Engineering and Science (Question References)

Paragraph 1 To better understand what engineers do, let's contrast the roles of engineers with those of the closely related field of the scientist. Many students approach both fields for similar reasons; they were good at math and science in high school. [A] While this is a prerequisite for both fields, it is not a sufficient discriminator to determine which is the right career for a given individual.

2 [B] The main difference between the engineer and the scientist is in the object of each one's work. The scientist searches for answers to technological questions to obtain a knowledge of why a phenomenon occurs. [C] The engineer also searches for answers to technological questions, but always with an application in mind. [D]

3 Theodore Von Karman, one of the pioneers of America's aerospace industry, said "Scientists explore what is; engineers create what has not been." (Paul Wright, *Intro to Engineering*).

4 In general, science is about discovering things or acquiring new knowledge. Scientists are always asking, "Why?" They are interested in advancing the knowledge base that we have in a specific area. The answers they seek may be of an abstract nature, such as understanding the beginning of the universe, or more practical, such as the reaction of a virus to a new drug.

5 The engineer also asks, "Why?" but it is because of a problem which is preventing a product or service from being produced. The engineer is always thinking about the application when asking why. The engineer becomes concerned with issues such as the demand for a product, the cost of producing the product, the impact on society and the environment of the product.

6 Scientists and engineers work in many of the same fields and industries but have different roles. Here are some examples:

- Scientists study the planets in our solar system to understand them; engineers study the planets so they can design a spacecraft to operate in the environment of that planet.
- Scientists study atomic structure to understand the nature of matter; engineers study the atomic structure in order to build smaller and faster microprocessors.
- Scientists study the human neurological system to understand the progression of neurological diseases; engineers study the human neurological system to design artificial limbs.
- Scientists create new chemical compounds in a laboratory; engineers create processes to mass-produce new chemical compounds for consumers.
- Scientists study the movement of tectonic plates to understand and predict earthquakes; engineers study the movement of tectonic plates to design safer buildings.

The Engineer and the Engineering Technologist

7 Another profession closely related to engineering is engineering technology. Engineering technology and engineering have similarities, yet there are differences; they have different career opportunities. ABET, which accredits engineering technology

programs as well as engineering programs, defines engineering technology as follows: *Engineering technology is that part of the technological field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities; it lies in the occupational spectrum between the craftsman and engineering at the end of the spectrum closest to the engineer.*

8 Technologists work with existing technology to produce goods for society. Technology students spend time in their curricula working with actual machines and equipment that are used in the jobs they will accept after graduation. By doing this, technologists are equipped to be productive in their occupation from the first day of work.

9 Both engineers and technologists apply technology for the betterment of society. The main difference between the two fields is that the engineer is able to create new technology through research, design and development. Rather than being trained to use specific machines or processes, engineering students study additional mathematics and engineering science subjects. This equips engineers to use these tools to advance the state of the art in their field and move technology forward.

10 There are areas where engineers and engineering technologists perform very similar jobs. For example, in manufacturing settings, engineers and technologists are employed as supervisors of assembly line workers. Also, in technical service fields both are hired to work as technical support personnel supporting equipment purchased by customers. However, most opportunities are different for engineering and engineering technology graduates.

1. With which of the following topics is the passage primarily concerned?
   - (A) A scientific definition of engineering
   - (B) A comparison of careers in science and engineering
   - (C) A classification of the types of engineering
   - (D) An example of technology in engineering

2. What kind of work do engineering technologists perform?
   - (A) They engage in basic technological research.
   - (B) They apply research to create technology.
   - (C) They make new products, using the latest technology.
   - (D) They use technological advances in tools and machines.

3. The word roles in the passage is closest in meaning to
   - (A) training
   - (B) ideas
   - (C) problems
   - (D) positions

4. The word phenomenon in the passage is closest in meaning to
   - (A) hazard
   - (B) system
   - (C) occurrence
   - (D) triumph

5. The word them in the passage refers to
   - Ⓐ scientists
   - Ⓑ planets
   - Ⓒ engineers
   - Ⓓ solar system

6. How does the author define *engineering technology* in paragraph 7?
   - Ⓐ He uses the definition in a textbook.
   - Ⓑ He defines the term in his own words.
   - Ⓒ He quotes from a professional organization.
   - Ⓓ He reads a definition from an engineering professor.

7. Which of the sentences below best expresses the information in the highlighted statement in the passage? The other choices change the meaning or leave out important information.
   - Ⓐ Engineering science subjects and math are less important than training on machinery for engineering students.
   - Ⓑ Training to use equipment is part of the students' curriculum, along with math and engineering courses.
   - Ⓒ Engineering students take higher math and engineering science instead of engaging in hands-on training.
   - Ⓓ Additional math and engineering science courses are required before training on machinery.

8. The author mentions all of the following in reference to a career in engineering EXCEPT
   - Ⓐ engineers try to solve practical problems
   - Ⓑ engineers apply scientific knowledge
   - Ⓒ engineers are hired to teach technologists
   - Ⓓ engineers consider production costs

9. It can be inferred that this passage would be published in
   - Ⓐ a mathematics textbook at the college level
   - Ⓑ an orientation book for engineering students
   - Ⓒ a workbook in an advanced science course
   - Ⓓ an engineering technology textbook

10. Four squares (□) indicate where the following sentence can be added to the passage.

    In order to make a good choice, it is necessary to understand what scientists and engineers do on the job.

    Where would the sentence best fit into the passage?

    [A]
    [B]
    [C]
    [D]

11. Complete the table below by matching each of the answer choices with the career to which it refers. All of the choices will be used.
    - Ⓐ They study the movement of tectonic plates to predict earthquakes.
    - Ⓑ They use the latest equipment to monitor changes in patterns.
    - Ⓒ They design buildings that will withstand the stresses of earthquakes.
    - Ⓓ They create models to build faster computers.
    - Ⓔ They study each of the parts to repair computers.
    - Ⓕ They propose theories of atomic structures for computer application.

Scientist	Engineer	Technologist
•	•	•
•	•	•