

**CONCOURS COMMUNS
POLYTECHNIQUES****EPREUVE COMMUNE - FILIERES MP - PC - PSI - TSI - TPC****LANGUE VIVANTE FACULTATIVE :****ALLEMAND - ANGLAIS - ARABE - ESPAGNOL - ITALIEN - PORTUGAIS - RUSSE****Epreuve obligatoire pour l'EEIGM Nancy (filiales PC et PSI)****Durée : 1 heure**

N.B. : Si un candidat croit repérer ce qui paraît être une erreur d'énoncé, il le signalera par écrit :
- en cochant la case 40 A (1^{re} ligne)
- en expliquant au verso de la grille réponse les raisons des initiatives qu'il a été amené à prendre et poursuivra normalement son épreuve.

INSTRUCTIONS GENERALES**Définition et barème :**

QCM en trois parties avec quatre propositions de réponse par item.

- I. Compréhension : 12 questions (10 points sur 20)
- II. Lexique : 12 questions (5 points sur 20)
- III. Compétence grammaticale : 15 questions (5 points sur 20)

Réponse juste : +3

Pas de réponse : 0

Réponse fausse ou réponses multiples : -1

Instructions :

Lisez le texte et répondez ensuite aux questions.

Choisissez parmi les quatre propositions de réponse (A, B, C ou D) celle qui vous paraît la mieux adaptée. Il n'y a qu'une seule réponse possible pour chaque item.

Reportez votre choix sur la feuille de réponse.

Dictionnaire : autorisé pour l'arabe uniquement.

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ANGLAIS

MAGLEVS: THE FLOATING FUTURE OF TRAINS?

They have been promised for decades, but is it now finally the time for magnetic levitation (maglev) trains to hit the mainstream? As a vision of the future it is a little underwhelming. A battered shipping container sits on top of a black platform that straddles a 130m (400ft) raised track. As I climb into the metal box, I note there are no seats and very little to hold on to. I am
5 still excited though, as I am about to ride the only magnetic levitation, or Maglev, train in the United States, owned and operated by General Atomic.

[...] The platform beneath the cargo container I am in is being buoyed up and moved along by powerful electromagnets, allowing the train to move with low friction and no moving parts. As we move off, there is hardly any sound. [...] Just 20 seconds later we are at a standstill, but it is
10 enough to help me understand why proponents believe Maglev systems are the future of trains and high-speed, long-distance travel.

Maglevs are not a new idea. Patents for high speed transportation systems were granted as early as 1907, but it was not until 1984 that the first commercial maglev system was opened at Birmingham international airport in the UK. The 600m (2,000ft) track ferried passengers at 40
15 km/h (25mph) for 11 years before it was closed because of maintenance problems. Since then, higher speed prototypes have also been shown-off, with a train in Japan (JR-Maglev) setting a world speed record of 581km/h (361mph) in 2003. But high start-up costs and the dominance of cheap and reliable trains, planes and cars means there are just two commercial systems operating today, one in China and one in Japan. But that could soon change. As roads become more and
20 more gridlocked, and air travel becomes more and more plagued by delays, security and environmental concerns, governments are looking to technologies like Maglev as part of the transport mix.

All Maglevs operate on a similar – and simple – principle. If you have ever played with bar magnets you will probably remember that opposites attract, but if you flip one of the magnets
25 around, then “like” poles repel. That is what keeps the mass of a train – or shipping container – floating several millimeters in the air, cutting down on friction and allowing it to travel much quicker than traditional engines. That same magnetic force can also be used to move it forwards. [...] But, whilst all systems are based on the same principle, there are lots of different approaches to getting the train to float and move.

30 Electromagnetic Suspension (EMS) is the most common form of maglev and is the type used in the Chinese system that zips passengers at more than 400km/h (250mph) between Shanghai and Pudong airport. In most cases, C-shaped arms underneath the train wrap around a guideway. Electromagnets mounted on these arms lift it above a steel track when they are energised. This type of train has the advantage that they can levitate when stationary. Controls monitor and
35 correct the levitation height to between 10 and 15mm, as tiny differences can have a huge effect on the magnetic force.

A second approach is Electrodynamic Suspension (EDS). The difference here is that both the rail and the train are magnetised. The magnets on the train can be either electromagnets, or strong permanent magnets. The track has an array of electromagnets, and when the train is moving at
40 speed, the train and track repel each other. This system is self-correcting. The train always levitates at the optimum gap, without the need for expensive or complicated feedback systems.

