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AUTHOR Wert, Jonathan M.
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ABSTRACT

This examination is designed to measure the general awareness level of high school students, teachers, and citizens in the area of energy development and conservation. It is composed of 100 true-false statements concerning energy education concepts. A sample examinee answer sheet and an examiner key are included. Reproduction of the exam is permitted, though credit is requested. An examinee information sheet is also included. No scoring norms have been prepared thus far. (Author/MA)

ENERGY EDUCATION/CONSERVATION EXAMINATION

Prepared
by
Dr. Jonathan Wert, Consultant
Energy/Environment/Conservation
Environment Center
The University of Tennessee
South Stadium Hall
Knoxville, Tennessee 37916
(615) 974-4251

Message to User

This examination has been designed to measure the general awareness level of high school students, teachers, and citizens in the area of energy development and conservation. Scoring norms have not been prepared to date. These will be developed after the examination is field tested on a sufficient number of people in each of the above target groups.

We would appreciate receiving information describing scores for classes or groups and any comments you might have for improving the examination.

Jonathan Wert

July, 1975

ENERGY EDUCATION/CONSERVATION EXAMINATION*

1. Coal is the most widely used fuel in the U.S. for generating electricity.

2. R values measure the resistance of heat flow through a material.

3. At this time, the use of solar, tide, and wind power on a large scale is technically practical and economical.

4. The technology for using fuels such as coal, oil, and uranium is firmly established.

5. The basic elements of energy conservation include (1) avoiding waste, (2) slowing the growth of energy demand, and (3) improving efficiency in production and use.

6. The breeder reactor will probably be used widely in the late 1970's.

7. The light water reactors and the gas-cooled reactor will be used widely, at least until the breeder reactor becomes a commercial reality.

8. The eastern part of the U.S. has more coal with lower sulfur content than the western states.

9. Open refrigerators or freezers in supermarkets waste energy.

10. A fuel cell converts gaseous fuel directly into electricity.

11. Widespread conversion of organic refuse into fuels could supply approximately 25 percent of our total annual oil consumption.

12. Pumped-storage systems are a common means of storing large amounts of energy.

13. The concern about possible adverse changes in the heat balance of the earth, carbon dioxide content of the atmosphere, and background radiation does not justify the need for caution in developing power plants.

14. Solar radiation would be a source of free, nonpolluting energy.

15. Effective energy conservation programs will help give us the needed time to find and develop new reserves to meet our growing needs.

16. It is not technically possible to collect energy in space and transmit it to earth by microwave.

* Please do not write on the examination. An answer sheet will be provided for your reaction to each statement.

17. Up to half the total weight of organic waste is water, which has no fuel value in producing energy.

18. The most efficient method of extracting energy from tides is to use dams and sluice gates across bays or estuaries where tidal head can be used to run hydraulic turbines.

19. The first step toward reducing energy demand is to identify and eliminate areas where energy is being wasted.

20. Tidal dams have essentially the same effect on the environment as dams have on rivers.

21. The problem with using wind to supply our energy needs is that it is unpredictable and unsteady.

22. The main reason we have wasted so much energy in the past has been because the price has been low.

23. There are very few problems associated with the development of geothermal energy.

24. The largest coal reserves in the western U. S. are found in Idaho.

25. If coal from reserves in the U. S. were mined and made available, there would be enough to last us for hundreds of years at the present rate of consumption.

26. The cost of transporting coal nation-wide can often equal the cost of mining.

27. The costs of reclaiming strip-mined areas or installing pollution abatement equipment must be passed on to the consumer.

28. Oil is the cleanest-burning of the fossil fuels and is, therefore, in great demand.

29. The Federal Power Commission regulates the transportation and sale of natural gas.

30. The most significant variable affecting fuel consumption in an automobile is its weight.

31. Refuse has approximately twice the heating value as coal.

32. Radial-ply tires can allow up to 6 percent better gas mileage.

33. Scientists believe there will be a 50 percent increase in solid waste generation by 1980.

34. Glass and metals make up about 33 percent of refuse.

35. Nuclear fission is caused by the splitting of a nucleus of an atom into two approximately equal fragments whose combined mass is less than the original nucleus.

36. The fission energy from one ounce of uranium fuel pellets is equivalent to the chemical energy of 100 tons of coal.

37. Uranium 238 can be used to produce energy when transformed into plutonium through neutron bombardment.

38. When spent fuel elements are removed from a power reactor, they are no longer radioactive.

39. If a reservoir has little or no storage capacity, it has limited value for producing energy.

40. Nuclear plants are less efficient than fossil plants.

41. Siting and licensing requirements for all reactors are governed by the regulations set forth by the Federal Energy Administration (FEA).

