

GENERAL SCIENCE

Super-Quiz for Science

This test will tell you about yourself. Thousands of high school seniors have just taken the National Science Talent Examination in annual search for future scientists.

By WATSON DAVIS

► HERE is the science quiz of the year. Take this test to find out whether you have scientific ability. You can try it on yourself and your friends. It will give you a hint as to whether you reason in the same way as the creative scientists responsible for our inventions and discoveries.

In America's mobilization for defense now underway, military and industrial and educational authorities recognize the necessity of discovering in our population all of those who can develop scientific and technical abilities. For this reason the work of thousands of science clubs in the nation's high schools and the Annual Science

Talent Search have taken on added meaning.

The sample questions here are part of the 2½-hour examination just taken by thousands of high school seniors all over the country, some of them your neighbors.

These young scientists were competing for top honors in the Tenth Annual Science Talent Search, an annual hunt for the cream of tomorrow's scientists.

Judges have scored the examinations and honors, some of them Westinghouse Science Scholarships, will be awarded.

You may now test yourself informally. You should be able to answer the specimen questions in not more than 25 minutes. Arrange to spend this time without inter-

ruption and finish all the questions at one sitting.

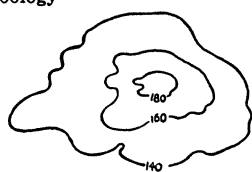
Even the most brilliant scientist of today would miss some of the questions in the full test. The quiz is purposely made extremely difficult. It is designed to test scientific aptitude, that is, ability to reason to a logical conclusion. You are not expected to make a perfect score.

None of the thousands of boys and girls who have taken Science Talent Search examinations has ever made a perfect score. Nor are they expected to do so.

SUPER QUIZ—Sample questions on this and the facing page, secret until now, are from Science Talent Search quiz just taken by thousands of high school seniors. What is your scientific ability? Answering these questions will tell you about your powers to reason in the scientific manner.

DIRECTIONS: Four possible answers are given for each question. Put an X in the parentheses in front of the number corresponding to that answer which you think is **most** nearly correct.

1. Galactose is
 - () 1. a constellation
 - () 2. a sugar
 - () 3. a variety of rose
 - () 4. an alloy
2. A substance produced by a living organism and having an antibacterial effect is classed as
 - () 1. antibiotic
 - () 2. antiseptic
 - () 3. detergent
 - () 4. germicidal
3. Through which of the following can sound waves *not* be transmitted?
 - () 1. gas
 - () 2. liquid
 - () 3. solid
 - () 4. vacuum
8. This type of diagram is employed in
 - () 1. biochemistry
 - () 2. geology
 - () 3. radiography
 - () 4. zoology



SECTION A

If periodically applied forces are causing vibration of a mechanical system which has a natural period of vibration, and if these applied forces are reversed in their time relationships so that the vibration of the mechanical system is being opposed by the forces which are now being applied to it, then the vibrations gradually die away so that the mechanical system comes to rest. Then fresh vibrations begin and are gradually built up which are exactly opposed in phase with those which the system was originally performing.

9. Gibbous refers to a
 - () 1. device on a boat
 - () 2. part of the throat
 - () 3. phase of the moon
 - () 4. type of ape

10. Silviculture refers to
 - () 1. an ancient civilization
 - () 2. breeding of termites
 - () 3. caring for a forest
 - () 4. mining of silver

11. The time required for a member of the solar system to go from some particular position relative to the sun as seen from the earth, back to the same relative position again is called its
 - () 1. conjunctive period
 - () 2. solar motion
 - () 3. sidereal period
 - () 4. synodic period

12. Aurora australis refers to
 - () 1. Australian bison
 - () 2. certain gold alloys
 - () 3. early morning rainbows
 - () 4. southern lights

PART A

SECTION B

Radioactive isotopes may be used medically for radiation treatment and for diagnosis of a limited number of diseases. The radioisotopes permit generalized irradiation of a patient, selective irradiation of bone, thyroid, spleen, and certain other body tissues, and localized applications of beta and gamma rays to some lesions. Also, radioactive and stable isotopes of an element may be used to trace the atoms of that element. One can thus observe the behavior of specific atoms and molecules in a wide variety of biological, chemical, or physical systems, from test tube to factory vat and from microbe to man. By using isotopic tracers, elements can often be traced in quantities millions of times below chemically detectable amounts. More important even than sensitivity is the specificity of the method. A specific batch of atoms or molecules may be labeled and traced independently even in the presence of existing atoms or molecules of the same kind, and in spite of reactions of numerous other atoms and molecules. This permits the ferreting out and untangling of complicated processes that often could be determined in no other way.

