

ALGO
QCM

1. Quel algorithme recherche les plus courts chemins entre tous les sommets pris 2 à 2 ?
 - (a) Bellman
 - (b) Dijkstra
 - ☒ (c) Floyd
2. Le plus court chemin est toujours le moins long ?
 - (a) oui
 - ☒ (b) non
 - (c) ça dépend
3. La longueur d'un chemin est ?
 - (a) La somme des coûts des arêtes qui le composent
 - (b) La somme des arêtes qui le composent
 - ☒ (c) La somme des arcs qui le composent
 - (d) La somme des coûts des arcs qui le composent
4. Le coût d'un chemin est ?
 - (a) La somme des coûts des arêtes qui le composent
 - (b) La somme des arêtes qui le composent
 - (c) La somme des arcs qui le composent
 - ☒ (d) La somme des coûts des arcs qui le composent
5. Le coût d'un graphe non orienté est ?
 - ☒ (a) La somme des coûts des arêtes qui le composent
 - (b) La somme des arêtes qui le composent
 - (c) La somme des coûts des chaînes qui le composent
 - (d) La somme des coûts des arcs qui le composent
6. Dans la 2-Connexité, on définit un bloc comme étant ?
 - (a) Un graphe connexe
 - (b) Un graphe p-Connexe
 - ☒ (c) Un graphe 2-Connexe
 - ☒ (d) Une arête
7. Deux composantes 2-Connexe, sont disjointes si ?
 - (a) Elles ont en commun un point d'articulation
 - (b) Elles ont en commun deux points d'articulation
 - ☒ (c) Elles n'ont pas de point d'articulation en commun

8. Un graphe 2-connexe ?

- ☒ (a) n'a pas de point d'articulation
- ☒ (b) est connexe
- ☒ (c) n'a pas d'isthme
- (d) est fortement connexe
- (e) est complet

9. Un plus court chemin élémentaire ne peut pas contenir ?

- ☒ (a) De circuit absorbant
- (b) De chemin à coût strictement négatif
- ☒ (c) De circuit à coût strictement positif
- ☒ (d) De circuit de coût nul

10. Si en retirant un sommet s d'un graphe connexe, le graphe n'est plus connexe, on dit que s est ?

- (a) Un isthme
- ☒ (b) Un point d'articulation
- (c) Une racine



QCM N°14

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Question 11

Le reste de la division euclidienne de -15 par 2 est

a. -1

$$-15 = 2 \times (-8) + 1 = -16 + 1$$

b. 2

c. 3

d. 4

☒ e. rien de ce qui précède

Question 12

Soit $(a, b, d) \in \mathbb{N}^3$. Alors

☒ a. Si $d \mid a$ et $d \mid b$ alors $d \mid a \wedge b$

☒ b. il existe $(u, v) \in \mathbb{Z}^2$ tel que $au + bv = a \wedge b$

☒ c. S'il existe $(u, v) \in \mathbb{Z}^2$ tel que $au + bv = 1$ alors $a \wedge b = 1$

d. rien de ce qui précède

Question 13

Soit $(a, b) \in \mathbb{N}^2$. Alors

☒ a. $a \wedge b \geq 1$

b. $a \wedge 1 = a$

☒ c. $a \wedge 1 = 1$

d. $a \wedge 0 = 0$

☒ e. $a \wedge 0 = a$

Question 14

Soient P et Q deux polynômes quelconques non nuls de $\mathbb{R}[X]$.

a. $d^\circ(P + Q) = d^\circ(P) + d^\circ(Q)$

☒ b. $d^\circ(P + Q) \leq \max(d^\circ(P), d^\circ(Q))$

☒ c. $d^\circ(PQ) = d^\circ(P) + d^\circ(Q)$

d. Si $d^\circ(P) \neq d^\circ(Q)$ alors $d^\circ(P + Q) = d^\circ(P) + d^\circ(Q)$

e. rien de ce qui précède

Question 15

Soient $P \in \mathbb{R}[X]$, a et b deux racines réelles de P avec $a \neq b$.

Alors $(X - a)(X - b) \mid P$.

