

ENERGY

1. ENERGY

Writer: American Heritage

Toss Up: Short Answer

What is the name for the science of converting the energy harnessed by solar panels into usable electricity?

Bonus Answer: photovoltaics

Bonus: Short Answer

What law states that the cost of solar panels tends to fall 20% every time cumulative shipping volume doubles?

Bonus Answer: Swanson's Law

2. ENERGY

Writer: American Heritage

Toss Up: Multiple Choice

Which of the following kinds of coal has the highest carbon content?

W) Lignite

X) Bituminous coal

Y) Anthracite

Z) Peat

Toss Up Answer: Y

Bonus: Short Answer

What is the name of the theoretical limit on the efficiency of a heat engine?

Bonus Answer: Carnot limit

3. ENERGY

Writer: American Heritage

Toss Up: Multiple Choice

What percentage of energy is lost as heat in an incandescent bulb?

W) 70%

X) 80%

Y) 85%

Z) 90%

Toss Up Answer: Z

Bonus: Short Answer

Which South American country is the largest producer of coal?

Bonus Answer: Colombia

4. ENERGY

Writer: Stuyvesant

Toss Up: Short Answer

Which compound in the atmosphere contributes the most to the greenhouse effect?

Bonus Answer: Water (accept: H₂O or dihydrogen monoxide)

Bonus: Short Answer

What is China's largest renewable energy source?

Bonus Answer: Hydropower (accept: Hydro)

5. ENERGY

Writer: Stuyvesant

Toss Up: Multiple Choice

In a conventional light bulb, what is the ratio of light energy to the heat energy produced?

W) 1:9

X) 3:2

Y) 1:1

Z) 7:3

Toss Up Answer: W

Bonus: Multiple Choice

The arctic is estimated to hold what percent of the worlds what percent of the world's undiscovered oil and natural gas reserves?

W) 7%

X) 13%

Y) 22%

Z) 35%

Bonus Answer: Y

6. ENERGY

Writer: Stuyvesant

Toss Up: Multiple Choice

Which country generates the highest percentage of its energy from nuclear power?

W) Britain

X) China

Y) France

Z) Denmark

Toss Up Answer: Y

Bonus: Short Answer

By name or number, list the operating temperatures from lowest to highest of these types of fuel cells:

1. MCFC

2. PAFC

3. PEMFC

4. SOFC

Bonus Answer: 3,2,1,4

7. ENERGY

Writer: Centennial

Toss Up: Multiple Choice

Which of the following compounds is not usually a major component of fly ash?

W) Silicon dioxide

X) Aluminum oxide

Y) Magnesium oxide

Z) Calcium oxide

Toss Up Answer: Y

Bonus: Short Answer

What is the name for the ash that, unlike fly ash, does not escape up the chimney?

Bonus Answer: Bottom ash

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8. ENERGY

Writer: Centennial

Toss Up: Multiple Choice

Which of the following is closest to the capacity of the largest offshore wind farm?

W) 60 MW

X) 600 MW

Y) 6000 MW

Z) 60000 MW

Toss Up Answer: X

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Bonus: Short Answer

In which country is the largest offshore wind farm?

Bonus Answer: The United Kingdom

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9. ENERGY

Writer: Centennial

Toss Up: Short Answer

What is the name of the theoretical maximum proportion of energy that can be extracted from an airflow?

Bonus Answer: Betz's law or the Betz limit

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Bonus: Short Answer

What is the exact value of the Betz limit?

Bonus Answer: 16/27

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10. ENERGY

Writer: Granada Hills

Toss Up: Short Answer

In what city was the protocol that phased out the use of chlorofluorocarbons signed?

Bonus Answer: Montreal (Do not accept Vienna)

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Bonus: Multiple Choice

At what national laboratory was a Shelby Cobra 3D printed in 2015?

W) Oak Ridge National Laboratory

X) Argonne National Laboratory

Y) Lawrence Berkeley National Laboratory

Z) Lawrence Livermore National Laboratory

Bonus Answer: W

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11. ENERGY

Writer: Granada Hills

Toss Up: Multiple Choice

What type of geothermal power plant relies on highly pressurized water to generate electricity?

