ALGO
QCM

1. **Un arbre binaire vide est un arbre de taille ?**
   (a) -1
   (b) 0
   (c) 1

2. **Si LC(B) défini la longueur de cheminement de B (un arbre binaire), alors PM(B) la profondeur moyenne de B est égale à ?**
   (a) LC(B)/f avec f le nombre de feuilles de B
   (b) LC(B)/n avec n le nombre de noeuds de B
   (c) LC(B)/n avec n le nombre de noeuds internes de B
   (d) LC(B).n avec n le nombre de noeuds internes de B

3. **Un arbre dont les noeuds contiennent des valeurs est ?**
   (a) valué
   (b) étiqueté
   (c) valorisé
   (d) évalué

4. **Dans un arbre binaire, un noeud possédant 2 fils est appelé ?**
   (a) une racine
   (b) noeud interne
   (c) noeud externe
   (d) point double

5. **Dans un arbre binaire, le chemin obtenu à partir de la racine en ne suivant que des liens droits est ?**
   (a) le chemin droit
   (b) le bord droit
   (c) la branche droite
   (d) le métalien droit

6. **Dans un arbre binaire, un noeud ne possédant qu'un fils gauche est appelé ?**
   (a) une racine
   (b) noeud interne
   (c) noeud externe à droite
   (d) point simple à gauche

7. **La hauteur d'un arbre binaire réduit à un noeud racine est ?**
   (a) -1
   (b) 0
   (c) 1

8. **Un arbre binaire parfait est un arbre binaire dont ?**
   (a) tous les niveaux sont remplis
   (b) tous les niveaux sont remplis sauf le dernier rempli de gauche à droite
   (c) tous les niveaux sont remplis sauf le dernier rempli de droite à gauche
   (d) tous les niveaux sont remplis sauf le dernier rempli aléatoirement

9. **Un peigne gauche est un arbre binaire ?**
   (a) parfait
   (b) complet
   (c) localement complet
   (d) filiforme

10. **L'arbre défini par B={1,2,3,4,5,6,7,8,9,10,11,13} est ?**
   (a) dégénéré
   (b) parfait
   (c) complet
   (d) quelconque

QCM 1

lundi 17 janvier 2022

Question 11

On considère les polynômes $A(X) = 2X^3 - X + 4$ et $B(X) = X - 2$. On a

a. Le quotient de la division euclidienne de A par B est $Q(X) = 2X^2 + 4X - 9$ et le reste est $R(X) = 18$

b. Le quotient de la division euclidienne de A par B est $Q(X) = 2X^2 + 4X + 7$ et le reste est $R(X) = -10$

c. Le quotient de la division euclidienne de A par B est $Q(X) = 2X^2 + 4X$ et le reste est $R(X) = 7X + 4$

d. Le quotient de la division euclidienne de A par B est $Q(X) = 2X^2 + 4X + 7$ et le reste est $R(X) = 18$

e. Aucune des autres réponses

Question 12

Soit $P \in \mathbb{R}[X]$. On note Q le quotient de la division euclidienne de P par $(X - 2)$ et R le reste de la division euclidienne de P par $(X - 2)$. On a

a. $P - R \mid X - 2$

b. $R(X) = aX + b$ où $(a, b) \in \mathbb{R}^2$ non nuls. $\rightarrow$ $\deg(R) = 1$ $\quad \deg R < \deg B$.

c. $R(X) = P(2)$

d. Aucune des autres réponses

$0 \leq r \leq |b|$

Question 13

Soit $P \in \mathbb{R}[X]$ tel que $P(-1) = P(2) = 0$. Alors,

a. $X + 1 \mid P$

b. $X - 2 \mid P$

c. $(X + 1)(X - 2) \mid P$

d. $(X + 1)^2 \mid P$

e. Aucune des autres réponses

3

Question 14

(x^2+2x+4)

On considère le polynôme $P(X) = X^3(X+2)^2(X-1)$. On a

a. 0 est une racine d'ordre de multiplicité exactement égal à 2 de P

b. 0 est une racine d'ordre de multiplicité exactement égal à 3 de P

c. 0 est une racine d'ordre de multiplicité exactement égal à 4 de P

d. Aucune des autres réponses

Question 15

Soit $P \in \mathbb{R}[X]$ tel que $P(1) = P'(1) = P''(1) = 0$ et $P^{(3)}(1) \neq 0$. Alors ← de multiplicité 3.

