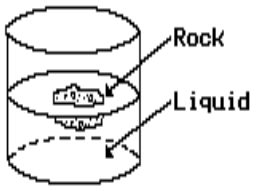
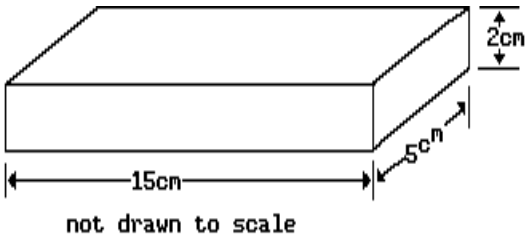
Name: _____

1) The diagram below shows a glass jar containing a clear liquid and a floating rock. Which conclusion about the relative density of the rock and the liquid is true?



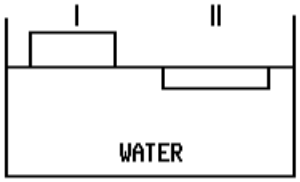
A) The rock and the liquid have the same density.
B) The rock is less dense than the liquid.
C) The rock is more dense than the liquid.

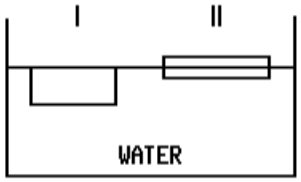
2) The diagram below represents a rectangular object with a mass of 450 grams. According to the *Earth Science Reference Tables*, what is the density of the object?

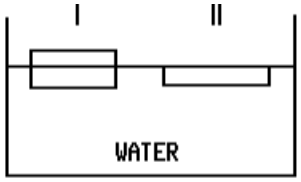


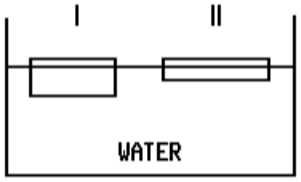
A) 2 grams per cubic centimeter
B) 4 grams per cubic centimeter
C) 1 gram per cubic centimeter
D) 3 grams per cubic centimeter

3) The diagrams below represent two differently shaped blocks of ice floating in water. Which diagram most accurately shows the blocks of ice as they would actually float in water?

A)


B)


C)


D)


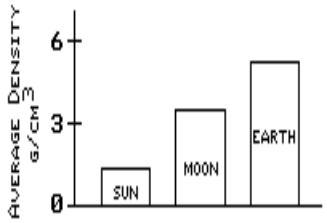
4) As water cools from 4° C to 0° C, its density

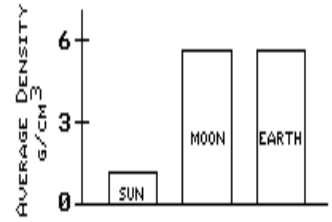
A) increases
B) decreases
C) remains the same

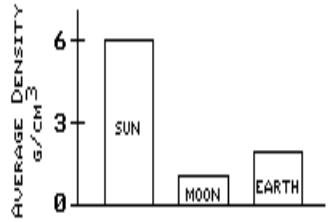
5) What is the density of a rock which has a mass of 35 grams and a volume of 7.0 cubic centimeters?

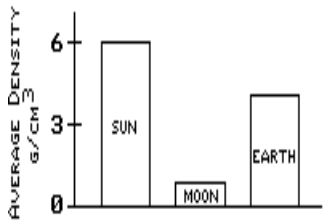
A) 42 g/cm^3
B) 0.20 g/cm^3
C) 28 g/cm^3
D) 5.0 g/cm^3

6) According to the *Earth Science Reference Tables*, which graph best represents the average densities of the Sun, Moon, and Earth?

A)


B)


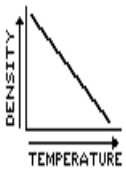
C)


D)


7) An empty 250-milliliter beaker has a mass of 60 grams. When 100 milliliters of oil is added to the beaker, the total mass is 140 grams. The density of the oil is approximately

A) 1.7 g/ml
B) 1.4 g/ml
C) 0.8 g/ml
D) 0.6 g/ml

8) A mineral expands when heated. Which graph best represents the relationship between change in density and change in temperature when that mineral is heated?