- W) Dry Steam
- X) Binary Cycle
- Y) Subsurface reservoir
- Z) Flash Steam

Toss Up Answer: Z

Bonus: Short Answer

What nuclear power plant was formerly located on the Pacific Coast of California in San Diego County and was closed in 2013?

Bonus Answer: San Onofre

12. ENERGY

Writer: Lakeside

Toss Up: Multiple Choice

About how many nuclear power plants are currently in the US?

- W) 57
- X) 104
- Y) 233
- Z) 312

Toss Up Answer: X

Bonus: Multiple Choice

What developed country was the first to follow through on the agreements to destroy nuclear weapon stockpiles and cease production of nuclear weapons?

- W) France
- X) USA
- Y) Hungary
- Z) South Africa

Bonus Answer: Z

13. ENERGY

Writer: Lakeside

Toss Up: Multiple Choice

Which US state consumes the most coal annually?

- W) California
- X) Wyoming
- Y) Texas
- Z) New York

Toss Up Answer: Y

Bonus: Short Answer

What byproduct of coal combustion is used as filler for tennis rackets, golf balls, and linoleum?

Bonus Answer: COAL ASH

14. ENERGY

Writer: Lakeside

Toss Up: Multiple Choice

About how much solar power does the Earth receive in its upper atmosphere?

- W) 569 Gigawatts
- X) 174 Petawatts
- Y) 298 Exawatts
- Z) 40 Zetawatts

Toss Up Answer: X

Bonus: Multiple Choice

In which US state is the world's largest solar power plant found?

- W) California
- X) Arizona
- Y) Texas
- Z) North Carolina

Bonus Answer: W

15. ENERGY

Writer: Oxford

Toss Up: Multiple Choice

To the nearest thousand megawatts, how much geothermal energy does the US have installed?

- W) 1000
- X) 2000
- Y) 3000
- Z) 4000

Toss Up Answer: Y

Bonus: Multiple Choice

Which country produces the second most geothermal electricity?

- W) The US
- X) The Phillipeans
- Y) China
- Z) Russia

Bonus Answer: X

16. ENERGY

Writer: Oxford

Toss Up: Short Answer

Which DOE national lab conducted the Manhattan project?

Bonus Answer: Oak Ridge (Accept: Oak Ridge National Lab)

Bonus: Short Answer

During the Manhattan project, which two atomic bombs were created?

Bonus Answer: Thin man and Fat man

17. ENERGY

Writer: Oxford

Toss Up: Short Answer

Which branch of the National Energy Technology Laboratory was started the earliest?

Bonus Answer: Pittsburgh

Bonus: Multiple Choice

Which DOE national lab was started the earliest?

- W) Lawrence Berkley National Lab
- X) Thomas Jefferson National Accelerator Facility
- Y) Fermi National Lab
- Z) SLAC National Lab

Bonus Answer: W

18. ENERGY

Writer: Venice

Toss Up: Multiple Choice

About how efficient is a gas turbine engine?

- W) 30%
- X) 40%
- Y) 50%
- Z) 60%

Toss Up Answer: X

Bonus: Short Answer

What two types of nuclear reactors employ water as both coolants and moderators?

Bonus Answer: BOILING WATER REACTOR AND PRESSURIZED WATER REACTOR

19. ENERGY

Writer: Venice

Toss Up: Multiple Choice

Which of the following is the biggest obstacle in nuclear fission?

- W) Rare materials
- X) Safety
- Y) Waste disposal
- Z) Coulomb force

Toss Up Answer: Z

Bonus: Short Answer

What semiconductor is commonly used for amplifying high frequency signals?

Bonus Answer: GALLIUM ARSENIDE

20. ENERGY

Writer: Venice

Toss Up: Multiple Choice

Which of the following is NOT a danger for a battery?

- W) Suddenly stopping a current
- X) High ambient temperature
- Y) Excessive current during charging or discharging
- Z) Pressure buildup within the cell

Toss Up Answer: W

Bonus: Short Answer

In terms of crystal structure, what type of silicon cells has the highest efficiency of converting solar energy?

Bonus Answer: POLYCRYSTALLINE CELLS
