Fact Sheet

PRINCIPLES OF PHYSICAL SCIENCE I

TEST INFORMATION

This test was developed to enable schools to award credit to students for knowledge equivalent to that which is learned by students taking the course. The school may choose to award college credit to the student based on the achievement of a passing score. The passing score for each examination is determined by the school based on recommendations from the American Council on Education (ACE). This minimum credit-awarding score is equal to the mean score of students in the norming sample who received a grade of C in the course. Some schools set their own standards for awarding credit and may require a higher score than the ACE recommendation. Students should obtain this information from the institution where they expect to receive credit.

CONTENT

The following topics, which are commonly taught in courses on this subject, are covered by this examination.

Approximate Percent

I. Physics **60%**
   A. Newton's Laws of Motion
      1. Motion
      2. Force and acceleration
      3. Inertia
      4. Mass and weight
      5. Action/reaction forces
      6. Law of Circular Motion
      7. Law of Universal Gravitation
   B. Energy and Momentum
      1. Work
      2. Power
      3. Potential and kinetic energy
      4. Momentum
   C. Thermodynamics
      1. Temperature and heat
      2. Heat transfer
      3. Heat capacity
      4. Changes in state
      5. Mechanical equivalent of heat
   D. Waves and Optics
      1. Reflection and refraction
      2. Lenses and mirrors
      3. Waves
      4. Interference and diffraction
   E. Electricity and Magnetism
      1. Electronic charges (Coulomb's Law)
      2. Electric current
      3. Potential differences
      4. Ohm's Law
      5. Magnetism
      6. Electromagnetism
      7. Circuits and applied electricity

II. Chemistry **40%**
   A. Properties of Matter
      1. Elements, compounds, mixtures, solutions
      2. Physical and chemical changes and properties
      3. Gas laws
      4. Kinetic theory
   B. Atomic Theory and Atomic Structure
      1. The Periodic Law
      2. Periodicity of the elements
      3. Atomic models of the atom
      4. Ions and molecules
      5. Stoichiometry
      6. The nucleus and radioactivity

C. Chemical Reactions
   1. Equations
   2. Acids, bases, and salts
   3. Catalysts

III. Miscellaneous
Some questions deal with general scientific principles or processes.

Questions on the tests require candidates to demonstrate the following abilities. Some questions may require more than one of the abilities.

- Knowledge of basic facts and terms (about 35-40% of the examination)
- Understanding of concepts and principles (about 35-40% of the examination)
- Ability to apply knowledge to specific problems and situations (about 25-30% of the examination)

SAMPLE QUESTIONS

1. Which of the following properties of fluids can serve to distinguish between a gas and a liquid?

   (A) Immiscibility
   (B) Malleability
   (C) Viscosity
   (D) Compressibility

2. A substance that alters the rate of a chemical reaction but is not itself altered is called a

   (A) catalyst
   (B) reactant
   (C) product
   (D) limiting agent

3. In which of the following cases is the vehicle described NOT accelerating?

   (A) A car traveling in a straight line, increasing its speed from 10 meters per second to 20 meters per second.
   (B) A bus traveling at a constant speed over the crest of a hill
   (C) A train traveling in a straight line at a constant speed
   (D) A car traveling at 15 meters per second around a curve

4. The best explanation for the location of the element helium in the periodic table is that it

   (A) has a filled outer shell
   (B) has a low density
   (C) is monatomic
   (D) is a nonmetal

5. Two forces, one of 300 newtons and the other of 400 newtons, act at right angles to each other. The magnitude of the resultant force is

   (A) 100 N
   (B) between 300 N and 400 N
   (C) 500 N
   (D) 700 N

6. Which of the following is true when the pendulum of a clock reaches the highest point of its arc?

   (A) The net force acting on the system is zero.
   (B) The kinetic energy is maximum
   (C) The potential energy is maximum
   (D) The frequency is zero

7. If the half-life of a certain isotope is one month, what portion of a sample of this isotope remains after two months?