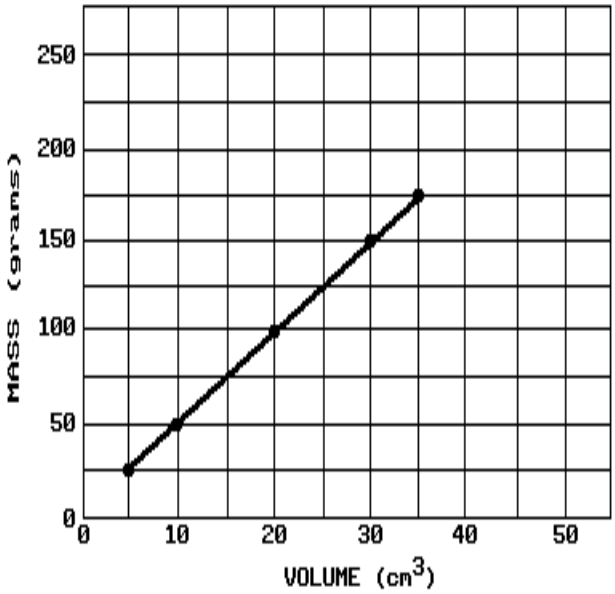
A)


C)


B)


D)


Questions 9 through 12 refer to the following:



The graph above shows the mass and volume for five different samples of the mineral pyrite.

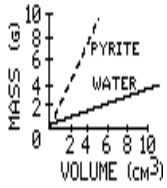
9) According to the graph above, the density of pyrite is about

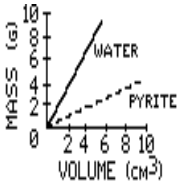
A) 0.5 g/cm^3
B) 7.5 g/cm^3
C) 2.5 g/cm^3
D) 5.0 g/cm^3

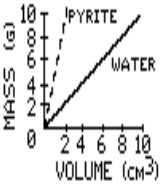
10) If one of the original samples of pyrite were cut in half, the density of each half would be

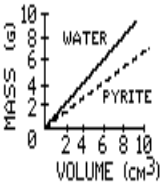
A) less than the original sample
B) the same as the original sample
C) greater than the original sample

11) The density of pyrite and the density of water were plotted on the same graph. Which diagram below best represents how the graph should appear?

A)


C)


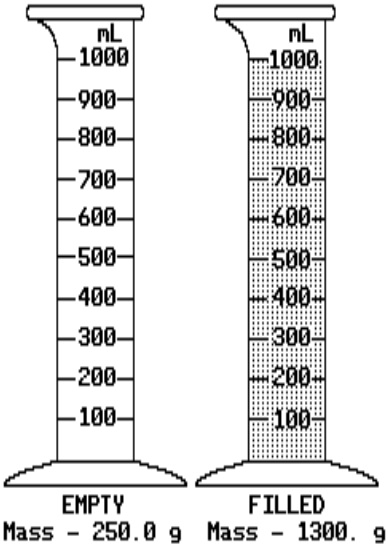
B)


D)


12) If a sample of pyrite has a volume of 50 cm^3, its mass would be

A) 350 g
B) 15 g
C) 150 g
D) 250 g

13) As shown below, an empty 1,000.-milliliter container has a mass of 250.0 grams. When filled with a liquid, the container and the liquid have a combined mass of 1,300. grams.

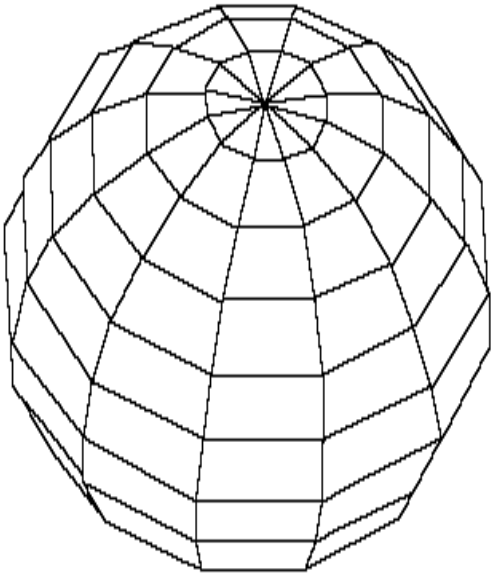


What is the density of the liquid?