42. A breeder reactor makes it possible to utilize up to 60 percent of the heat energy content of uranium ore while water-cooled reactors utilize approximately 1 to 2 percent.

43. The breeder reactor could greatly extend uranium reserves.

44. The potential value of fusion reactors lies in the virtually inexhaustible supply of inexpensive fuel which can be extracted from all forms of water.

45. The most favorable sites for solar power appear to be in the Southwest (not more than 35 degrees north or south of the Equator).

46. In recent years, earth temperature seems to be increasing rather than decreasing.

47. Flourescent lights are less efficient than incandescent.

48. Frost-free refrigerators and/or freezers use 50 percent more energy than manual units.

49. A house without ceiling or wall insulation will cost about twice as much to heat as one properly insulated.

50. The south side of a building gets more sun than the north side.

51. Good insulation in houses is only important in the winter.

52. The best location for the thermostat is on the coldest wall.

53. The energy used to drive a car initially came from the sun via green plants.

54. A color TV set consumes about 33 percent more energy than a black and white set.

55. An insulation material having an R value of 10 is better than one having a value of 18.

56. Fully insulating a home can cut the electric bill by about 50 percent.

57. The heat lost through the house is primarily through the ceiling.

58. Covering a window or wall air conditioner in the winter does not help conserve heat energy.

59. Operating fuel heaters in an airtight room could lead to the consumption of all the oxygen in the air and could cause suffocation.

60. Lowering the thermostat from 72° to 68° and leaving it there during winter months can result in a 20 percent reduction in your electric bill.

61. Lowering the thermostat during winter months to 65° can result in a 35 percent reduction in your electric bill.

62. It is best to use the central heating system and the fireplace at the same time.

63. With more efficient production techniques in industry, over 25 percent of energy used now could be saved.

64. An air conditioner cools and removes moisture from the air.

65. In the Tennessee Valley region, the water heater accounts for about 50 percent of the electric bill.

66. The United States has only about 6 percent of the world's population, but over 45 percent of the world's cars.

67. In the United States we now consume roughly 17 to 18 million barrels of oil a day, and at a 5 percent rate of increase, this is almost a million barrels a day additional requirement per year.

68. Tremendous quantities of low sulfur coal can be mined at a reasonable cost without the risk of underground mining.

69. Just about a 5-year lead time is required to get a nuclear plant on the line in the U. S.

70. High-compression engines develop more power and are more efficient than low-compression engines, but they have a greater tendency to knock and consequently require gasolines of higher octane number.

71. The antiknock quality of a gasoline is usually expressed in terms of octane numbers.

72. The lower the air or engine temperature, the greater the octane requirement.

73. The use of lead components is the most economical way to increase the octane numbers of gasolines.

74. Octane is the sole criterion of a quality gasoline.

75. Natural gas reserves are in rapid decline in the U. S .

76. The breeder reactor uses sodium as the reactor coolant, plutonium as the fuel, and uranium 238 as the fertile material which concurrently is converted to more plutonium as the reactor is operated.

77. A one-inch cube of uranium contains enough energy to supply a 6-room house with electricity and heat for 1,000 years.

78. The Federal Energy Administration (FEA) reviews the required environmental impact statements on nuclear power plants to determine if adequate protection of human health and the environment from radiation and other factors has been provided.

79. Most radiation comes from natural sources - in our foods, in rocks, in the earth, in the air, and in the water - in an average dose per person of 130 millirems a year.

80. The EPA regulates the amount of radiation permitted to be discharged from a nuclear reactor.

81. There has been no radioactive releases from commercial nuclear reactors that have exceeded the population exposure guides recommended by EPA.

82. Nuclear reactor vessels are enclosed in huge concrete and metal containers which, along with many automatic safety features, are designed to prevent leakage of radiation.

83. It is doubtful that higher fuel prices will act as much of a stimulus to energy conservation.

84. Serious accidents have occurred in past shipment and storage of radioactive waste.

85. Hearings are held for license application in the area where a nuclear plant is proposed and the public along with state and local authorities can attend.

86. The electric range uses less electricity than the laundry dryer, window air conditioner and dishwasher combined.

87. Studies have shown that the average bath requires 10 gallons of water whereas the average shower requires about twice that much.

88. Solar energy is the original source of fossil fuels.

89. A British Thermal Unit (BTU) is the amount of heat required to raise the temperature of a pound of water 1° Fahrenheit.

90. The Energy Research and Development Administration (ERDA) initiated Project Independence in March 1975 to evaluate the Nation's energy problems and provide a framework for developing a national energy policy.