a. $X - 1 \mid P$ et $(X-1)^2 \nmid P$

b. $(X-1)^2 \mid P$ et $(X-1)^3 \nmid P$

c. $(X-1)^3 \mid P$ et $(X-1)^4 \nmid P$

d. Aucune des autres réponses

IRREDUCTIBLES

$\mathbb{R} \to$ deg 1

deg 2 $\to \Delta < 0$

$X^2 - X + 0$

$\Delta = (-1)^2 - 4 \times 1 \times 0$
$= 1$

Question 16

Cochez la(les) bonne(s) réponse(s)

a. $X^2 - 1$ est irréductible dans $\mathbb{R}[X]$. $(X+1)(X-1)$

b. $X^3 - X$ est irréductible dans $\mathbb{R}[X]$. $X(X^2-1)$

c. $X^3 + X + 10$ est irréductible dans $\mathbb{R}[X]$.

d. $X^2 + X + 1$ est irréductible dans $\mathbb{R}[X]$. $(X+1)^2$

e. Aucune des autres réponses

Question 17

On considère le polynôme $P(X) = X^5 - X$. Une décomposition de P en polynômes irréductibles dans $\mathbb{R}[X]$ est

a. $X(X^2-1)(X^2+1)$

$X(X^2+1)(X+1)(X-1)$.

b. $(X^3+X)(X^2-1)$

c. $X(X-1)^2(X^2+1)$

d. Aucune des autres réponses

4

Question 18

On considère sur $\mathbb{R}$ l'équation différentielle (E) $y' + (x^2+1)y = x^3 + x + 1$. On a

a. $x \longmapsto 1$ est une solution particulière de (E).

b. $x \longmapsto x$ est une solution particulière de (E).

c. $x \longmapsto 0$ est une solution particulière de (E).

d. Aucune des autres réponses

Question 19

On considère sur $\mathbb{R}$ l'équation différentielle (E) $2y' + 8y = 0$. L'ensemble des solutions de (E) est formé des fonctions de la forme

a. $x \longmapsto ke^{-4x}$ avec $k \in \mathbb{R}$.

b. $x \longmapsto ke^{4x}$ avec $k \in \mathbb{R}$.

c. $x \longmapsto -4x + k$ avec $k \in \mathbb{R}$.

d. $x \longmapsto 4x + k$ avec $k \in \mathbb{R}$.

e. Aucune des autres réponses

Question 20

On considère sur $]0, +\infty[$ l'équation différentielle (E) $xy' + y = 0$. L'ensemble des solutions de (E) est formé des fonctions de la forme

a. $x \longmapsto ke^{-\frac{1}{x}}$ avec $k \in \mathbb{R}$.

b. $x \longmapsto kx$ avec $k \in \mathbb{R}$.

c. $x \longmapsto \dfrac{k}{x}$ avec $k \in \mathbb{R}$.

d. Aucune des autres réponses

5

CIE S2 MCQ1, 17/1/22 Grammar Chap2

Choose the correct sentence (Q.21,22):

21. A) Has your family ever drove to Rocky Mountain National Park?

B) Has your family ever drived to Rocky Mountain National Park?

C) Have your family ever drove to Rocky Mountain National Park?

D) Has your family ever driven to Rocky Mountain National Park?

22. A) Google has bought any smaller companies this year?

B) Has Google bought any smaller companies this year?

C) Have Google bought any smaller companies this year?

D) Has Google bought no smaller companies this year?

Choose the correct alternative (Q. 23-30):

23. I _____ Greece three times since my friend _____ there three years ago and I love it!

A) visited, moved

B) am visiting, has moved

C) had visited, moved

D) have visited, moved

24. Laura ____ very interested in this city ever since she ____.

A) has been, arrived

B) is, arrived

C) is been, has arrived

D) was, arrived

25. Matt works at ABC Appliances. He _____ there since 2005.

A) worked

B) has worked

C) had worked

D) None of the above is correct.

26. Joe has an old bike. He ___ the same bike for 20 years.

A) is having

B) had

C) has had

D) has been having

27. It ___ all morning. When will it stop?

A) has rained

B) is raining

C) has been raining

D) had been raining

28. It ____ a colder than normal winter. I am ready for spring.

A) has been

B) is

C) was

D) will be

29. Tom ____ a busy day so far. Right now he ____ a break.

A) had, takes

B) has, has been taking

C) is having, took

D) has had, is taking

30. I ___ in Australia for the last four months. During this time, I ____ many things and ___ many places.

A) am, did, saw

B) was, did, saw

C) have been, have done, have seen

D) had been, had done, had seen

Surprise! Empire State Building Switches to LED

While New York slept, the Empire State Building switched on a new light show with the capability to produce millions of color combinations and effects.

