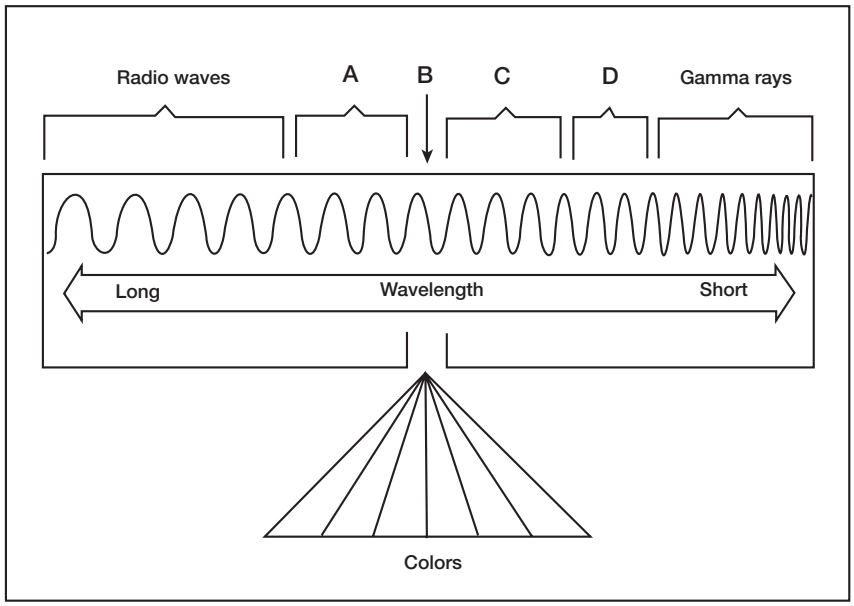
Name _____ Date_____ Class _____

BENCHMARK TEST: PHYSICAL SCIENCE

Multiple Choice

Directions: *Use the diagram below to answer question 1.*

Electromagnetic Spectrum



1. In the diagram above, the entire range of waves from radio waves to gamma radiation is

A visible light.
B ultraviolet radiation.
C a single wavelength.
D the electromagnetic spectrum.

2. Which of the following produces regular reflection?

A a smooth pane of glass
B a piece of white paper
C a piece of red colored paper
D a fog when you shine a flashlight into it

3. Which of these is true about electromagnetic waves from the sun?

A They travel through space without a medium.
B They consist of electric charge emitted by the sun.
C They are attracted to Earth's north and south magnetic poles.
D They consist entirely of infrared rays.

4. What happens when light passes from air into water?

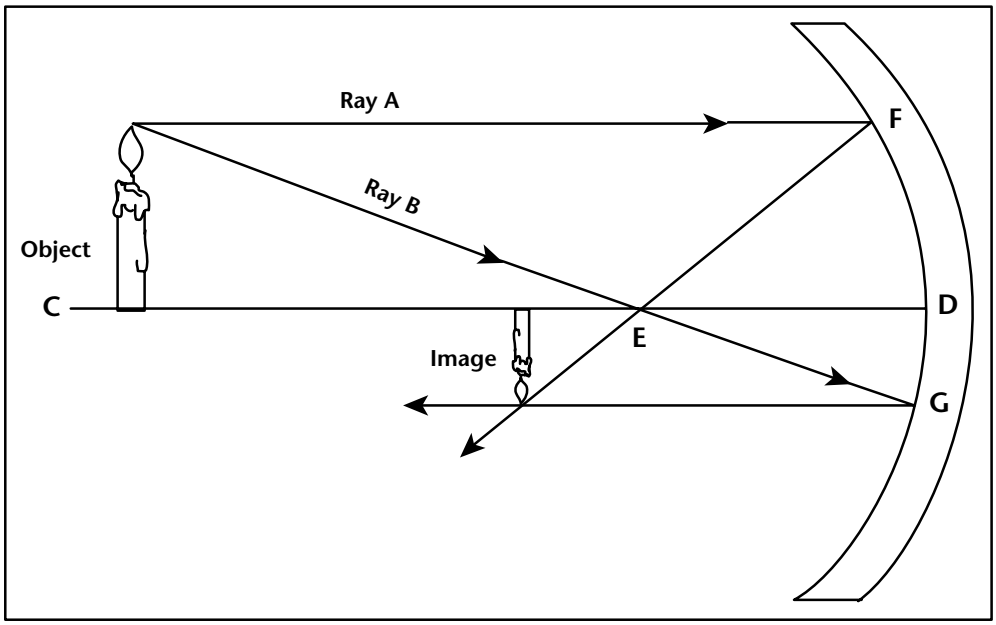
A The light speeds up.
B The light continues at the same speed.
C The light slows down.
D The light forms a mirage.

