Qcm27, B**

	T_1 (m)	T_2 ($\bar{m}$)
T^+	MT1 VP	NMT1 FP
T^-	MT2 FN	NMT2 VN

$$S_p = \frac{VN}{VN + FP}$$

* **Qcm28, C**

$$S_e = \frac{VP}{VP + FN}$$

* **Qcm29, D**

$$m : 40 \begin{cases} 36\, T^+ \\ 4\, T^- \end{cases} \qquad S_e = \frac{36}{40}$$

* **Qcm30, D**

$$\bar{m} : 40 \begin{cases} 2\, T^+ \\ 38\, T^- \end{cases} \qquad S_p = \frac{38}{40}$$

* **Qcm31, A**

$$VPP = \frac{S_e \cdot p}{S_e \cdot p + (1-p)(1-S_p)}$$

* **Qcm32, B**

$$VPN = \frac{S_p \cdot (1-p)}{S_p \cdot (1-p) + p(1-S_e)}$$

* **Qcm33, E**

$$VPP = \frac{S_e \cdot p}{p(T^+)} \Leftrightarrow S_e \cdot p = VPP \cdot p(T^+)$$

$$VPN = \frac{(1-p) S_p}{p(T^-)} = 1 \Leftrightarrow (1-p) S_p = p(T^-)$$

$$S_e \cdot p = VPP \cdot (1 - p(T^-)) = VPP \cdot (1 - (1-p) S_p)$$

$$S_e \cdot p = VPP - VPP \cdot S_p + VPP \cdot p \cdot S_p$$

$$p \cdot (S_e - VPP \cdot S_p) = VPP \cdot (1 - S_p)$$

$$p = \frac{VPP \cdot (1 - S_p)}{S_e - VPP \cdot S_p} = 0{,}01$$

* **Qcm34, CDE**

On a 2 groupes $\begin{cases} T^+ \\ T^- \end{cases}$

VPP et VPN estimées par :

$$VP = \frac{VP}{VP + FP} = \frac{140}{200}$$

$$VPN = \frac{VN}{VN + FN} = \frac{172}{200}$$

* **Qcm35, C**

$$VPP = \frac{S_e \cdot p}{S_e \cdot p + (1-p)(1-S_p)}$$

$$0{,}70 = \frac{0{,}90 \cdot p}{0{,}90 \cdot p + 0{,}10 (1-p)}$$

$$0{,}7 \cdot \left(0{,}9 \cdot p + 0{,}1 \cdot (1-p)\right) = 0{,}9 \cdot p$$

$$0{,}34 \cdot p = 0{,}07 \Leftrightarrow \begin{cases} p = \frac{0{,}07}{0{,}34} \\ p = 0{,}206 \end{cases}$$

Risque d'erreur, $(T^+ \cap \bar{m}) \cup (T^- \cap m)$

$$p(T^+ \cap \bar{m}) + p(T^- \cap m) = \begin{cases} p(\bar{m}) \cdot p(T^+/m) \\ + p(m) \cdot p(T^-/m) \end{cases}$$

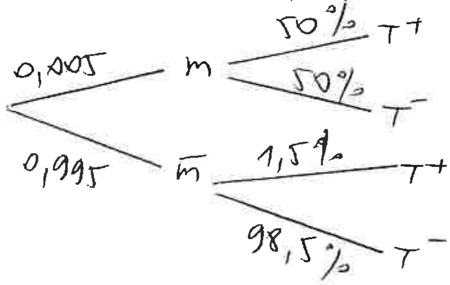
$$= (1-p)(1-S_p) + p(1-S$$

$$= (1 - S_e) = 0{,}10$$

$$(S_e = S_p)$$

* **Qcm36, D**

$$VPP = p(m/T^+) = \frac{S_e \cdot p}{S_e \cdot p + (1-p)(1-S_p)}$$



*Qcm 37. A

$$p(m/T^+) = \frac{odds_{post-test}}{1 + odds_{post-test}} = \frac{3}{4}$$

*Qcm 38. C

$$odds_{pré-test} = \frac{P}{1-P} = 0,111$$

$$odds_{post-test} = odds_{pré-test} \cdot RV^+ = 1,665$$

$$p(m/T^+) = \frac{odds_{post-test}}{1 + odds_{post-test}} = 0,625$$

*Qcm 39. A

$$RV^- = \frac{1-Se}{Sp} = 0,054$$

*Qcm 40. D

$$RV^+ = \frac{Se}{1-Sp} = 11,875$$

$$odds_{pré-test} = \frac{P}{1-P} = 0,136$$

$$odds_{post-test} = odds_{pré-test} \cdot RV^+ = 1,615$$

$$p(m/T^+) = \frac{odds_{post-test}}{1 + odds_{post-test}} = 0,62$$