

全国 2021 年 4 月高等教育自学考试
英语科技文选试题

课程代码:00836

1. 请考生按规定用笔将所有试题的答案涂、写在答题纸上。
2. 答题前,考生务必将自己的考试课程名称、姓名、准考证号用黑色字迹的签字笔或钢笔填写在答题纸规定的位置上。

选择题部分

注意事项:

每小题选出答案后,用 2B 铅笔把答题纸上对应题目的答案标号涂黑。如需改动,用橡皮擦干净后,再选涂其他答案标号。不能答在试题卷上。

I. Directions: Read through the following passages. Choose the best answer and blacken the corresponding letter A, B, C or D on the ANSWER SHEET. (20%)

(A)

Researchers at the National Institute of Standards and Technology (NIST) and their colleagues have for the first time created and imaged a novel pair of quantum dots -- tiny islands of confined electric charge that act like interacting artificial atoms. Such “coupled” quantum dots could serve as a robust quantum bit, or qubit, the fundamental unit of information for a quantum computer. Moreover, the patterns of electric charge in the island can’t be fully explained by current models of quantum physics, offering an opportunity to investigate rich new physical phenomena in materials.

Unlike a classical computer, which relies on binary bits that have just one of two fixed values – “1” or “0” -- to store memory, a quantum computer would store and process information in qubits, which can simultaneously take on a multitude of values. Therefore, they could perform much larger, more complex operations than classical bits and have the potential to revolutionize computing.

Electrons orbit the center of a single quantum dot similar to the way they orbit atoms. The charged particles can only occupy specific permitted energy levels. At each energy

level, an electron can occupy a range of possible positions in the dot, tracing out an orbit whose shape is determined by the rules of quantum theory. A pair of coupled quantum dots can share an electron between them, forming a qubit.

To fabricate the quantum dots, the NIST-led team, which included researchers from the University of Maryland Nano Center and the National Institute for Materials Science in Japan, used the ultrasharp tip of a scanning tunneling microscope (STM) as if it were a stylus of an Etch A Sketch. Hovering the tip above an ultracold sheet of graphene (a single layer of carbon atoms arranged in a honeycomb pattern), the researchers briefly increased the voltage of the tip.

The electric field generated by the voltage pulse penetrated through the graphene into an underlying layer of boron nitride, where it stripped electrons from atomic impurities in the layer and created a pileup of electric charge. The pileup corralled freely floating electrons in the graphene, confining them to a tiny energy well.

But when the team applied a magnetic field of 4 to 8 tesla (about 400 to 800 times the strength of a small bar magnet), it dramatically altered the shape and distribution of the orbits that the electrons could occupy. Rather than a single well, the electrons now resided within two sets of concentric, closely spaced rings within the original well separated by a small empty shell. The two sets of rings for the electrons now behaved as if they were weakly coupled quantum dots.

This is the first time that researchers have probed the interior of a coupled quantum dot system so deeply, imaging the distribution of electrons with atomic resolution, noted NIST co-author Daniel Walkup. To take high-resolution images and spectra of the system, the team took advantage of a special relationship between the size of a quantum dot and the spacing of the energy levels occupied by the orbiting electrons: the smaller the dot, the greater the spacing, and the easier it is to distinguish between adjacent energy levels.

1. What makes a quantum computer differ from a traditional computer is ____.
 - A. a quantum computer works on classical bits only
 - B. a quantum computer sometimes relies on binary bits only
 - C. a quantum computer only relies on quantum bits
 - D. a quantum computer stores and processes information in qubits
2. The word “fabricate” in line 1, para.4, is closest in meaning to ____.
 - A. calculate
 - B. operate
 - C. create
 - D. invent

3. Which statement is **NOT** true according to the passage?
- A. The basic unit of information for a classical computer is two digits.
 - B. Coupled quantum dots may occupy some positions around the center of a quantum dot.
 - C. The rules of quantum theory determine orbit shape.
 - D. Quantum computers have great potentials for human beings.
4. We know from the passage that the difference between an electron and coupled quantum dots is ____.
- A. coupled quantum dots may become a quantum bit, but an electron can't
 - B. coupled quantum dots as well as an electron may become a quantum bit
 - C. an electron can only occupy some energy levels determined by the quantum theory
 - D. the voltage pulse is generated by the quantum dots
5. What is the main topic of this passage?
- A. The international cooperation between NIST and NIMS.
 - B. Quantum computing concept.
 - C. Coupled quantum dots may offer a new way to store quantum information.
 - D. A study on quantum qubits models.