GO ON

BENCHMARK TEST *(continued)*

Directions: *Use the diagram below to answer question 5.*

Mirror



5. Which type of mirror is illustrated in the diagram?

A virtual
B convex
C concave
D polarized

6. Which of the following is caused by an effect that is similar to light passing through a prism?

A lightning
B moonlight
C a rainbow
D the aurora borealis

7. Which kind of wave has the highest frequency?

A x-rays
B radio
C infrared
D visible light

8. Which of the following is true of every energy transformation?

A Energy is destroyed.
B Matter is formed.
C Energy is created.
D Energy is conserved.

9. Which of the following is a measure of the average kinetic energy of the molecules of a substance?

A mass
B momentum
C temperature
D weight

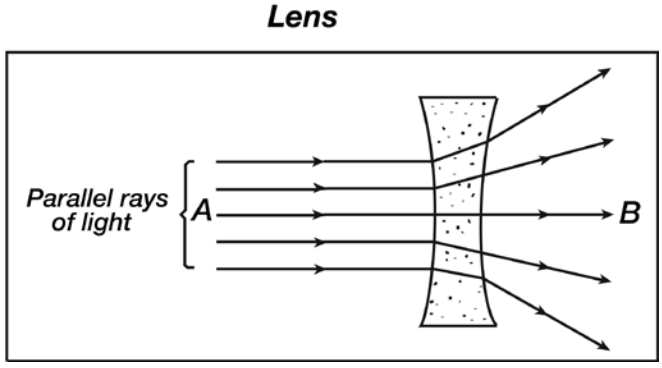
10. The three types of heat transfer are radiation, conduction, and

A subduction.
B rarefaction.
C compression.
D convection.

GO ON

BENCHMARK TEST *(continued)*

Directions: *Use the diagram below to answer question 11.*



11. What kind of image is formed by the lens shown in the diagram?

A real
B virtual
C upside down
D magnified

12. Which of the following statements belongs in a written report that explains how heat is transferred through empty space?

A The freezing point of water is 0°C.
B Convection currents can transfer heated air.
C Radiation is the transfer of thermal energy by electromagnetic waves.
D The Fahrenheit scale is the most common temperature scale in the United States.

13. How is an object's mechanical energy calculated?

A by multiplying an object's mass by its velocity
B by dividing the net force on an object by its mass
C by finding an object's change in speed per unit time
D by adding an object's kinetic energy and potential energy

14. Which of the following correctly shows the temperature at absolute zero?

A –273 K
B 0°C
C 0 K
D 273°C

GO ON

BENCHMARK TEST *(continued)*

15. Why does a sheet of sandpaper become warm when you rub it against a wooden board?

A Heat in the air is transferred to the sandpaper.
B Matter in the sandpaper is converted to heat.
C The chemical energy in the wood is converted to thermal energy.
D The mechanical energy of the moving sandpaper is converted to thermal energy.

16. A form of energy is stored in the bonds between atoms. What is the name for this stored energy?

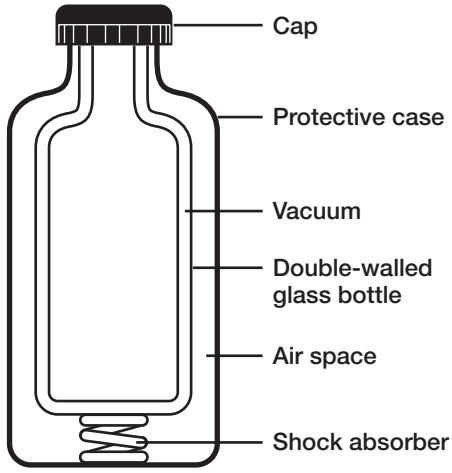
A kinetic energy
B chemical energy
C electrical energy
D electromagnetic energy

17. What happens if heat flows into matter when no change of state is involved?

A Both thermal energy and temperature increase.
B Both thermal energy and temperature decrease.
C Thermal energy decreases, and temperature increases.
D Thermal energy increases, and temperature decreases.

