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وزارت علوم، تحقیقات و فناوری
سازمان سنجش آموزش کشور

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امام خمینی (ره)

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بهمن ماه سال ۱۳۸۸

استفاده از ماشین حساب مجاز نمی باشد.

PART A: Vocabulary

Directions: Choose the word or phrase (1), (2), (3), or (4) that best completes each sentence. Then mark the correct choice on your answer sheet.

- 1- The warm sun and enough water caused the plant to ----- in a few days.
1) propel 2) boost 3) flourish 4) proceed
- 2- Unfortunately the patient ----- many symptoms of heart disease.
1) exhibited 2) conducted 3) expressed 4) attributed
- 3- They accused the President of ----- information from Congress.
1) abolishing 2) withholding 3) surrendering 4) terminating
- 4- The President's power is severely ----- by the Supreme Court.
1) circulated 2) penetrated 3) circumscribed 4) sophisticated
- 5- ----- refers to the fact of two or more things becoming one.
1) Compromise 2) Consensus 3) Disposition 4) Confluence
- 6- You can add the fluid to the powder, or, -----, the powder to the fluid.
1) intensely 2) instantly 3) conversely 4) rigorously
- 7- Her latest book, ----- "An Introduction to Applied Physics," is out this week.
1) entitled 2) contended 3) illuminated 4) acquainted
- 8- The ----- of a sense of hopelessness is evident in this novel.
1) impulse 2) exposure 3) persuasion 4) pervasiveness
- 9- The president was ----- with admiration for the country's technological progress.
1) surplus 2) replete 3) extensive 4) excessive
- 10- Because of its ----- population, this is a good area for wildlife.
1) sparse 2) shallow 3) unfastened 4) concise

PART B: Cloze Test

Directions: Read the following passage and decide which choice (1), (2), (3), or (4) best fits each space. Then mark the correct choice on your answer sheet.

There are obviously many theoretical motives for studying the history of science. (11) ----- would study that history in order to throw light upon his own task and to increase his enjoyment of it. However, the people who study a subject for theoretical reasons are probably exceptional. Most students (12) ----- definite training for practical reasons, such as qualifying themselves for a trade or profession. (13) ----- from their angle, then, the study of the history of science will complete the training of scientific teachers, (14) ----- well requires a kind of perspective that can be obtained only by historical inquiries. Furthermore, the study of the history of science will improve the qualifications of students for many parascientific positions having to deal directly or (15) ----- scientific pursuits, such as those of librarians, editors, curators of museums, and school or government administrators.

- 11- 1) Scientific men 2) A man's science 3) Men from science 4) A man of science
- 12- 1) are submitted to 2) submit them for
3) submit themselves to 4) are submitted for
- 13- 1) When it is looked 2) Looking at it
3) That they look at itself 4) They look at it
- 14- 1) since to teach 2) as if to teach 3) as for teaching 4) since if teaching
- 15- 1) indirectly in 2) indirectly with 3) to indirect with 4) to indirect in

PART C: Reading Comprehension

Directions: Read the following two passages and answer the questions by choosing the best choice (1), (2), (3), or (4). Then mark the correct choice on your answer sheet.

Passage I:

A typical organic light emitting diode (OLED) lighting structure is composed of films of organic compounds and conductive layers sandwiched between two electrodes that provide positive and negative charges. When the two charges recombine in the organic layer, energy is given off in the form of photons, creating a patch of soft visible light. In the theory, the efficiency of this energy conversion could reach 100 percent, researchers say.

Such a structure (excluding the substrate) has a depth that can be measured in mere nanometers, making for extremely thin, lightweight lighting products (and displays) that could be manufactured in sheet form. This opens the way for large area lighting and differentiates the OLED from its cousin, the light-emitting diode, or LED—a device designed to be a point light source.

In the lab, at least, OLED material can be put on a variety of substrates, including plastic. The material also is environmentally friendly, containing no harmful elements such as the mercury found in fluorescent tubes.

A major challenge all OLED manufacturers face is how to make their products cost-competitive with the ultracheap incandescent and fluorescent lighting products on the market. "Cost will be the key to penetrating the marketplace," agrees Toyohit Tanaka, general manager and head of business development in Konica Minolta.

- 16- Which one is likely to be an OLED structure?
 1) Electrode, conductive layer, electrode, films of organic compounds.
 2) Electrode, conductive layer, films of organic compounds, electrode.
 3) Conductive layer, electrode, electrode, films of organic compounds.
 4) Films of organic compound, electrode, electrode, conductive layer.
- 17- ----- differentiates OLED from LED.
 1) Ability for large area lighting
 2) Light weight lighting
 3) Being measured in nanometers
 4) Extremely thin in displaying
- 18- According to the text fluorescent tubes -----.
 1) do not contain mercury
 2) are environmentally friendly
 3) are not environmentally friendly
 4) are like OLEDs
- 19- Which one is among the remaining challenges for OLED's manufactures?
 1) Making them environmentally friendly.
 2) Having mercury in their structure.
 3) Making them as point light sources.
 4) Making them cheaper.

Passage II:

It may be a first: an office building with a net of electricity use of zero or less, that burns no fossil fuels for heating and produces no greenhouse gas, and that makes the people working there at least as comfortable as those in conventionally heated and cooled buildings. The building, in San Jose, Calif., opens in October, and if all goes according to plan, it will raise the bar for designers of energy-efficient buildings world wide. Though other so-called z-squared buildings exist they are highway rest stops, nature centers, and event locations, not office structures with computers and printers and cubicles full of employees.

The building was once a bank. Kaneda, the owner of the San Jose building, embarked on the project of renovating the old bank in September 2005, with the goal of creating an environmentally friendly building that could earn a Platinum rating—the highest—from the U.S. Green Building Council, an association of builders in Washington D. C. At that time, global climate change was not in the forefront of public eye. So Kaneda thought he was being very forward-thinking when he proposed to renovate the bank to meet the council's specifications. But when he hired architect Scott Shell to work on the project Shell went even further, suggesting they design a building with no net electricity usage and no carbon dioxide emissions.

To reduce the amount of energy used for lighting, Kaneda's builders sawed through the concrete perimeter of the building to install windows and skylights. Special window glass lets visible light through but blocks infrared and ultraviolet light, keeping the office cool. An overhang on the south side shades the windows from direct sun; on the east side, electrochromic glass controlled by a sensor darkens the window when sun hits them directly and makes them transparent the rest of the day. Because the ceilings are high, the skylights bathe much of the office space in a diffuse light; in areas where the skylight illumination is too strong, Kaneda is experimenting with different types of diffusers.

- 20- Why is the mentioned office building different from the other offices?
- 1) Because it saves a lot of energy.
 - 2) Because it makes the employees feel comfortable.
 - 3) Because it is not conventionally heated or cooled.
 - 4) Because it's comfortable, environmentally friendly, and does not use electricity as well.
- 21- Which sentence is true?
- 1) Highway rest stops can not be z- squared buildings.
 - 2) The mentioned office is the first building to use zero electricity.
 - 3) Nature centers spend more energy than office buildings.
 - 4) The mentioned office is the first office structure which uses zero electricity.
- 22- Whose idea was to build a building which does not emit carbon dioxide?
- 1) The architect of the project.
 - 2) The old bank owner.
 - 3) Kaneda.
 - 4) Green Building Council.
- 23- Having high ceilings in the building makes it possible to -----.
- 1) have diffused light.
 - 2) have skylights.
 - 3) bathe in the building.
 - 4) to have light.

Passage III:

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In experiments and even limited human clinical trials, electrode arrays implanted on the brain's surface have given monkeys and humans the ability to move objects with their thoughts. The experiments are proof that brain-computer interfaces could improve the lives of severely paralyzed people. But these systems rely on wires snaking out from the skull, which would affect a person's mobility and leave an opening in the scalp prone to infection.

Wireless brain-machine interfaces would be much more practical and could be implanted in several different areas of the brain to tap into more neurons. A typical scheme would have electrodes penetrating brain tissue picking up neuronal electrical impulses, called spikes. A chip would amplify and process the signals and transmit them over a broadband RF connection through the skull to a receiver. Then, just as in wired systems, algorithms would decode these signals into commands for operating a computer or a robot.

The key requirement for such a system is that it should consume very little power to keep the heat down. "Most of the guidelines for implantable devices say that you should not raise the surrounding tissue temperature by more than 1C; otherwise, you'll kill the cells you're trying to record from," says Reid Harrison.