A) 0.95 g/mL
B) 1.05 g/mL
C) 1.00 g/mL
D) 1.30 g/mL

Questions 14 through 16 refer to the following:

The diagram below represents a three-dimensional solid object of uniform material.



MASS = 80.0 grams

VOLUME = 25 cm^3

14) The mass of the object could best be determined by

A) counting the number of flat surfaces it contains
B) comparing it with a known standard mass
C) calculating its circumference
D) placing it in a beaker of water

15) If the object is cut in half, the density of each piece will be

A) greater than that of the original object
B) the same as that of the original object
C) less than that of the original object

16) What is the density of the object?

A) 3.2 g/cm^3
B) 5.5 g/cm^3
C) 0.3 g/cm^3
D) 1.3 g/cm^3

17) A student calculates the densities of five different pieces of aluminum, each having a different volume. Which graph best represents this relationship?

A)


C)

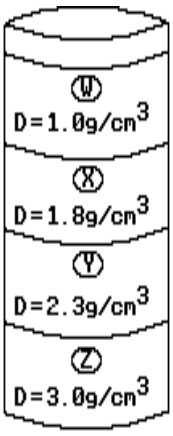

B)


D)


18) In which phase (state) do most Earth materials have their *greatest* density?

A) gaseous
B) solid
C) liquid

19) The diagram below represents a cylinder which contains four different liquids, *W*, *X*, *Y*, and *Z*, each with a different density (*D*) as indicated. A piece of solid quartz having a density of 2.7 g/cm^3 is placed on the surface of liquid *W*. When the quartz is released, it will pass through

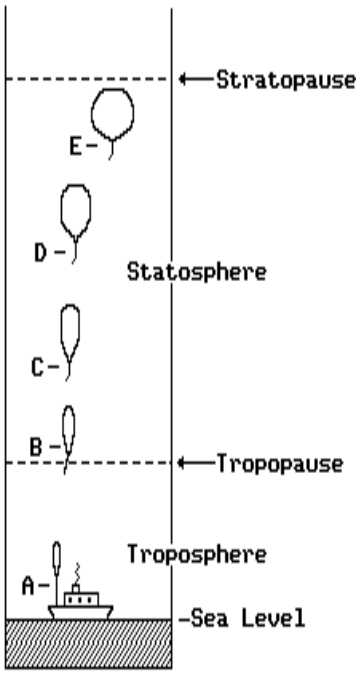


A) *W* and *X*, but not *Y* or *Z*
B) *W*, *X*, *Y*, and *Z*
C) *W*, but not *X*, *Y*, or *Z*
D) *W*, *X*, and *Y*, but not *Z*

20) As a volume of air expands due to heating, the density of this air will

A) remain the same
B) increase
C) decrease

21) The drawing below represents five positions of a balloon after being released from a ship. The drawings of the balloon are not to scale compared to the altitude distances, but are to scale with each other.

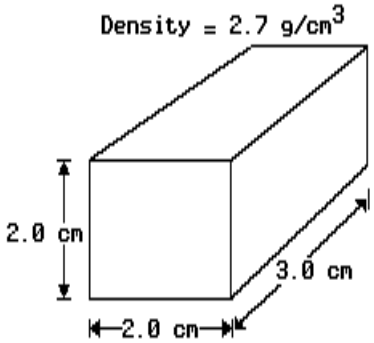


In order to make the balloon rise, the density of the gas put inside the balloon must be

A) less than the density of the air at sea level
B) more than the density of the air at sea level
C) the same as the density of the air at sea level

Questions 22 through 25 refer to the following:

The diagram below represents a solid material of uniform composition.



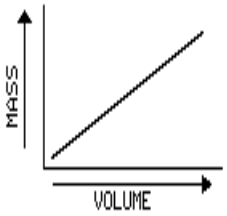
22) When this material is placed in a container of water, it sinks to the bottom of the container. Compared to the density of water, the density of the material is

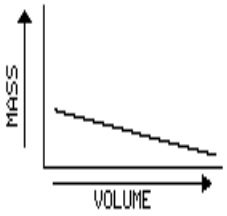
A) less
B) the same
C) greater

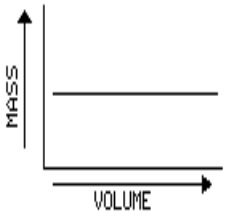
23) If this material is heated and expands, the density of the material will

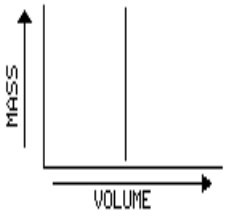
A) decrease
B) increase
C) remain the same

24) Which graph best represents the relationship between the mass and volume of various-sized pieces of this material?