Directions: *Use the diagram below to answer question 18.*

Thermos Bottle



18. This bottle is designed to keep thermal energy from flowing in or out. Why does the bottle contain a vacuum, or space from which the air has been removed?

A to prevent the loss of thermal energy by radiation
B to prevent the loss of thermal energy by convection
C to prevent the loss of thermal energy by refraction
D to prevent the loss of thermal energy by reflection

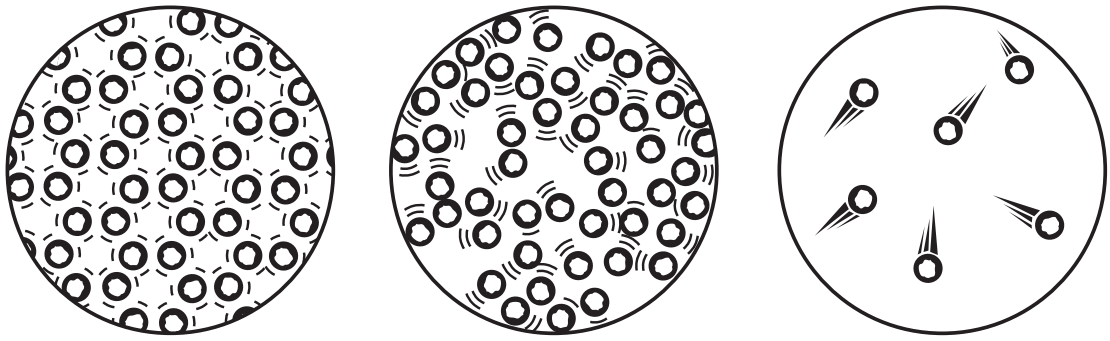
GO ON

Name _____ Date_____ Class _____

BENCHMARK TEST *(continued)*

Directions: *Use the diagram below to answer question 19.*

States of a Substance



State A State B State C

19. The diagram compares the particles in three different states of matter. What process causes particles in State A to change to State B?

A condensation
B evaporation
C freezing
D melting

20. The first person to fly faster than the speed of sound attempted it at a high altitude. How would that have helped?

A The temperature at high altitudes is lower, so sound travels faster.
B The temperature at high altitudes is lower, so sound travels more slowly.
C The temperature at high altitudes is higher, so sound travels faster.
D The temperature at high altitudes is higher, so sound travels more slowly.

21. By which process do you feel the warmth of the sun's rays on your face?

A conduction
B convection
C radiation
D refraction

22. Which state of matter has a definite volume but not a definite shape?

A solid
B liquid
C gas
D none of the above

23. If you place a pencil halfway into a glass of water, the pencil will appear bent. Why does this occur?

A The density of the water causes the pencil to bend.
B Some light is reflected as it enters the water from the air.
C Light bends as it passes between air and water.
D Light passes through the glass in a straight line.

GO ON

BENCHMARK TEST *(continued)*

Directions: *Use the table below to answer question 24.*

Speed of Sound in Different Media	
Medium	**Speed (m/s)**
Air (0°C)	330
Air (20°C)	342
Lead (25°C)	1,210
Plastic (25°C)	1,800
Silver (25°C)	2,680
Copper (25°C)	3,100
Gold (25°C)	3,240
Glass (25°C)	4,500
Steel (25°C)	5,200

24. In which medium listed in the table does sound travel the slowest?

A air
B silver
C steel
D plastic

25. Which of the following is a form of electrical energy?

A sunlight
B a burning candle
C a falling apple
D lightning

26. Some of the energy put into tossing a basketball is lost from the ball while it is moving through the air. What force causes this energy loss?