By Verena Dobnik:

1. **In the middle of the night, as most of New York slept, something big and bright lit up the Manhattan skyline for just seconds a tightly kept secret to all but a handful of people.** It was a tiny test for the huge public surprise four days later: the flipping of a switch at the Empire State Building to turn on its dancing new LED lights. They burst from the skyscraper while synchronized with R&B star Alicia Keys singing "Empire State of Mind" on nationwide radio.

2. The LED system has "16.7 million color possibilities, in digital combinations of ripples, sparkles, sweeps and strobes," says Phil O'Donnell, of Burlington, Mass.-based Philips Color Kinetics that's responsible for the system and worked with a resident lighting designer. "It's the sum of all possibilities a huge palette."

3. The old lights came in only 10 colors.

4. From Manhattan and the Bronx to Staten Island and even New Jersey, "there were hundreds of thousands of people on the streets looking up, filming and videoing, clustered on street corners," when the new lights came on, said Anthony Malkin, whose family controls the iconic Art Deco building. In an interview with The Associated Press at his office, he glowed with pleasure describing Monday night's inaugural light show. Keys also sang "Girl On Fire" from her new CD.

5. After all, the 102-story skyscraper "has always been a symbol of what's possible in New York, and all the dreams that can come true in this city that never sleeps," Keys, a New York native, said before her performance, which was ready on tracks while she watched from a Manhattan studio.

6. Malkin and his technical team wanted to test the new lighting system with as few people noticing as possible and chose early Thanksgiving morning. Good luck, in the middle of Manhattan, with people walking around even at 2:30 a.m. That seemed the best moment, after most bars close and before dawn.

7. "We decided to do it facing west, in very short bursts between 2:30 a.m. and 3 a.m., because we knew we didn't have a camera trained on us from there," Malkin said. Apparently, the secret test worked. No images of the Empire State Building alight that night appeared anywhere, as far as Malkin knows. To stage the show, he worked with Clear Channel radio, which has 239 million monthly listeners in the United States.

8. The lights are part of a larger effort to modernize the 81-year-old edifice that is undergoing a more than half a billion-dollar renovation that includes making it "green." The computerized LED system will cut energy consumption by more than half, while delivering light and vibrancy superior to the old floodlights, which have huge timpani drum-size lenses that had to be changed every so often, O'Donnell said.

9. They may still have nostalgic value to some who watched them light up New York City for every special occasion from Christmas to the Fourth of July.

10. They were part of "the grande dame of the New York skyline, now state-of-the-art, but still stately," says Malkin, adding that the light show was "a gift we gave to the world, these lights. We don't get paid for this."

11. On a sunny Wednesday afternoon, with a spectacular view of the new World Trade Center and New York Harbor, a vacant space under reconstruction on the building's 72nd floor was filled with the retired floodlights, sitting side by side in long lines, veterans of years of New York weather. What will be done with them is also a secret for now.

12. One old light will not be discarded in favor of a 21st century novelty: a red beacon "half the size of a Volkswagen Beetle," as Malkin puts it that serves as a warning signal for aircraft constantly flying over New York City.

31) What is the primary purpose of the first sentence in **bold** of the article?
   a) To explain that New Yorkers are commonly asleep in the middle of the night.
   b) To mislead readers into thinking the light flash was some sort of attack
   c) To build suspense and curiosity so that the reader wants to know more
   d) To suggest that there is a secret organization working late at night at the Empire State Building

32) The phrase "huge palette" in Paragraph 2 is most likely
   a) A metaphor for the scope and range of combinations the new LED lights have
   b) A literal explanation of the shape of the new lights, which form an artist's palette
   c) An extreme over exaggeration meant to draw more onlookers to the new display
   d) A way to emphasize the amount of lights, since 16.7 could never fit onto a palette

33) What does Alicia Keys suggest the Empire State building is a symbol of?
   a) A way for Americans to have a landmark similar to other major global cities
   b) The iconic American capacity to push boundaries and break new ground in art and architecture.
   c) Lights that are always on due to the number of New Yorkers who work night shifts
   d) That any person can use the new lights as a way to make a wish, as people do with other world landmarks.