PART B

QUESTIONS ON SECTION A

51. According to the above statement, the vibrations of a mechanical system which has a natural period of vibration
- () 1. are opposite in phase to that of a periodically applied force
 - () 2. gradually die away unless the time relationship of an applied force is periodically reversed
 - () 3. momentarily stop in transition from one phase to an opposite phase
 - () 4. require no outside force to set it vibrating

101. 1 side of a section = 1 mile
1 section = 640 acres
1 side of 40 acres (a square) =

- () 1. $\frac{1}{2}$ mile
- () 2. $\frac{1}{4}$ mile
- () 3. $\frac{1}{8}$ mile
- () 4. $\frac{1}{16}$ mile

105. What is the fallacy in the following syllogism?
Some teachers are science teachers.
My teacher is a science teacher.
Therefore, my teacher is some teacher.

- () 1. Erroneous major premise
- () 2. Erroneous minor premise
- () 3. Inductive reasoning
- () 4. Inconsistent use of words

108. Each statement in Column I is a definition. Among the terms in Column II are those defined in Column I. For each definition in Column I put the number of its term (from Column II) in the parentheses.

COLUMN I

- () 1. A line along which warm air has been lifted from the earth's surface by opposing wedges of cold air.

COLUMN II

- 1. cold front
- 2. high

QUESTIONS ON SECTION F

70. Which of the following conclusions can properly be made on the basis of the paragraph?

- () 1. All elements have radioactive and stable isotopes.
- () 2. Chemical analysis of a chemical process is sometimes not so revealing as radioactive isotopic analysis.
- () 3. None of the other three conclusions given here can properly be concluded on the basis of the information given.
- () 4. The most important use of tracer isotopes is in the treatment of disease in man.

72. The statement that some radioactive isotopes of elements may be unstable is

- () 1. contrary to the paragraph
- () 2. made in the paragraph
- () 3. neither made nor implied in the paragraph
- () 4. not made, but implied in the paragraph

- () 2. A line between advancing cold air and a mass of warmer air.
- () 3. A line between advancing warmer air and a mass of colder air.
- () 4. A line connecting localities which report the same barometer readings.
- () 5. An area where the barometric pressure is above normal.

3. isobar

4. low

5. occluded front

6. warm front

111. Fill in the missing words:

The characteristic property of the atomic nucleus is that it has a _____ charge, which determines the atomic _____ of the atom.

PART C

You may start the test and then not finish. Or you may take one look at it and decide that it is too tough for you. That is your privilege, just as it was the privilege of the high school seniors. No one made the high school seniors take it. They could walk out on it—and many of them did, thus withdrawing from the competition.

Making the test especially difficult eliminates the persons who do not have the perseverance to finish a job. This ability to finish what is started is a prime requisite for solving scientific problems, whether they be in atomic energy, bacteriological research, industrial technology or in everyday life. Sometimes those who quit have reasoning ability, but it is not doing them any good unless they use it.

Your answers may show that you have hidden abilities in the field of science. However, if your score is not high, do not be disappointed, for very few people are gifted with the abilities necessary for creative scientific research.

And if you do well on this sample, it does not mean that you should quit what you are doing and become a scientist. To be a professional scientist requires many years of study and preparation as well as native ability. The test has merely revealed that you have a certain amount of this

native ability, and there are many situations in your everyday life that require this kind of ability.

Ready now to test yourself? There are three kinds of questions. Answer all questions in Part A by putting an X in the number of the answer that is most nearly correct. In the case of Part B, first read each paragraph and then choose the answer that is most nearly correct on the basis of the information given in the paragraph. In Part C, either pick the correct answer or fill in the missing words.

After you have completed the test, score yourself, using the answers printed on page 76.

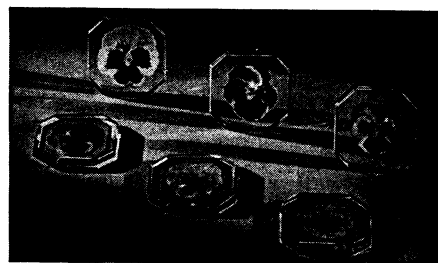
Having taken the test yourself you can appreciate the abilities of the boys and girls, 15 to 18 years old, who win honors in the nationwide search. The 40 top winners will arrive in Washington, D. C., March 1, to attend the annual Science Talent Institute.

They will meet leading scientists during their five-day stay. An additional 260 contestants are being given honorable mention and recommended to colleges, universities and technical schools as potential top-notch scientists of the future. In 23 states, further awards and scholarships are being awarded to state winners.