(B)

A virus is a small infectious agent that duplicates itself inside of another living being. Viruses infect all types of life forms, from animals and plants to microorganisms, including bacteria. When a virus is not in an infected cell it exists in the form of independent particles. These viral particles, also known as virions, consist of two or three parts: (1) the genetic material made from DNA that carry genetic information; (2) a protein coat called the capsid which surrounds and protects the genetic material; and in some cases; (3) an envelope of lipids that surround the protein coat when they are outside a cell.

Viruses display a variety of shapes and sizes called morphologies. Viruses are much smaller than bacteria and have a diameter between 20 and 300 nanometers. Most viruses are unable to be seen even with an optical microscope.

The origin of viruses in the evolutionary history of life is unclear. Some may have evolved from pieces of DNA that can move between cells. Others may have evolved from bacteria. Viruses are an important means of horizontal gene transfer, which increases

genetic diversity.

Viruses are considered by some to be a life form, however, this opinion varies among scientists. They have been described by some as 'organisms that live at the edge of life'. Although they have genes, they do not have a cellular structure which is often seen as the basis for life. Viruses do not have their own metabolism and require a host cell in order to reproduce. They therefore cannot naturally reproduce outside of another living cell. This alone is an argument that a virus is not a life form outside of a host cell.

Viruses spread in many ways. In plants, viruses are often transmitted from plant to plant by insects that feed on the plant sap. In animals, viruses can be carried by blood-sucking insects. In human beings, viruses are spread through a variety of ways. For example, influenza viruses are spread through coughing and sneezing. Noroviruses are spread through bodily fluids which can be transmitted both orally and intravenously. Many viruses enter the human body through food and water. HIV virus is an example of a virus transmitted through sexual contact and by exposure to infected blood.

The range of host cells that a virus can infect is called its host range. This can be narrow, meaning a virus is capable of infecting only a few species, or it can be broad, meaning it is capable of infecting many species.

Viral infections in animals provoke an immune response that usually eliminates the infecting virus. Because human beings do not have the same capability, immune responses are produced by vaccines which give an artificial immunity to the specific viral infection. However, some viruses including those that cause AIDS and viral hepatitis, evade these immune responses and result in long-lasting infections and death. Antibiotics have no real effect on viruses, but there are several antiviral drugs that have been developed to attack specific viruses.

Classification seeks to describe the diversity of viruses by naming and grouping them on the basis of similarities. However, because of the numerous varieties and the tiny size, it is difficult to complete a classification for all viruses.

In summary, viruses duplicate themselves inside living organisms. They appear in a variety of sizes and shapes and can only be seen with special microscopes. Many viruses can be quite harmful to humans and other living things, but some viruses can be eliminated using medicines and other typical remedies.

6. Viruses display a variety of shapes and sizes called ____.

A. morphologies

B. capsomeres

C. genealogies

D. capsids

21. Her interest in flowers ___ her childhood in the country.
22. This milk must be bad, it's ___ a nasty smell.
23. If we are going to put on a performance next week, please notify us ___ .
24. She didn't really ___ until she won the election for party leader.
25. Automation is ___ about 40,000 unskilled jobs a week.
26. ___ all the circumstances, he thought it wise not to say anything further.
27. His scheme has been talked about in the press, and much ___ by the men who must provide the financial backing.
28. The neighborhood has ___ a fresh look since the new park was built.
29. The factory ___ bottles at the rate of several thousand per day.
30. ___ your request I am sending you sample pages of the dictionary.

IV. Directions: Fill in each blank with a suitable word given below and write your answer on the ANSWER SHEET. (10%)

on	considered	damage	investment	global
seriously	behind	into	approved	focus

Now, how to safely and properly deal with dangerous wastes has become a crucial task in environmental protection. If the latent (潜在的) problems caused by dangerous wastes cannot be resolved timely, it will be the detriment (损害) of the 31 environment. In the wake of China's rapid industrialization, solid waste levels are 32 the rise. Although resource usage rates remain low, the manner of waste disposal and related infrastructure construction have fallen 33 industrial development. So dangerous wastes have brought increasingly serious 34 to the environment.

A regulation to standardize disposal of dangerous and medical wastes was recently 35 by the State Council. The Chinese Government plans to pool more 36, 14.92 billion yuan within three years, to control pollution caused by medical and radioactive wastes. Efforts will 37 on safe storage and disposal of industrial wastes to minimize their contamination on the environment.

Dangerous wastes include poisonous, inflammable, explosive, caustic, chemical and epidemic waste materials that 38 damage natural environment and people's health. They are divided 39 47 categories and over 600 kinds. Used batteries, discarded lamps and wastes from hospitals are all 40 dangerous wastes and deemed by the government "killers to animals, plants and human beings."

V. Directions: Translate the following sentences into English, each using one of the given words or phrases below. Write your answer on the ANSWER SHEET. (10%)

allow for wind up be exposed to transform into run down

41. 我们能尽快结束会议吗?
42. 电池快耗完了。
43. 这座旧厂房被改造成了一座美术馆。
44. 预算没有把这些额外的开支计算进去。
45. 他们被暴露于高强度辐射中。

VI. Directions: Translate the following paragraph into Chinese. Write your answer on the ANSWER SHEET. (15%)

46. Every development in architecture has been the result of major technological changes. Materials and methods of construction are integral parts of the design of architectural structures. In earlier times, it was necessary to design structural systems suitable for the materials that were available, such as wood, stone, or brick. Today technology has progressed to the point where it is possible to invent new building materials to suit the type of structure desired. Enormous changes in materials and techniques of construction within the last few generations have made it possible to enclose space with much greater ease and speed and with a minimum of material. Progress in this area can be measured by the difference in weight between buildings built now and those of comparable size built one hundred years ago.

VII. Directions: Read the following passage, and then fill in the table with the information based on the passage. Write your answer on the ANSWER SHEET. (10%)

An angiosperm is a group of seed plants. All angiosperms, or flowering plants, share two important characteristics. First, they produce flowers. Second, in contrast to gymnosperms, which produce uncovered seeds, angiosperms produce seeds that are enclosed in fruits.

Flowers come in all sorts of shapes, sizes, and colors. But despite their differences, all flowers have the same function - reproduction. A flower is the reproductive structure of an angiosperm. A flower bud is enclosed by leaf-like structures called sepals that protect the developing flower. Most flowers have petals: colorful, leaf-like structures. Within the petals are the flower's male and female reproductive parts. Thin stalks topped by small knobs inside the flower are stamens, the male reproductive parts. The thin stalk is called

the filament. Pollen is produced in the knob, or anther, at the top of the stalk. The female parts, or pistil, are found in the center of most flowers. The sticky tip of the pistil is called the stigma. A slender tube, called a style, connects the stigma to the ovary, a hollow structure at the base of the flower. The ovary contains one or more ovules. An ovary is a flower structure that protects seeds as they develop.

For angiosperms to reproduce, first, pollen falls on a flower's stigma. In time, the sperm cell and egg cell join together in the flower's ovule. The zygote develops into the embryo part of the seed. As the seed develops the ovary changes and eventually becomes a fruit, a ripened ovary and other structures that enclose one or more seeds.

Angiosperms are divided into two major groups: monocots and dicots. Monocots are angiosperms that have only one seed leaf. Grasses, including corn, wheat and rice, and plants such as lilies and tulips, are monocots. Dicots produce seeds with two seed leaves. Dicots include plants such as roses, violets and dandelions.

Angiosperms

Unlike gymnosperms, angiosperms produce <u>47</u> seeds.	All flowers are the same in terms of their reproduction though they may <u>48</u> in sizes, shapes and/or colors.	One of the differences between stamens and pistils is that pistils are in the <u>49</u> of some flowers.	The function of ovary inside the flower is to <u>50</u> the seeds.	Some grasses and plants are monocots while others, like roses, etc. are <u>51</u> .
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VIII. Directions: Write a passage (150-200 words) in English on the following title. Develop the ideas according to the Chinese outline given below. Write your passage on the ANSWER SHEET. (15%)

52. Shall we spend money on space exploration or problems on earth?

- (1) 太空探索和解决地球上人类所面临的问题哪个更重要?
- (2) 原因是什么?