34) To help keep the new lights secret during their initial test, all precautions were taken EXCEPT:
   a) Conducting the test in the middle of the night
   b) Conducting the test facing west, away from cameras
   c) Conducting the test in short bursts, so that there was no sustained lighting
   d) Conducting the test with additional sound effects to distract anyone who might be on the street

35) What was the primary reason Malkin and his team choose to test the new LED lights in the middle of the night?
   a) Because the lights are impossible to see in the daylight
   b) So that no spies would be awake to steal the new lighting design
   c) Because his team only works at night, to enhance their creativity
   d) So that when they made the formal reveal to the city and world, it would be a true surprise

36) How does the new LED display contribute to the Empire State Building's efforts to become more 'green'?
   a) The lights will be bright enough to reflect into the building, allowing less lighting to be used indoors
   b) The new lighting will consume almost half the amount of energy the old lights did
   c) The lights can become green in color, to cover the entire building
   d) The lights will be solar-powered, generating their own electricity.

37) The article suggests that some older people might miss the old lights. Why is this?
   a) The elderly who have poorer eyesight have an easier time seeing the old lights
   b) The older generation might not understand the technology behind the new LED lighting
   c) Those who used to work in the Empire State Building will no longer be able to recognize it without the old, larger lights
   d) The old lights represented momentous occasions in American history, and may still have nostalgic value

38) In Paragraph 11, the old floodlights are described as veterans. What is the most suitable explanation for this word in context?
   a) The old lights have worked through the years, despite harsh weather conditions and continual use for special occasions
   b) The old lights have been up through many previous wars, making them literal veterans
   c) The old lights were dedicated to the Empire State Building to memorialize war heroes
   d) The old lights were only used before to celebrate Veteran's Day

39) Currently, how many of the former lights are set to be preserved for a specific purpose?
   a) All, to replace other major lights around the city
   b) None, they are all set to be discarded entirely
   c) Five, spaced across Central Park for more light and better security
   d) One, to serve as a warning beacon for aircraft

40) Why might it be important for the Empire State's global image to replace its lighting?
   a) To represent that it is both environmentally conscious as well as technologically advanced
   b) To prove that other world landmarks are not as spectacular
   c) To suggest that despite its being decades-old, the Empire State Building is still relevant
   d) To provide New Yorkers and visitors with better entertainment

QCM Physique/Electronique – InfoS2

Pensez à bien lire les questions ET les réponses proposées

Q41. Dans la base cartésienne $(\vec{u}_x, \vec{u_y})$, quelle est la proposition fausse :

a- $a_x = \frac{d^2x(t)}{dt^2}\vec{u_x}$ b- $\frac{d\vec{u}_x}{dt} = \vec{0}$ c- $\vec{a} = \frac{d\vec{v}}{dt}$

Q42. En coordonnées polaires, ($\vec{u_\rho}$, $\vec{u_\theta}$) , le vecteur vitesse est donné par

a- a. $\vec{v(t)} = \rho\,\vec{u_\rho} + \rho d\theta\,\vec{u_\theta}$

b- b. $\vec{v(t)} = \dot{\rho}\,\vec{u_\rho} + \rho\frac{d\theta}{dt}\,\vec{u_\theta}$

c- c. $\vec{v(t)} = \frac{d\rho}{dt}\,\vec{u_\rho} + \frac{d(\rho\theta)}{dt}\,\vec{u_\theta}$

d- d. $\vec{v(t)} = \dot{\rho}\,\vec{u_\rho} - \rho\dot{\theta}\,\vec{u_\theta}$

Q43. Le produit scalaire de deux vecteurs $\vec{V_1}$ et $\vec{V_2}$ est nul si

a- Les vecteurs sont colinéaires

b- Si la norme d'un des vecteurs est nulle

c- Si les nomes des deux vecteurs sont égales

d- Si le cosinus de l'angle α entre les deux vecteurs est inférieur à 0

Un point matériel décrit un cercle de centre O et de rayon R. Sa vitesse a pour norme $v(t) = Rt$ (questions 44 et 45)

Q44. Donner l'expression de l'abscisse curviligne s(t), sachant que s(t=0) = 0

a- $s(t) = R^2t$

b- $s(t) = -Rt^2$

c- $s(t) = \frac{Rt^2}{2}$

d- $s(t) = R(\frac{t}{2})^2$

Q45. Exprimer les composantes aT et aN du vecteur accélération en base de Frenet.