91. Domestic energy demand has been growing at about 5 percent per year.

92. The Middle East countries possess about 80 percent of world's oil reserves.

93. The U. S. was self-sufficient in energy through about 1950, but since then has deteriorated.

94. Mercury vapor lamps are more efficient and produce more light with less energy than incandescent street lights.

95. Ceiling insulation should be at least 6 inches thick.

96. Almost 20 percent of all the energy consumed in the U. S. is used in our households.

97. A 40-watt fluorescent tube provides more light than three 60-watt incandescent bulbs.

98. Automobiles consume about 14 percent of all the energy used in the U. S.

99. The amount of material needed to do a good insulating job in your home depends on the type of material used.

100. The U. S. uses more energy per capita than any other nation in the world.

Jonathan Wert
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Knoxville, Tennessee 37916

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Answer Sheet

1.	T	F	21.	T	F	41.	T	F	61.	T	F	81.	T	F	
2.	T	F	22.	T	F	42.	T	F	62.	T	F	82.	T	F	
3.	T	F	23.	T	F	43.	T	F	63.	T	F	83.	T	F	
4.	T	F	24.	T	F	44.	T	F	64.	T	F	84.	T	F	
5.	T	F	25.	T	F	45.	T	F	65.	T	F	85.	T	F	
6.	T	F	26.	T	F	46.	T	F	66.	T	F	86.	T	F	
7.	T	F	27.	T	F	47.	T	F	67.	T	F	87.	T	F	
8.	T	F	28.	T	F	48.	T	F	68.	T	F	88.	T	F	
9.	T	F	29.	T	F	49.	T	F	69.	T	F	89.	T	F	
10.	T	F	30.	T	F	50.	T	F	70.	T	F	90.	T	F	
11.	T	F	31.	T	F	51.	T	F	71.	T	F	91.	T	F	
12.	T	F	32.	T	F	52.	T	F	72.	T	F	92.	T	F	
13.	T	F	33.	T	F	53.	T	F	73.	T	F	93.	T	F	
14.	T	F	34.	T	F	54.	T	F	74.	T	F	94.	T	F	
15.	T	F	35.	T	F	55.	T	F	75.	T	F	95.	T	F	
16.	T	F	36.	T	F	56.	T	F	76.	T	F	96.	T	F	
17.	T	F	37.	T	F	57.	T	F	77.	T	F	97.	T	F	
18.	T	F	38.	T	F	58.	T	F	78.	T	F	98.	T	F	
19.	T	F	39.	T	F	59.	T	F	79.	T	F	99.	T	F	
20.	T	F	40.	T	F	60.	T	F	80.	T	F	100.	T	F	

NAME(Optional): _____

DATE _____

Jonathan Wert
Environment Center
The University of Tennessee
South Stadium Hall
Knoxville, Tennessee 37916

ENERGY EDUCATION/CONSERVATION EXAMINATION
-INFORMATION ON EXAMINEE-

DATE: _____

NAME (Optional): _____ ___URBAN ___RURAL

ORGANIZATION: _____ SEX: ___M ___F

AGE: ___Under 30
___30-39
___40-59
___60 and over

RACE: ___White
___Black
___Other

OCCUPATION: ___Student
___Teacher
Other(Explain):
_____

HIGHEST GRADE LEVEL COMPLETED IN SCHOOL/COLLEGE:
___8 ___9 ___10 ___11 ___12 --- ___13 ___14 ___15 ___16 ___17 and above

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KEY

1.	T	21.	T	41.	F	61.	T	81.	T
2.	T	22.	T	42.	T	62.	F	82.	T
3.	F	23.	F	43.	T	63.	T	83.	F
4.	T	24.	F	44.	T	64.	T	84.	F
5.	T	25.	T	45.	T	65.	F	85.	T
6.	F	26.	T	46.	T	66.	T	86.	F
7.	T	27.	T	47.	F	67.	T	87.	F
8.	F	28.	F	48.	T	68.	T	88.	T
9.	T	29.	T	49.	T	69.	F	89.	T
10.	F	30.	T	50.	T	70.	T	90.	F
11.	F	31.	F	51.	F	71.	T	91.	T
12.	T	32.	T	52.	F	72.	F	92.	F
13.	F	33.	T	53.	T	73.	T	93.	T
14.	T	34.	F	54.	T	74.	F	94.	T
15.	T	35.	T	55.	F	75.	T	95.	T
16.	F	36.	T	56.	T	76.	T	96.	T
17.	T	37.	T	57.	T	77.	T	97.	T
18.	T	38.	F	58.	F	78.	F	98.	T
19.	T	39.	T	59.	T	79.	T	99.	T
20.	T	40.	T	60.	T	80.	F	100.	T

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