A)


B)


C)


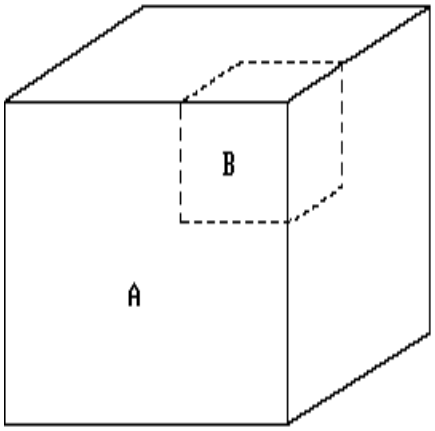
D)


25) The mass of this piece of material is approximately

A) 0.23 g
B) 4.4 g
C) 9.3 g
D) 32 g

Questions 26 through 30 refer to the following:

Object *A* below is a solid cube of uniform material having a mass of 65 grams and a volume of 25 cubic centimeters. Cube *B* is a part of cube *A*.



26) The mass of cube *B* is measured in order to calculate its density. The cube has water on it while its mass is being measured. How would the calculated value for density compare with actual density?

A) The calculated density value would be greater than the actual density.
B) The calculated density value would be the same as the actual density.
C) The calculated density value would be less than the actual density.

27) The density of cube *A* is

A) 2.6 g/cm^3
B) 0.38 g/cm^3
C) 3.8 g/cm^3
D) 0.26 g/cm^3

28) The density of the material in cube *A* is determined at different temperatures and phases of matter. At which temperature and in which phase of matter would the density of cube *A* most likely be *greatest*? [Assume a standard atmospheric pressure.]

A) at 200° C and in the solid phase
B) at 1800° C and in the liquid phase
C) at 20° C and in the solid phase
D) at 2700° C and in the gaseous phase

29) If cube *B* is removed from cube *A*, the density of the remaining part of cube *A* will

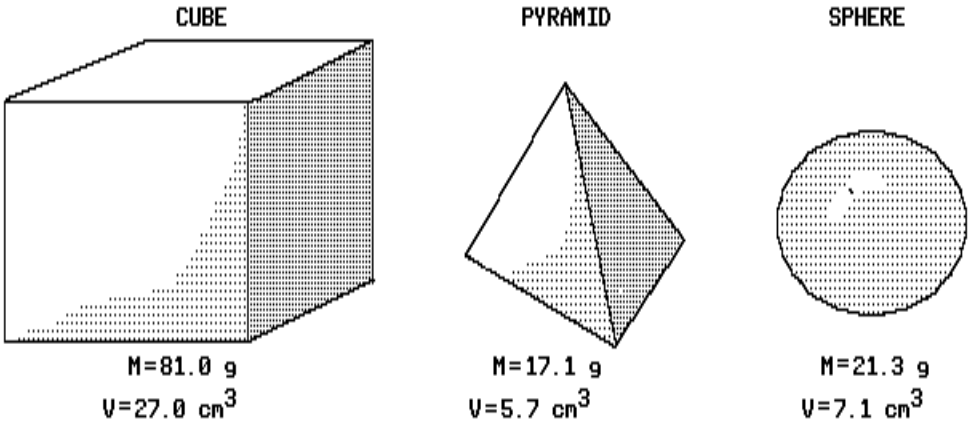
A) increase
B) remain the same
C) decrease

30) If pressure is applied to cube *A* until its volume is one-half of its original volume, its new density will be

A) one-half its original density
B) twice its original density
C) the same as its original density
D) one-third its original density

Questions 31 through 34 refer to the following:

The diagrams below represent three solid objects made of the same uniform material. The name of each shape is shown, along with its mass (*M*) and volume (*V*).