   (A) None
   (B) One-fourth
   (C) One-third
   (D) Three-fourths

8. If the distance between a proton and an electron is doubled, the resulting attraction will be

   (A) four times as great
   (B) twice as great
   (C) half as great
   (D) one-fourth as great

9. The heat that is required to raise the temperature of 10 grams of a sample whose specific heat is 0.212 calories/gram °C from 30° C to 50° C would be

   (A) 200.0 cal
   (B) 42.4 cal
   (C) 4.24 cal
   (D) 2.0 cal

10. In the Earth-Moon system, if r is the distance between the two masses, the attracting force between them is

    (A) directly proportional to r
    (B) directly proportional to r^2
    (C) inversely proportional to r
    (D) inversely proportional to r^2

11. The work done in holding a 50-newton object at 2 meters above a table top is

    (A) 980 J
    (B) 100 J
    (C) 25 J
    (D) 0 J

12. Which of the following statements regarding the force on an object in circular motion is NOT true?

    (A) It is inversely proportional to the period squared.
    (B) It is inversely proportional to the mass.
    (C) It is directly proportional to the velocity.
    (D) It is directly proportional to the acceleration.

STUDYING FOR THE EXAMINATION

The following is a list of reference publications that were being used as textbooks in college courses of the same or similar title at the time the test was developed. Appropriate textbooks for study are not limited to those listed below. If you wish to obtain study resources to prepare for the examination, you may reference either the current edition of the following titles **or** textbooks currently used at a local college or university for the same class title. It is recommended that you reference **more than one textbook** on the topics outlined in this fact sheet. You should **begin by checking textbook content against the content outline** included on the front page of this Fact Sheet **before** selecting textbooks that cover the test content from which to study. Textbooks may be found at the campus bookstore of a local college or university offering a course on the subject.

Sources for study material suggested but not limited to the following:

Physics

Kirkpatrick, Larry D. and Gerald F. Wheeler. *Physics: A WorldView*. Fort Worth, TX: Saunders College Publishing, current edition.

Krauskopf, Konrad B. and Arthur Beisner. *The Physical Universe*. New York: McGraw-Hill, current edition.

Payne, Charles A., William R. Falls, and Charles J. Whidden. *Physical Science: Principles and Applications*. Dubuque, IA: William C. Brown Publishers, current edition.

Riban, David M. *Introduction to Physical Science*. New York: McGraw-Hill, current edition.

Sears, Francis W., Mark W. Zemansky, and Hugh D. Young. *College Physics*. Reading, MA: Addison-Wesley Publishing, current edition.

Chemistry

Brown, Theodore L., Eugene H. LeMay, Jr., and Bruce E. Burston. *Chemistry: The Central Science.* Englewood Cliffs, NJ: Prentice-Hall, Inc., current edition.

Holtzclaw, Jr., Henry F., William R. Robinson, and Jerome D. Odom. *College Chemistry With Quantitative Analysis.* Lexington, MA: D. C. Health, current edition.

Mortimer, Charles E. *Chemistry*. Belmont, CA: Wadsworth Publishing Co., current edition.

Current textbook used by a local college or university for a course on the subject.

CREDIT RECOMMENDATIONS

The Center for Adult Learning Educational Credentials of the American Council on Education (ACE) has reviewed and evaluated the DSST test development process and has made the following recommendations:

Area or Course Equivalent:	Physical Science I
Level:	Lower level baccalaureate
Amount of Credit:	Three (3) semester hours
Source:	ACE Commission on Educational Credit and Credentials

INFORMATION

Colleges and universities that would like additional information about the national norming, or assistance in local norming or score validation studies should write to: DSST Program, Prometric, 2000 Lenox Drive, 3rd Floor, Lawrenceville, NJ 08648.

It is advisable that schools develop a consistent policy about awarding credit based on scores from this test and that the policy be reviewed periodically. Prometric will be happy to help schools in this effort.

Correct Responses to sample questions: 1.D; 2.A; 3.C; 4.A; 5.C; 6.C; 7.B; 8.D; 9.B; 10.D; 11.D; 12.B.

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