A friction
B heat
C inertia
D momentum

27. What is the electromagnetic spectrum?

A the complete range of electromagnetic waves in order of wavelength
B the visible color pattern of light from a prism
C the kinds of organisms living in a region
D a rainbow

28. When a wave hits a surface through which it cannot pass, it bounces back. This interaction with the surface is called

A interference.
B diffraction.
C reflection.
D refraction.

29. Whenever one form of energy is converted into mechanical energy, some energy is also transformed into

A thermal energy.
B electrical energy.
C light.
D magnetism.

BENCHMARK TEST *(continued)*

30. What energy transformation occurs during the combustion of coal in a power plant?

A Electromagnetic energy is transformed to thermal energy.
B Nuclear energy is transformed to electromagnetic energy.
C Chemical energy is transformed to thermal energy.
D Chemical energy is transformed to nuclear energy.

31. The boiling point of water is 100 Celsius degrees higher than its melting point. How large is this difference in temperature on the Kelvin temperature scale?

A 32 kelvins
B 100 kelvins
C 180 kelvins
D 212 kelvins

32. What determines the color of a visible light wave?

A its amplitude
B its wavelength
C its pitch
D its intensity

33. When two objects at different temperatures are in contact, heat

A flows from the hotter to the cooler object.
B flows from the cooler to the hotter object.
C does not flow if the temperatures are unequal.
D flows from the object with more thermal energy to the one with less.

34. When energy transforms from one form to another,

A friction creates energy.
B no energy is lost.
C energy is lost unless the machine is 100% efficient.
D work is transformed into power.

BENCHMARK TEST *(continued)*

Short Response

Write an answer for each of the following.

35. How does the speed of sound change for mediums of different densities, compressibilities, and temperatures? _____

_____

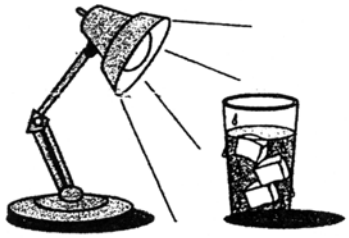
_____

36. Compare and contrast a real image and a virtual image. _____

_____

_____

Directions: *Use the diagram below to answer questions 37 and 38.*



37. Suppose a ray of light strikes a block of clear ice at an angle of 40°. A similar ray strikes a block of glass at the same angle. If the light ray is bent less in ice, which material has the greater index of refraction? Explain. _____

_____

_____

38. Predict what will happen to the water and ice cubes. Justify your prediction in terms of heat flow. _____

_____

_____

39. Compare and contrast nuclear energy and thermal energy. _____

_____

_____

Name _____ Date_____ Class _____

BENCHMARK TEST REPORT: PHYSICAL SCIENCE pages 140-147

Florida Standards	Test Items	Number Correct	Proficient? Yes or No	Chapter Number	
				Comp. Science	Earth & Space, Physical, Life
BIG IDEA 10: Forms of Energy **A.** Energy is involved in all physical processes and is a unifying concept in many areas of science. **B.** Energy exists in many forms and has the ability to do work or cause a change.					
SC.7.P.10.1: Illustrate that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.	1, 3, 7, 27, 32			CS2.9	PS9
SC.7.P.10.2: Observe and explain that light can be reflected, refracted, and/or absorbed.	2, 5, 6, 11, 23, 28, 36, 37			CS2.9	PS9
SC.7.P.10.3: Recognize that light waves, sound waves, and other waves move at different speeds in different materials.	4, 20, 24, 35			CS2.9	PS9
BIG IDEA 11: Energy Transfer and Transformations **A.** Waves involve a transfer of energy without a transfer of matter. **B.** Water and sound waves transfer energy through a material. **C.** Light waves can travel through a vacuum and through matter. **D.** The Law of Conservation of Energy: Energy is conserved as it transfers from one object to another and from one form to another.					
SC.7.P.11.1: Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.	9, 17, 19, 22, 31, 38			CS2.10	PS10
SC.7.P.11.2: Investigate and describe the transformation of energy from one form to another.	13, 15, 16, 25, 30, 39			CS2.10	PS10
SC.7.P.11.3: Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.	8, 26, 29, 34			CS2.10	PS10
SC.7.P.11.4: Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature..	10, 12, 14, 18, 21, 33, 38			CS2.10	PS10

Comments: