



**CONCURSO DE ADMISSÃO  
AO  
CURSO DE FORMAÇÃO**

**PORTUGUÊS E  
INGLÊS**

**CADERNO DE QUESTÕES  
E SOLUÇÕES**

**COLAR ETIQUETA AQUI**

**2009**

## COMISSÃO DE EXAME INTELECTUAL

### INSTRUÇÕES PARA A REALIZAÇÃO DA PROVA

1. Não assine ou faça qualquer sinal no caderno de questões e soluções que possa identificá-lo. A inobservância desta recomendação poderá anular a sua prova.
2. Utilize apenas caneta azul ou preta para a resolução das questões.
3. A interpretação das questões faz parte da prova, portanto são vedadas perguntas à Comissão de Aplicação e Fiscalização (CAF).
4. Use apenas o espaço destinado à solução de cada questão, que é suficiente. Não será considerada a resolução fora do local especificamente designado.
5. Você recebeu um **CADERNO DE QUESTÕES E SOLUÇÕES**, contendo as provas de **PORTUGUÊS** e de **INGLÊS**.
6. A prova de Português é constituída de 01 (uma) questão de produção de texto, no valor de 10 (dez) pontos, e deverá ser desenvolvida nas páginas 3 e 4.
7. A prova de Inglês é constituída de um texto e 10 (dez) questões que deverão ser respondidas nas páginas 7 a 10. Cada questão vale 1,0 (um) ponto e a prova totaliza 10 (dez) pontos.
8. Não é permitido o uso de dicionários durante a prova de português. Durante a prova de Inglês será permitido o uso de um dicionário Inglês/Inglês ou Inglês/Português.
9. O tempo total para a execução da prova é limitado a **4 (quatro) horas**.
10. Não é permitido deixar o local de exame antes de transcorrido o prazo de **1 (uma) hora** de execução de prova.
11. Leia os enunciados com atenção. Resolva as questões na ordem que mais lhe convier, observando o local para a resolução de cada questão. Escreva com caligrafia legível.
12. Não é permitido destacar quaisquer das folhas que compõem o caderno.
13. Aguarde o aviso para iniciar a prova. Ao terminá-la, avise o fiscal e aguarde-o no seu lugar.
14. Ao entregar a prova, devolva todo o material recebido.



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## PORTUGUÊS

2009

### QUESTÃO DE PRODUÇÃO DE TEXTO

Leia o texto que se segue.

#### **Fundão vai ter trem magnético e ciclovia**

(O Globo. Caderno Cidades: 25/01/2009)

Projetos para o campus integram novo Plano Diretor da instituição, que prevê maior integração com a cidade.

Após mais de 30 anos, a Ilha do Fundão deve ganhar um novo Plano Diretor, com a integração como meta principal. Empolgado com as propostas apresentadas na UFRJ, o reitor Aloísio Teixeira espera ter até maio um esqueleto inicial do projeto aprovado. Além de ciclovia interligando o campus, a novidade pode ficar por conta de um projeto feito pela COPPE e a Escola Politécnica: o Magleve. A intenção é que o veículo, que dispensa o uso de trilhos e rodas, possa no futuro fazer a ligação entre os aeroportos Santos Dumont e Tom Jobim, aproveitando um trecho-piloto na Cidade Universitária.

- A nova proposta do Plano Diretor trabalha com um conceito bem diferente daquele que foi aprovado nos anos 70. Naquela época, a ideia era basicamente oferecer instalações adequadas para receber os alunos. Agora, o eixo que organiza o projeto é a integração, tanto interna quanto com o Rio – afirma Aloísio.

#### **Protótipo será instalado num pequeno trecho**

O projeto do Magleve surgiu há dez anos, com a equipe do Laboratório de Aplicações de Supercondutores da COPPE. Recursos de R\$ 4 milhões da Fundação de Amparo à pesquisa do Rio de Janeiro (FAPERJ) possibilitaram a realização do projeto inicial: até 2011, um protótipo será instalado num pequeno trecho, de cem metros, próximo a um salão de exposições da COPPE. Será possível ver o trem do entroncamento da Linha Amarela com a Linha Vermelha.

A partir dessa exposição inicial, estamos apostando em parcerias público-privadas para colocar o Magleve num trecho de quatro quilômetros no Fundão. Acreditamos que seja possível expandir o projeto para uma ligação entre os aeroportos pois os custos, principalmente no que envolve construção civil, são bem mais baixos do que os do metrô, por exemplo – diz o professor da COPPE Richard Stephan.

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Disserte acerca da decisão da UFRJ em investir neste Plano Diretor atual. Seria mais indicado destinar o investimento a outros projetos científicos?







# CONCURSO DE ADMISSÃO AO CURSO DE FORMAÇÃO



## INGLÊS

2009

LEIA O TEXTO A SEGUIR E RESPONDA ÀS QUESTÕES DE 1 A 10.

### Texto

#### **Wireless power system shown off**

By Jonathan Fildes

Technology reporter, BBC News, Oxford

A system that can deliver power to devices without the need for wires has been shown off at a hi-tech conference. The technique exploits simple physics and can be used to charge a range of electronic devices.