☒ a. vrai

b. faux

Question 16

Soit f continue et positive sur $[1, +\infty[$ quelconque telle que $t^2 f(t) \rightarrow +\infty$ quand $t \rightarrow +\infty$. Alors

a. $\int_1^{+\infty} f(t) dt$ converge

b. $\int_1^{+\infty} f(t) dt$ diverge

☒ c. on ne peut rien dire sur la nature de $\int_1^{+\infty} f(t) dt$

Question 17

Soient E l'ensemble des fonctions continues sur $[-1, 1]$ à valeurs réelles et $\varphi : E \times E \rightarrow \mathbb{R}$ définie pour $(f, g) \in E^2$ par $\varphi(f, g) = \int_{-1}^1 f(t)g(t)dt$. Alors

☒ a. φ est un produit scalaire sur E

b. φ n'est pas un produit scalaire sur E

c. (E, φ) est un espace euclidien

Question 18

Soient $(E, <, >)$ un espace euclidien, F un sev de E et p_F le projecteur orthogonal sur F . Alors

- a. $\text{Ker}(p_F) = F$
- b. $\text{Im}(p_F) = F^\perp$
- c. Pour tout $x \in E$, $x - p_F(x) \in F$
- ☒ d. $\text{Ker}(p_F) = F^\perp$
- e. rien de ce qui précède

Question 19

Soit (E, φ) un espace préhilbertien réel. Alors le théorème de Cauchy-Schwarz dit que

- a. $\forall (x, y) \in E^2 \quad |\varphi(x, y)| \leq \varphi(x, x)\varphi(y, y)$
- b. $\forall (x, y) \in E^2 \quad \sqrt{|\varphi(x, y)|} \leq \varphi(x, x)\varphi(y, y)$
- ☒ c. $\forall (x, y) \in E^2 \quad |\varphi(x, y)| \leq \sqrt{\varphi(x, x)}\sqrt{\varphi(y, y)}$
- d. $\forall (x, y) \in E^2 \quad |\varphi(x, y)| \leq (\varphi(x, x))^2(\varphi(y, y))^2$
- e. rien de ce qui précède

Question 20

Soit f continue et positive sur $[0, +\infty[$ quelconque telle que $tf(t) \rightarrow +\infty$ quand $t \rightarrow +\infty$. Alors

- a. $\int_0^{+\infty} f(t)dt$ converge
- ☒ b. $\int_0^{+\infty} f(t)dt$ diverge
- c. on ne peut rien dire sur la nature de $\int_0^{+\infty} f(t)dt$

OCM API (3condit) Choose the sentence that best communicates the situation in the sentence given.

21. I didn't feel well last night, so I didn't do any homework.

- a. If I had felt better, I would do it.
- b. If I felt better, I would have done it.
- c. If I had fell better, I would have done it.
- ☒ d. If I had felt better, I would have done it.

22. If sales don't increase by the end of the month, we ____ have to change the advertising campaign.

- ☒ a. will
- b. would
- c. should
- d. are going

23. I didn't know the party was very far away so I walked but...

- ☒ a. If I had known it was so far, I would have taken my car.
- b. If had known it was so much far, I would have taken my car.
- c. If had knew it was so far, I would have taken my car.
- d. If had known it was so far, I would had taken my car.

24. I didn't think Neil Young needed my help for his concert, so I didn't bring my guitar.

- a. If I've thought that Neil needed my help, I would have brought my guitar.
- b. If I'd thought that Neil needed my help, I would had brought my guitar.
- ☒ c. If I'd thought that Neil needed my help, I would have brought my guitar.
- d. If I'd thought that Neil needed my help, would have brung my guitar.

25. John would like to help Jenny move house today, but he has to study for a math test.

- a. If John didn't have to study, he would helped Jenny move house.
- ☒ b. If John didn't have to study, he would help Jenny move house.
- c. If John had not the math test, he would helped Jenny move house.
- d. If John helped Jenny, he failed the math test.

26. You want to phone John but you don't have his number. Which sentence expresses this situation?

- a. If I have John's number, I will call him.
- b. If I call John, I will have his number.
- ☒ c. If I had John's number, I would call him.
- d. If I had had John's number, I would have called him.

27. Choose the sentence with **no** mistakes.

- ☒ a. If I were rich, I would buy a new car.
- b. If I were rich, I would have buy a new car.
- c. If I was rich, I would bought a new car.
- d. If I were rich, I will buy a new car.

28. Choose the sentence with **no** mistakes.

- ☒ a. If I hadn't been away for years, I would not have noticed the changes in my town.
- b. If I had been away for years, I would have notice the change s in my town.
- c. If I am away for years, I would have noticed the changes in my town.
- d. If I would not been away for years, I would not notice many things had changed in my town.

29. Choose the sentence with **no** mistakes.

- a. If I go anywhere in the world, I would go to Bali.
- b. If I can go anywhere in the world, I would go to Bali.
- c. If I went anywhere in the world, I am going to Bali.
- ☒ d. If I could go anywhere in the world, I would go to Bali.

30. (At the airport.) We will upgrade some passengers to first class if the flight...

- a. won't be full.
- b. will be full.
- c. is full.
- ☒ d. is not full.