But the downside of EDS is that the train still needs wheels of some sort. At low speeds, not enough repulsive force is generated for the train to levitate.

45 The system I saw at General Atomics is based on a third way, known as Inductrak, which does
away with electromagnets in favour of permanent magnets arranged in a special pattern known as
a Halbach array, originally designed for particle accelerators. These concentrate the magnetic
field on one side, while canceling it on the opposite side. Like an EDS system, these still needs
support when stationary, but levitate at much slower speeds, making them a more practical
50 alternative for systems with multiple stops. Inductrack also has the distinct advantage that in a
power failure, the cars slow down on their own, and the levitation gradually lowers as the train
slows. It is also thought that over time, this approach may be more cost effective than
electromagnetic systems, something that will not be known until commercial systems begin to
operate. [...]

BBC News, May 6, 2012
(Abridged and adapted)

I. COMPREHENSION

Choisissez la réponse qui vous paraît la plus adéquate en fonction du sens du texte.

1. From line 1 to line 6, it should be understood that, when the narrator sees the Maglev for the first time:
 - (A) he has a quite positive feeling.
 - (B) he has a totally negative feeling.
 - (C) he has a mitigated feeling.
 - (D) he has a feeling of anxiety.
2. From line 7 to line 11, it should be understood that:
 - (A) The Maglev is a little noisy.
 - (B) It stops from time to time without any reason.
 - (C) It is powered by electromagnets.
 - (D) There is some friction in the moving parts.
3. From line 12 to line 22, it should be understood that:
 - (A) The Maglev was released in 1907.
 - (B) In 1907, they started thinking about developing the system.
 - (C) In 1907, there were already some maglevs in Japan.
 - (D) 1907 was the date when high speed trains started being authorized.
4. From line 12 to line 22, it should be understood that the first Maglev:
 - (A) became a success 11 years after it was released.
 - (B) had maintenance problems for 11 years.
 - (C) was closed for 11 years to be repaired.
 - (D) was closed 11 years after it was commercialised.
5. From line 12 to line 22, it should be understood that:
 - (A) Today, Maglevs are able to compete with planes and cars.
 - (B) It is still hard for maglevs to compete with planes and cars.
 - (C) Maglevs are cheap and reliable.
 - (D) There are already many commercial Maglev systems around the world.
6. From line 12 to line 22, it should be understood that:
 - (A) Because of their cost, the future of Maglevs is not rosy.
 - (B) Maglevs will become more widespread in the future.
 - (C) Governments will not invest in Maglevs in the future.
 - (D) Maglevs will pose environmental threats in the future.
7. From line 23 to line 29, it should be understood that:
 - (A) The maglev floats because of the “like” poles that repel.
 - (B) Because of friction, Maglevs are slower than other trains.
 - (C) To travel quicker, maglevs need to be lighter.
 - (D) Maglevs are as fast as traditional trains.

8. From line 30 to line 36, it should be understood that:
- (A) There is no use controlling tightly the levitation height in EMS.
 - (B) In EMS, it is essential to measure precisely the levitation height.
 - (C) The levitation height in EMS can exceed 1.5 cm without any trouble.
 - (D) 12.5 mm is the correct levitation height.
9. From line 37 to line 43, it should be understood that:
- (A) Systems based on EDS are by far much more efficient than EMS ones.
 - (B) There are pros and cons in EDS systems.
 - (C) EDS systems are more expensive than EMS systems.
 - (D) It is quite complicated to control levitation in EDS systems.
10. From line 37 to line 43, it should be understood that:
- (A) The electromagnets enable EDS trains to levitate even when they run slowly.
 - (B) The EDS is the most autonomous technique whatever the speed considered.
 - (C) The EDS technique does not allow the train to levitate at low speed.
 - (D) It is easier for EDS systems to levitate at lower speed.

11. From line 44 to line 53, it should be understood that:
- (A) Inductrack uses a lot of electromagnets.
 - (B) Permanent magnets and electromagnets enable Inductrack to be more performing.
 - (C) Inductrack doesn't use electromagnets at all.
 - (D) There are more permanent magnets than electromagnets in Inductrack.
12. From line 44 to line 53, it should be understood that:
- (A) Inductrack is quite autonomous at a standstill.
 - (B) It is easier for Inductrack than for EDS to levitate at low speed.
 - (C) Trains based on Inductrack have trouble to cope with multiple stops.
 - (D) Inductrack trains only levitate at high speed.

II. LEXIQUE

Choisissez la réponse qui vous paraît la plus appropriée en fonction du contexte.

13. "hit the mainstream" (line 2) means:
- (A) become widespread
 - (B) reach big cities
 - (C) cross the main streets
 - (D) be expensive
14. "underwhelming" (line 2) means:
- (A) frightening
 - (B) underestimated
 - (C) disappointing
 - (D) interesting
15. "battered" (line 3) means:
- (A) covered with bats
 - (B) tagged
 - (C) damaged by blows
 - (D) brand-new

16. "straddles" (line 3) means:
- (A) measures
 - (B) stops at
 - (C) goes up to
 - (D) extends across
17. "beneath" (line 7) means:
- (A) next to
 - (B) under
 - (C) behind
 - (D) over
18. "buoyed up" (line 7) means:
- (A) cleaned up
 - (B) maintained at a high level
 - (C) shaken
 - (D) checked

19. "granted" (line 12) means:

- (A) invented
- (B) taken
- (C) seen
- (D) awarded

20. "reliable" (line 18) means:

- (A) trusted
- (B) linked
- (C) remembered
- (D) affordable

21. "gridlocked" (line 20) means:

- (A) safe
- (B) blocked
- (C) covered with dirt
- (D) divided into squares

22. "plagued" (line 20) means:

- (A) scheduled
- (B) planned
- (C) avoided
- (D) afflicted

23. "wrap around" (line 32) means:

- (A) turn around
- (B) embrace
- (C) move around
- (D) rotate

24. "array" (line 39) means:

- (A) row
- (B) orderly arrangement
- (C) picture
- (D) model

III. COMPETENCE GRAMMATICALE

Parmi les quatre phrases proposées, choisissez celle qui est grammaticalement correcte.

25.

- (A) Faster it goes, more it is expensive.
- (B) The faster it goes, the more expensive it is.
- (C) The faster it goes, the most it is expensive.
- (D) The fastest it goes, the more expensive it is.

26.

- (A) It is a four-hundred-feet track.
- (B) It is a four-hundreds-feet track.
- (C) It is a four-hundred-foot track.
- (D) It is a four-hundred-foots track.

27.

- (A) There are a great many approaches.
- (B) There are many a great approaches.
- (C) There are great many approaches.
- (D) There are many great an approach.

28.

- (A) This technique is thought to be cost-effective.
- (B) This technique is thought being cost-effective.
- (C) This technique is thought be cost-effective.
- (D) This technique is being thought be cost-effective.

29.

- (A) When the system has been developed, nobody thinks it will work.
- (B) When the system was developed, nobody thinks it will work.
- (C) When the system was developed, nobody thought it would work.
- (D) When the system had been developed, nobody thought it would work.

30.

- (A) As soon as they have finished developing it, they will market it.
- (B) As soon as they finished developing it, they will market it.
- (C) As soon as they have finished developing it, they marketed it.
- (D) As soon as they finish developing it, they are marketing it.

31.

- (A) I will take it provided if it is safe.
- (B) I will take it providing if it is safe.
- (C) I will take it provided it is safe.
- (D) I will take it if providing it is safe.

32.

- (A) There is not lot of space in here
- (B) There is not much space in here.
- (C) There is not many space in here.
- (D) There is not lots space in here.

33.

- (A) It is cheapest to take the train than the plane.
- (B) It is most cheap to take the train than the plane.
- (C) It is cheaper to take the train than the plane.
- (D) It is more cheap to take the train than the plane.

34.

- (A) If I am you, I will rather take the boat.
- (B) If I was you, I will rather take the boat.
- (C) If I were you, I would rather take the boat.
- (D) If I had been you, I would rather take the boat.

Parmi les quatre solutions proposées, choisissez, pour chacun des énoncés lacunaires suivants, celle qui vous paraît le compléter correctement.

35. ... by train or by plane, travelling has become expensive nowadays.

- (A) Whether it is
- (B) Whether it be
- (C) Whether it should be
- (D) Whether it will be

36. The system ...

- (A) keeps on to improve.
- (B) keeps on improving.
- (C) keeps on improved.
- (D) keeps on improve.

37. Since 1907, they ... many approaches to improve the system.

- (A) tried
- (B) try
- (C) have tried
- (D) are trying

38. After ... the first step, they will move on to the second one.

- (A) complete
- (B) to complete
- (C) have completed
- (D) completing

39. I look forward ... the new train.

- (A) to try
- (B) try
- (C) trying
- (D) to trying

Fin de l'énoncé.