31) If the cube were cut into four smaller cubes, the density of one of the small cubes, compared to that of the original cube, would be

A) one-fourth as great
B) the same
C) four times as great
D) one-sixteenth as great

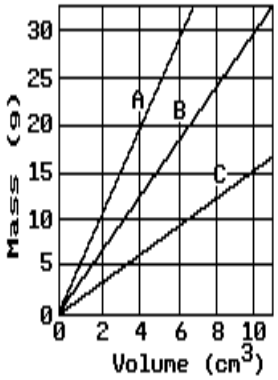
32) What is the actual length of any one side of the cube?

A) 2.0 cm
B) 1.0 cm
C) 8.0 cm
D) 3.0 cm

33) If the sphere is heated to a temperature below its melting point, which is most likely to occur?

A) Both the volume and density of the sphere will increase.
B) The volume of the sphere will increase, but it's density will decrease.
C) The volume of the sphere will decrease, but it's density will increase.
D) Both the volume and density of the sphere will decrease.

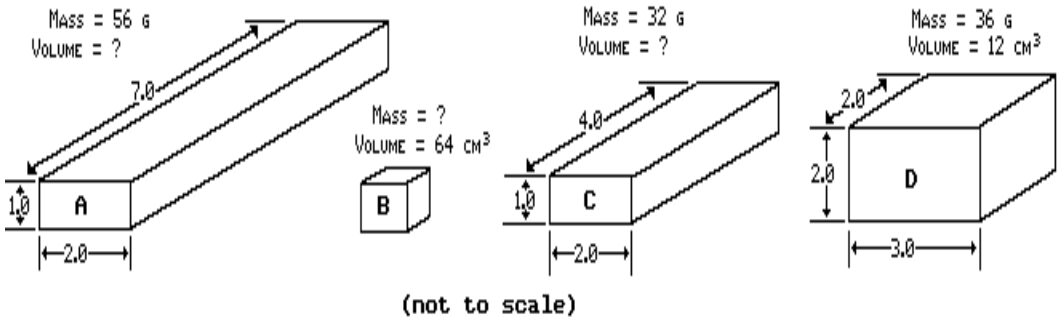
34) Which line on the graph below best represents the density of the three samples?



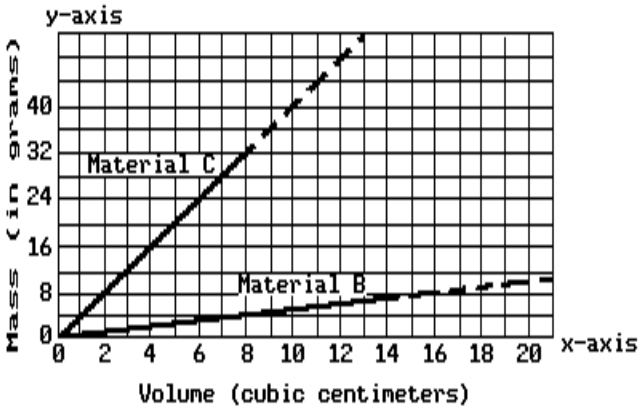
A) *A*
B) *C*
C) *B*

Questions 35 through 39 refer to the following:

The diagrams below represent four solid materials, *A*, *B*, *C*, and *D*. Some of their physical properties are shown. The dimensions of the materials are recorded in centimeters. The graph indicates the relationship between the mass and volume of materials *B* and *C*.



(not to scale)



35) If the density for material *D* were plotted on the graph, where would this line be located?

A) between the lines for materials *B* and *C*
B) on the same line as material *C*
C) between the line for material *C* and the y-axis
D) between the line for material *B* and the x-axis

36) What is the density of sample *A*?

A) 0.25 g/cm^3
B) 4.0 g/cm^3
C) 56 g/cm^3
D) 14 g/cm^3

37) If sample *B* is a perfect cube, what is the length of any one side?