Eric Giler, chief executive of US firm Witricity, showed mobile phones and televisions charging wirelessly at the TED Global conference in Oxford. He said the system could replace the miles of expensive power cables and billions of disposable batteries. "There is something like 40 billion disposable batteries built every year for power that, generally speaking, is used within a few inches or feet of where there is very inexpensive power," he said. Trillions of dollars, he said, had also been invested building an infrastructure of wires "to get power from where it is created to where it is used. We love this stuff [electricity] so much," he said.

Mr Giler showed off a Google G1 phone and an Apple iPhone that could be charged using the system. Witricity, he said, had managed to pack all the necessary components into the body of the G1 phone, but Apple had made that process slightly harder. "They don't make it easy at Apple to get inside their phones so we put a little sleeve on the back," he said. He also showed off a commercially available television using the system. "Imagine you get one of these things and you want to hang it on the wall," he said. "Think about it, you don't want those ugly cords hanging down."

#### **Good vibrations**

The system is based on work by physicist Marin Soljacic at the Massachusetts Institute of Technology (MIT). It exploits "resonance", whereby energy transfer is markedly more efficient when a certain frequency is applied. When two objects have the same resonant frequency, they exchange energy strongly without having an effect on other, surrounding objects. For example, it is resonance that can cause a wine glass to explode when a singer hits exactly the right tone. But instead of using acoustic resonance, Witricity's approach exploits the resonance of low frequency electromagnetic waves.

The system uses two coils - one plugged into the mains and the other embedded or attached to the gadget. Each coil is carefully engineered with the same resonant frequency. When the main coil is connected to an electricity supply, the magnetic field it produces is resonant with that of with the second coil, allowing "tails" of energy to flow between them.

As each "cycle" of energy arrives at the second coil, a voltage begins to build up that can be used to charge the gadget. Mr Giler said the main coil could be embedded in the "ceiling, in the floor, or underneath your desktop".

Devices using the system would automatically begin to charge as soon as they were within range, he said. "You'd never have to worry about plugging these things in again."

### **Safety concerns**

Mr Giler was keen to stress the safety of the equipment during the demonstration. "There's nothing going on - I'm OK," he said walking around a television running on wireless power. The system is able to operate safely because the energy is largely transferred through magnetic fields.

"Humans and the vast majority of objects around us are non-magnetic in nature," Professor Soljagic, one of the inventors of the system, told BBC News during a visit to Witricity earlier this year.

It is able to do this by exploiting an effect that occurs in a region known as the "far field", the region seen at a distance of more than one wavelength from the device. In this field, a transmitter would emit mixture of magnetic and potentially dangerous electric fields. But, crucially, at a distance of less than one wavelength - the "near field" - it is almost entirely magnetic. Hence, Witricity uses low frequency electromagnetic waves, whose waves are about 30m (100ft) long. Shorter wavelengths would not work.

### **'Ridiculous technology'**

Witricity is not the first jump on the concept of wireless electricity. For example, the nineteenth century American inventor Thomas Edison and physicist and engineer Nikola Tesla explored the concept.

"In the very early days of electricity before the electric grid was deployed [they] were very interested in developing a scheme to transmit electricity wirelessly over long distances," explained Professor Soljagic. "They couldn't imagine dragging this vast infrastructure of metallic wires across every continent." Tesla even went so far as to build a 29m-high aerial known as Wardencllyffe Tower in New York. "It ran into some financial troubles and that work was never completed," said Professor Soljagic.

Today, chip-giant Intel has seized on a similar idea to Witricity's, whilst other companies work on highly directional mechanisms of energy transfer, such as lasers. However, unlike Witricity's work, lasers require an uninterrupted line of sight, and are therefore not good for powering objects around the home.

In contrast, Mr Giler said Witricity's approach could be used for a range of applications from laptops and phones to implanted medical devices and electric cars. "Imagine driving in the garage and the car charges itself," he said. He even said he had had interest from a company who proposed to use the system for an "electrically-heated dog bowl". "You go from the sublime to the ridiculous," he said.

**QUESTÕES DE 1 A 10**

De acordo com o texto apresentado, responda **EM PORTUGUÊS** às seguintes questões.

1. What is the general idea of the text? Answer in 30 to 35 words.
2. Using ideas presented in the text, compare the Google G1 phone and the Apple iPhone when it comes to using wireless charging.
3. What is the relation between wine glasses that explode when a singer hits exactly the right tone and the technology used by Witricity? Talk about each of them using ideas from the text.
4. According to the text, explain the mechanism applied to the wireless system used to charge electric devices.
5. What does Mr. Giler mean with the sentence: "You'd never have to worry about plugging these things in again."?
6. How safe to human health is the equipment demonstrated by Mr. Giler? Support your answer with ideas from the text.
7. Is the concept of wireless electricity presented in this text a brand new one? Support your answer with ideas from the text.
8. Talk about the use of lasers for powering objects at home. Use ideas from the text.
9. What other uses for wireless electricity are suggested in the text?
10. What is your personal idea about the concept presented in the text?

**ESPAÇO DESTINADO ÀS SOLUÇÕES DAS QUESTÕES DE 1 A 10**

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