Sending the complex analog impulses as they are would take up so much bandwidth. So it will be necessary to convert them into a simpler, robust form as close as possible to that of the neuron, says Brown University neuroengineer Arto Nurmikko. He and some of his colleagues were associated with the now-defunct Foxborough, Mass., start-up Cyberkinetics Neurotechnology Systems, which did the first human clinical trials of an implanted brain-computer interface.

- 24- Which is **NOT** mentioned as one of the problems with electrode arrays implanted on the brain skull?
- 1) The probability of infection.
 - 2) The reduction of movement for target users.
 - 3) The high financial consequences
 - 4) The fact that many pieces of wires surround the target user.
- 25- What are spikes?
- 1) Neuronal electrical impulses.
 - 2) Specific kinds of brain tissue.
 - 3) Electrodes which penetrate brain tissue.
 - 4) A typical scheme.
- 26- If the temperature of the surrounding tissue heats up more than 1C,
- 1) the patient will die.
 - 2) too much heat will be wasted.
 - 3) the targeted cells will die.
 - 4) the experiment will fail.
- 27- Which statement is correct according to the text?
- 1) Cyberkinetics Neurotechnology Systems is a company which exists in Massachuset.
 - 2) Cyberkinetics Neurotechnology Systems is where the first human clinical trial of an implanted brain-computer interface was performed.
 - 3) Arto Nurmikko is now working for Cyberkinetics Neurotechnology Systems.
 - 4) Arto Nurmikko performed the first human clinical trials of an implanted brain-computer interface.

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Passage IV:

Chances are your health and happiness rely on sensors, those ubiquitous little devices that tell us if a fridge is too cold, a nuclear reactor's safety systems are operating, or a factory production line is processing components correctly. But sensors have a dirty little secret: it's all too easy for them to be in perfect working order, reporting all is well when, in fact, your milk is turning into a frozen block, the reactor's safety system is impotent, and that factory has filled a warehouse with useless - and possibly dangerous products. Fortunately, help is on the way with a new standard for analog sensors, the most common kind in use today. The dirty little secret of sensors is calibration, the process by which data from a sensor are mapped to real-world conditions, and the new standard should help make miscalibration a thing of the past. Miscalibrated sensors can cause problems ranging in severity from a wasted morning's research to what happened at the Bruce B nuclear generating station near Toronto in 2002. There it was discovered that a backup reactor shutdown system that had been operating for weeks, in what appeared to be working order, was actually incapable of catching a dangerous rise in radiation, owing to an incorrectly calibrated neutron detector.

Like most standards, the new standard goes by an unlovely name - in this case, IEEE 1451.4. But 1451.4 marks a huge advance in sensor technology and is already being applied in research and industrial laboratories. This new standard marries the tried-and-true robustness and cost-effectiveness of analog sensors with the intelligence of digital equipment. Now, what does that mean in practice? It means a lot of things in the long term. One of the most important aspects of 1451.4 is that it offers a standard interface and protocol by which a sensor can describe itself over a network. With the advent and adoption of intelligent networked and wireless sensors, the notion of self-identifying devices may seem fairly elementary, but this has taken more than a decade to happen with analog sensors. Most commercially available sensor networks today are based on proprietary communications protocols, limiting their usefulness and hampering their adoption. IEEE 1451.4 could change all that.

- 28- **Based on the text, what are sensors?**
- 1) What our health and happiness totally rely on.
 - 2) Amphibious devices that tell us if a nuclear reactor's systems are operating.
 - 3) Ambiguous devices that tell us if a refrigerator is too cold.
 - 4) Tiny devices that tell us if a factory production line is processing components correctly.
- 29- **What is the possible result of miscalibration?**
- 1) A dirty little secret.
 - 2) An important reactor safety system.
 - 3) Erroneous feedback.
 - 4) The process by which data from a sensor are mapped to real-world conditions.
- 30- **What is so lovely about the name of Standard IEEE 1451.4?**
- 1) It makes a huge advance in sensor technology.
 - 2) Nothing is so lovely about this name.
 - 3) It could cause a backup reactor shutdown.
 - 4) It can cause various problems.

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