a- $a_T = R$; $a_N = R$

b- $a_T = \frac{Rt^2}{2}$; $a_N = R\,t^2$

c- $a_T = R$; $a_N = Rt^2$

d- $a_T = -R$; $a_N = \frac{(t*R)^2}{R}$

Q46. Si on applique la loi d'Ohm avec U en V et I en μA, on obtient R en :

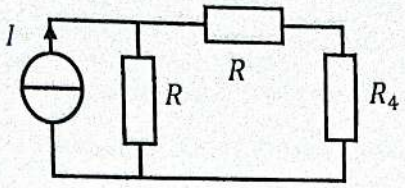
a- Ω

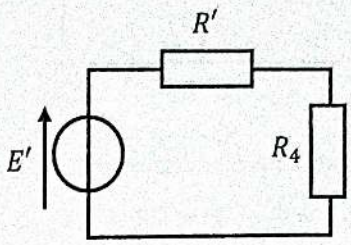
b- $\mu\Omega$

c- $M\Omega$

d- $k\Omega$

Q47. On considère les 2 circuits suivants :





Ces 2 circuits sont équivalents si et seulement si :

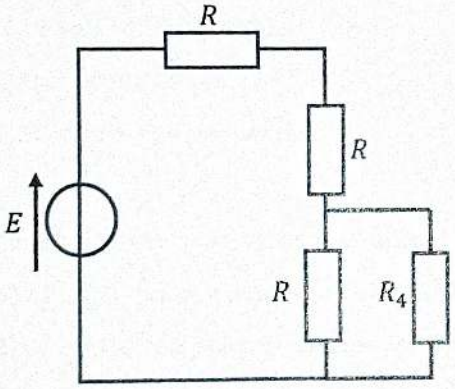
a- $E' = U$ et $R' = R_4$

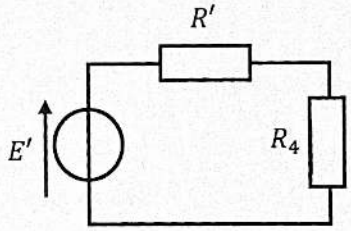
b- $E' = 2.RI$ et $R' = R$

c- $E' = R.I$ et $R' = R$

d- $E' = R.I$ et $R' = 2.R$

Q48. On considère les 2 circuits suivants :





Ces 2 circuits sont équivalents si et seulement si :

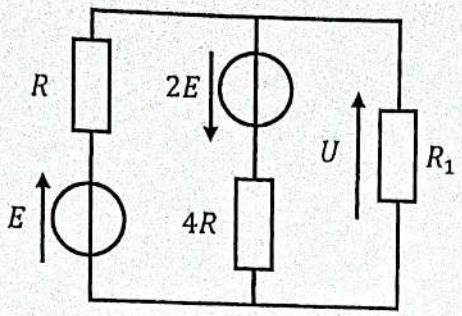
a- $E' = E$ et $R' = 2R$

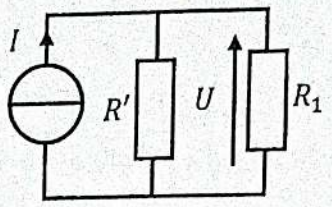
b- $E' = \frac{E}{3}$ et $R' = \frac{2}{3}R$

c- $E' = \frac{E}{2}$ et $R' = 2R$

d- $E' = E$ et $R' = \frac{2}{3}R$

Q49. On considère les 2 circuits suivants :

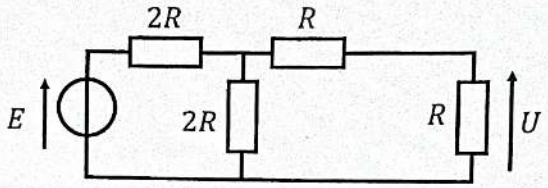




Ces 2 circuits sont équivalents si et seulement si :

- a- $I = \frac{E}{2R}$ et $R' = \frac{4}{5}R$
- b- $I = \frac{3E}{2R}$ et $R' = \frac{4}{5}R$
- c- $I = -\frac{E}{2R}$ et $R' = \frac{4}{5}R$
- d- $I = \frac{E}{2R}$ et $R' = 5R$

Q50. Soit le montage ci-contre. Quelle est l'expression de la tension U ?



- a. $U = \frac{E}{2}$
- b. $U = \frac{E}{6}$
- c. $U = \frac{E}{3}$
- d. $U = E$

Q1 Que veut dire VUCA ?

A)Volatility, Uncertainty, Complexity, Ambiguity

B)Volatility, Unprecisely, Complexity, Ambiguity

C)Volatility, Unprecisely, Chaotic, Ambiguity

Q2 Comment Kodak a raté le virage de la photo numérique ?

A)Par manque de clairvoyance stratégique

B)Par manque de savoir-faire technologique

C)Par manque de culture organisationnelle adhoc

Q3 Qu'est ce qui génère de la différence entre réel et réalité ?

A)Rien, il n'y en a pas

B)La perception sensorielle des individus

C)Notre manière de comprendre le monde

Q4 La virtualité est un continuum reliant réalité et réalité virtuelle... où se place la virtualité augmentée ?

A)Avant la réalité virtuelle

B)Après la réalité virtuelle

C)Après la réalité augmentée

Q5 Le téléphone portable permet aujourd'hui de travailler de n'importe où...

A)... il est 10 fois plus puissant que l'ordinateur d'Apollo 11

B)... il est 100 fois plus puissant que l'ordinateur d'Apollo 11

C)... il est 1 000 fois plus puissant que l'ordinateur d'Apollo 11

Q6 Quelle est la théorie qui n'est pas utilisée dans la vision présentée du Campus Virtuel Persistent

A)Embodied cognition Theory

B)Construal Level Theory

C)Extended-self Theory

Q7 Nous avons abordé des cas d'usage de la VR dans...

A)... la santé

B)... l'industrie des transports

C)... le marketing

Q8 La réalité virtuelle dans la pédagogie ne permet pas de ...

... passer de la théorie à la pratique et vice-versa en cycles longs

... modifier la routine d'apprentissage

... d'approche systémique

Q9 La technologie de réalité augmentée se développer aujourd'hui...

A)... aussi vite que la réalité virtuelle

B)... moins vite que la réalité virtuelle

C)... plus vite que la réalité virtuelle

Q10 Quel levier de décision n'a pas été cité comme impactant la transformation du monde ?

A) Levier technologique

B) Levier financier

C) Levier climatique

QCM 1
Architecture des ordinateurs

Lundi 17 janvier 2022

Pour toutes les questions, une ou plusieurs réponses sont possibles.

11. $150{,}21875_{10}$ =
    A. $10010110{,}001101_2$
    B. $10010110{,}00101_2$
    C. $10010010{,}00111_2$
    D. Aucune de ces réponses.

12. $0{,}078125_{10}$ =
    A. $0{,}000011_2$
    B. $0{,}000111_2$
    C. $0{,}000101_2$
    D. Aucune de ces réponses.

13. $101{,}1001_2$ =
    A. $5{,}5625_{10}$
    B. $5{,}3125_{10}$
    C. $5{,}625_{10}$
    D. Aucune de ces réponses.

14. $0{,}000011_2$ =
    A. $0{,}078125_{10}$
    B. $0{,}046875_{10}$
    C. $0{,}09375_{10}$
    D. Aucune de ces réponses.

15. $110{,}01_2$ =
    A. $0{,}0000011001_2 \times 2^8$
    B. $0{,}0011001_2 \times 2^5$
    C. $1100100000{,}0_2 \times 2^7$
    D. Aucune de ces réponses.

15

Soit le nombre suivant : $1{,}0_2 \times 2^{-1}$

16. Choisir la réponse correcte :
    - A. Sa mantisse (m) est $1{,}0_2$
    - B. Sa mantisse (m) est 10_2
    - C. Sa mantisse (m) est $0{,}1_2$
    - D. Aucune de ces réponses.

17. Choisir la réponse correcte :
    - A. Sa mantisse est normalisée.
    - B. Pour normaliser la mantisse, il faut décaler la virgule vers la gauche.
    - C. Pour normaliser la mantisse, il faut décaler la virgule vers la droite.
    - D. Aucune de ces réponses.

18. Pour les nombres normalisés au format IEEE-754 :
    - A. E = e + biais
    - B. E = ~~1 + biais~~
    - C. E = e – biais
    - D. E = ~~1 – biais~~

19. Quelle est la valeur du biais en simple précision ?
    - A. 127
    - B. ~~–127~~
    - C. 1023
    - D. –1023

20. Quelle est la taille du champ M pour un nombre codé en simple précision ?
    - A. 23 bits
    - B. ~~32 bits~~
    - C. ~~52 bits~~
    - D. ~~64 bits~~

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