Q.C.M n°14 de Physique

31- L'effet Compton a permis de mettre en évidence

- a) L'aspect ondulatoire de l'onde électromagnétique
- b) L'existence de la masse des photons
- c) L'existence des quarks
- ☒ d) L'aspect corpusculaire de l'onde électromagnétique

32- Lorsque le nombre d'onde k d'une onde électromagnétique est imaginaire pur : $k = ik''$ l'onde sera :

- a) progressive
- b) amortie
- ☒ c) évanescente (ou atténuée)

33- Dans le milieu "vide" l'équation de dispersion $k^2 = \omega^2 \mu(\varepsilon + \frac{i\gamma}{\omega})$ devient :

- ☒ a) $k = \omega / c$
- b) $k = \omega.c$
- c) $k = \omega\mu\varepsilon$

34- Lorsque le nombre d'onde k d'une onde électromagnétique est complexe : $k = k' + ik''$ l'onde sera :

- a) progressive
- b) évanescente (ou atténuée)
- ☒ c) amortie

35- Le processus d'émission correspond à :

- a) l'ionisation des atomes
- b) la désexcitation des atomes vers des niveaux inférieurs, en émettant des électrons
- c) l'excitation des atomes vers des niveaux d'énergies supérieures
- ☒ d) la désexcitation des atomes vers des niveaux inférieurs, en émettant des photons

36- Lors d'une émission, la hauteur d'une raie spectrale dépend

- a) de la longueur d'onde de la transition
- b) de la fréquence de transition
- ☒ c) du nombre de photons émis

37- Le proton est un ensemble de trois quarks

- ☒ a) uud
- b) \overline{uud}
- c) udd

38- Le neutron est un ensemble de trois quarks

- a) $\bar{u}\bar{u}\bar{d}$
- b) uud
- ☒ c) udd

39- Dans l'expérience de Rutherford, on interprète le passage des particules α à travers la feuille d'or sans être déviées par :

- a) La charge positive du noyau
- b) La charge négative des électrons
- c) La grande masse du noyau
- ☒ d) Le grand vide entre le nuage électronique et le noyau

40- Dans l'expérience de Franck-Hertz la chute de courant est interprétée par :

- a) la perte d'énergie des atomes de mercure
- ☒ b) la perte d'énergie des électrons suite à leur collision avec les atomes de mercure
- c) la désexcitation des atomes de mercure
- d) l'ionisation des atomes de mercure

41. Game theory is...
- a. a way to use classical games to understand modern situations.
 - b. derived from an analysis of how prisoners interact with one another.
 - ☒ c. a mathematical representation of decisions.
 - d. all of the above
42. In game theory, an individual will always choose the option that gives the best payout unless...
- a. they are irrational.
 - b. they do not know what the options are.
 - c. they are unaware of the possible outcomes.
 - ☒ d. all of the above.
43. One major criticism of it is that...
- ☒ a. it assumes people are aware of the gains and losses of a choice.
 - b. it assumes that all people are completely self-interested.
 - c. it doesn't take morals into account.
 - d. it only focuses on money.
44. Which of the following are atomic games?
- a. battle of the sexes
 - b. co-ordination game
 - c. chicken
 - ☒ d. all of the above
45. They are used to...
- ☒ a. describe different types of potential decisions.
 - b. explain complex analyses to non-experts.
 - c. make learning concepts more interesting.
 - d. all of the above
46. An example of a prisoner's dilemma would be...
- ☒ a. choosing to work or be lazy in a large group.
 - b. choosing to pay for private school or public school.
 - c. choosing to whether or not to take recreational drugs before a competition.
 - d. having to decide between two equally bad options.
47. In one of these games the outcome...
- a. depends on what people think is most important.
 - b. can be hard to predict.
 - c. is based heavily on the culture in which it takes place.
 - ☒ d. none of the above
48. A critical concept of game theory is the Nash equilibrium which is...
- ☒ a. when neither side wants to change their decision.
 - b. when neither side is satisfied with a choice.
 - c. when all the choices presented are equally attractive.
 - d. when all sides benefit equally from a choice.
49. This can lead to situations where...
- a. everyone is content and so no further discussion is needed.
 - ☒ b. people become trapped in mutually undesirable situations.
 - c. a lack of change can lead to stagnation.
 - d. no one can make a decisions easily.
50. Its depiction in the film A Beautiful Mind is inaccurate because...
- a. he specifically stated his theory doesn't apply to social situations.
 - b. the scene was not really how Nash came up with his theory.
 - ☒ c. it's not a real Nash equilibrium.
 - d. none of the above.