

GENERAL SCIENCE

Test Your Science Aptitude

Try this short version of the two-hour Science Aptitude Examination taken by high school seniors in the 23rd annual Science Talent Search and find your science potential.

► MANY OF US wonder how we rate, when compared with today's up-and-coming young scientists. Here is a test that may give some such indication. It may be less embarrassing to take the test in private. The questions are not easy.

For instance, what are auxins? What about cybernetics? Does copper exist in a vitreous state at room temperature, or does glass, sodium chloride or water?

You can make a quick rough evaluation of your science potential in a few minutes by choosing the best answer to such interesting questions. They are part of the two-hour Science Aptitude Examination given to thousands of high school seniors in the 23rd Science Talent Search for the Westinghouse Science Scholarships and Awards, results of which have been announced.

For your private testing, allow yourself 20 minutes to complete the sample, then check your answers with those on p. 94.

If you are astonished to find all your answers are right, you should be! None of the Science Talent Search contestants did as well as that!

Awarding yourself one point for each entirely correct answer, a high score on this short version would be at least 10 out of a possible total score of 18. A random selection showed 12% of the students did this well or better. A score of three or less was scored by about eight percent of the students. The easiest questions were 5, 7, 73 and 75. Each of these was answered correctly by more than half of the 200 students. Questions 9, 31, 34 and 90 were the most difficult, with each answered correctly by less than one out of five of the hopeful students.

The most difficult question was 31, with only seven percent of the test-takers knowing that the Erlanger program classifies geometrics.

On the other hand, 76% of the contestants knew that a missile orbiting earth at the Tropic of Capricorn travels a shorter distance per orbit than by the other orbits listed.

If your score is not very impressive, take comfort in knowing the test was deliberately designed to screen out all but the best among thousands of very able science-oriented students. No one has made a perfect score in the entire 23 years of the Science Talent Search.

Dr. Harold A. Edgerton, Washington psychologist, constructed the 23rd Science Aptitude Examination. He also is chairman of the Science Talent Search judging committee.

The Science Talent Search is supported by the Westinghouse Educational Foundation and is administered by SCIENCE SERVICE.

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PART A

DIRECTIONS: Each question has four possible answers, BUT there may be as many as four right answers for a question. For some questions there will be only one right answer, while others may have two, three or four right answers.

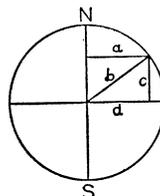
5. Auxins are
 1. extremely durable adhesives
 2. plant hormones
 3. simple unsaturated hydrocarbons
 4. superconductors
6. The resistance of a conductor
 1. depends on the material of which it is made
 2. depends upon the temperature
 3. is inversely proportional to its cross-sectional area
 4. is proportional to its length
7. "To change temperature expressed by means of the Centigrade scale (C) to Fahrenheit (F), multiply the Centigrade temperature by 9, divide this product by 5, and to this quotient add 32." Which of the following statements are true?
 1. -10°C is the same as 14°F
 2. 0°C is the same as 32°F
 3. 15°C is the same as 59°F
 4. -35°C is the same as -35°F
8. Which of the following exists in a vitreous state at room temperature?
 1. copper
 2. glass
 3. sodium chloride
 4. water
9. Tantalum carbide is
 1. an alloy of tantalum and carbon
 2. a salt of tannic acid
 3. a salt of carbonic acid
 4. a very hard material used in cutting tools
31. The Erlanger program classifies
 1. cranial nerves
 2. geometries
 3. land forms
 4. stereoisomers
32. Stimulation of a nerve results in the production of which of the following?
 1. acetic acid
 2. carbon dioxide
 3. oxygen
 4. water vapor
33. Tuatara is a
 1. fish found at depths greater than 10,000 feet
 2. form of communication among social insects
 3. reptile relative of the dinosaur
 4. root crop from Tahiti
34. Halley's comet
 1. follows an erratic path
 2. is expected to be visible in 1986
 3. was of the first magnitude
 4. was last seen in 1910
35. The mho is a unit of
 1. capacitance
 2. conductance
 3. inductance
 4. resonance
36. Cybernetics is the study of
 1. computer programming systems
 2. control and communication in machines and organisms
 3. free radicals
 4. the properties of matter at temperatures near absolute zero

PART B

DIRECTIONS: Four possible answers are given for each question. Choose that ONE answer which is most nearly correct.

SECTION J

The earth is represented by the diagram. Its diameter is 8,000 miles at the equator and may be assumed to be that distance whenever measured through the center of the earth.



QUESTIONS ON SECTION J

73. An astronaut flies around the earth at the equator 200 miles above the earth's surface. Which of the following statements about the astronaut's path is true?
 1. The diameter of the orbit is 400 miles.
 2. The further north the orbit the less its diameter.
 3. At such an altitude the astronaut could see from the Tropic of Cancer to the Tropic of Capricorn.
 4. Noting that the circumference of a circle is $2\pi r$, one orbit is 400π miles longer than the earth's circumference.
74. If an airplane, flying west to east at 600 mph is able to fly around the world in 24 hours, parallel to the equator (the circumference of a circle is $2\pi r$) it would have to make its flight at some latitude other than the equator. At this latitude,
 1. distance b is the diameter of the earth
 2. distance a is approximately 2,000 miles
 3. distance c is less than 2,000 miles
 4. distance a is equal to distance c
75. Four missiles are fired so as to orbit the earth in a circular orbit. Which one will travel the shortest distance in making one orbit around the earth?
 1. Missile A has a polar orbit travelling over both the north and south poles.
 2. Missile B has an equatorial orbit.
 3. Missile C orbits the earth at the Tropic of Capricorn.
 4. Missile D has a path which takes it directly over the Tropic of Cancer and over the Tropic of Capricorn twice in each orbit.

SECTION O

Following are brief statements of four of Mills' canons (in which he summarizes the methods he found in use among men of science).

1. If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree is the cause of the given phenomenon.
2. If an instance in which the phenomenon under investigation occurs and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former; the circumstance in which alone the two instances differ is the effect, or the cause, or an indispensable part of the cause of the phenomenon.
3. If two or more instances in which the phenomenon occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance, the circumstance in which alone the two sets differ is the effect, or the cause, or an indispensable part of the cause of the phenomenon.
4. Whatever phenomenon varies in any manner whenever another phenomenon varies in some particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation.

QUESTIONS ON SECTION O

For each of the items 87 through 90, the correct answer is the one of the above numbers identifying the one method that would be most effectively adapted to investigate the hypothesis.

87. When a charge is at rest there is no magnetic field associated with it but when it is in motion there is a magnetic field.
88. Whenever there is a net force acting on a body the body is accelerated.
89. When three masses are subject to the same net force, the more massive the object, the smaller the acceleration.
90. The speed of light is different but constant in each different medium but always less than its value in air.

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TEST YOURSELF—Compare your own score with those of a random sampling of the thousands of high school seniors who took the full test.