The science aptitude test is only one of

the methods used in selecting the boys and girls who are scientifically gifted. In addition, each contestant filled out a personal data blank and wrote a report describing some scientific project he has done or wishes to do. Teachers filled out a recommendation form and principals reported on scholarship of the contestants.

The science aptitude test was compiled by two of the Science Talent Search judges, Dr. Harold A. Edgerton, vice-president, Richardson, Bellows, Henry & Co., New



REAL PANSY COASTERS

These attractive coasters were made by embedding real pansies in Castolite, a new liquid casting plastic. With it students embed real flowers, butterflies, shells, photos, medals, etc. to make unusual jewelry, buttons, coasters, plaques, tiles, book ends, trays, other distinctive objects. Successfully used by hundreds of schools and colleges. Write for new FREE folder "Liquid Magic" showing things students can make. Many practical ideas. The Castolite Company, Dept. B-50, Woodstock, Ill.

York, and Dr. Stuart Henderson Britt, Director of Personnel, McCann-Erickson, Inc., New York, both leading psychologists.

Taking the test and competing in the Search comes as a culmination of high school science study and activity with science clubs for thousands of boys and girls of America's public, private and parochial secondary schools.

Science News Letter, February 3, 1951

Leaves and outer stalks of *celery* are higher in vitamin A and C than the inner stalks and "hearts."

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RADIO

Jets Strain Radar

Spotting high-speed planes that might roar over our borders to drop atomic bombs would be difficult for detecting radar. Study needed.

➤ SPOTTING high-speed jets that might roar over our borders to drop atomic bombs on our cities and industrial centers strains our detecting radar to its limits, Dr. Edward U. Condon, director of the National Bureau of Standards, has suggested.

Using our radar in the best possible way is the solution, and that job, he told the Conference on High Frequency Measurements, depends on the electronics specialists.

It means more accurate measurements of high frequency waves, for without these measurements, Dr. Condon pointed out, a radar operator cannot tell how effective his radar is, whether the range of his beam is 10 miles or 100.

The performance of radar and other high frequency electronic equipment depends on our knowledge of how microwaves, alternating many billions of times per second, behave. High frequency measuring instruments help to give us this knowledge and thus successfully send and receive these pulses.

The radio frequency spectrum has expanded somewhere between a thousand and a million fold in the last ten years, Dr. Condon stated. The Conference, sponsored by the American Institute of Electrical Engineers, the Institute of Radio Engineers and the National Bureau of Standards, celebrate the 50th anniversary of the National Bureau of Standards.

Future developments in high frequency electronics are vital to the national defense. Research, development and procurement in that field should therefore be planned carefully and logically, he told the Conference.

Science News Letter, February 3, 1951

ENGINEERING

Storage Battery Has Longer Life

➤ A NEW storage battery, developed particularly for the telephone industry, has a 50% longer life than present batteries due to the use of calcium instead of antimony as a hardener in the battery lead.

It is a development of Bell Telephone Laboratories, and will be used in telephone central offices throughout the nation. It is not, at present, recommended for other uses but may become commercially available at a later date after more information about its characteristics has been obtained.

The new battery is the result of studies made by Bell scientists concerning why a certain gas called stibine, antimony hydride, escaped from batteries. They found that antimony, a metal commonly used to harden lead, was passing undetected from one plate to another within the cell, speeding up corrosion and causing electrochemical action which resulted in partial discharge of the negative plate.

They found that small amounts of calcium could be used instead of antimony and the calcium stops the trouble for which the antimony was responsible. Less than one-tenth of one percent of calcium, compared with the 12% of antimony usually employed in battery alloy, does the job. This new lead-calcium battery loses only four percent of its total charge each month, and can go for several months without the addition of water.

Science News Letter, February 3, 1951

SCIENCE QUIZ ANSWERS

Now that you have taken the science aptitude test, you are ready to check your answers.

Correct answers to Part A are: 1, 2; 2, 1; 3, 4; 8, 2; 9, 3; 10, 3; 11, 4; 12, 4.

For Part B, Section A: 51, 3. Section F: 70, 2; 72, 4.

For Part C, 101, 3; 105, 4; 108-1, 5; 108-2, 1; 108-3, 6; 108-4, 3; 108-5, 2; 111, positive, number.

Out of the 20 possible right answers, if you got 16 or more correct, your score is very good. If you got 14 or more correct, your rating is high. Those who did as well on the entire test were in the running for consideration for honors in the National Science Talent Search. If you scored only 8 or less questions correctly, your talents probably lie in non-scientific fields.

Science News Letter, February 3, 1951

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