A) 4.0 cm
B) 21 cm
C) 2.0 cm
D) 32 cm

38) If sample *C* were cut in half, the slope of the line for material *C* on the graph would

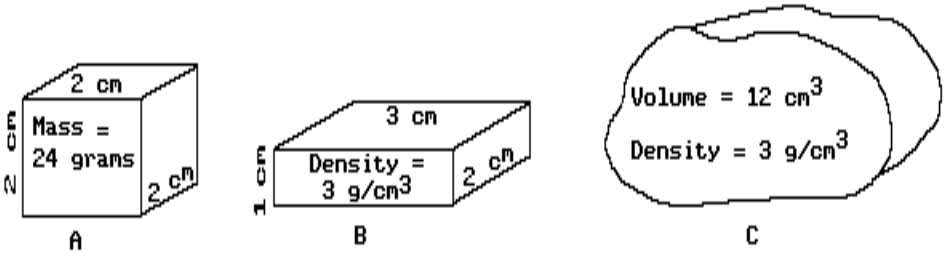
A) increase
B) remain the same
C) decrease

39) What is the mass of another sample of material *C* whose volume is 5 cubic centimeters?

A) 4.0 g
B) 8.0 g
C) 20. g
D) 32 g

Questions 40 through 44 refer to the following:

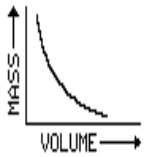
The diagrams below represent three samples of the same substance, each having a different size and shape. [The diagrams are not drawn to scale.]

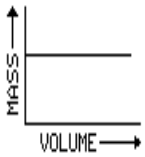


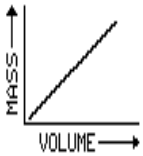
40) If sample *B* were split in half, what would be the density of each piece?

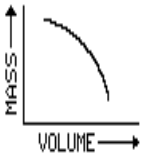
A) 3.0 g/cm^3
B) 1.0 g/cm^3
C) 1.5 g/cm^3
D) 6.0 g/cm^3

41) Which graph best represents the relationship between the mass and volume of the substance?

A) 

C) 

B) 

D) 

42) If sample *C* were compressed, which would probably occur?

A) The volume would decrease and the density would decrease.
B) The volume would decrease and the density would increase.
C) The volume would increase and the density would decrease.
D) The volume would increase and the density would increase.

43) What is the density of sample *A*?

A) 2.0 g/cm^3
B) 4.0 g/cm^3
C) 3.0 g/cm^3
D) 0.33 g/cm^3

44) Which order of letters ranks the samples by volume from largest to smallest?

A) *C*, *B*, *A*
B) *A*, *B*, *C*
C) *A*, *C*, *B*
D) *C*, *A*, *B*

Questions 45 through 49 refer to the following:

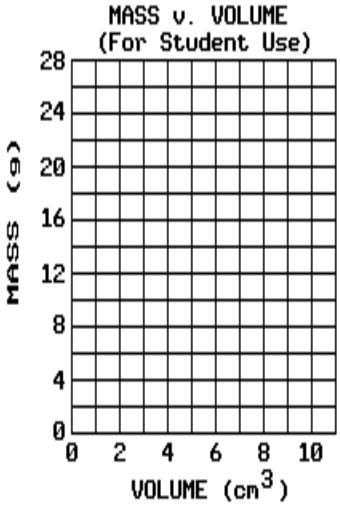
Tables *I* and *II* below show the volume and mass of three samples of mineral *A* and three samples of mineral *B*.

Table I: Mineral A

Sample No.	Volume	Mass
1	2.0 cm^3	5.0 g
2	5.0 cm^3	12.5 g
3	10.0 cm^3	25.0 g

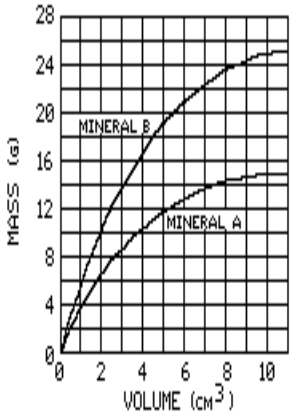
Table II: Mineral B

Sample No.	Volume	Mass
1	3.0 cm^3	12.0 g
2	5.0 cm^3	20.0 g
3	7.0 cm^3	28.0 g

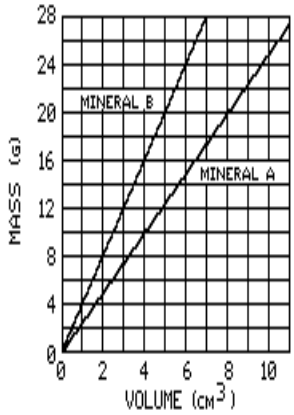


45) Which graph best represents the densities for all samples of mineral *A* and mineral *B*?

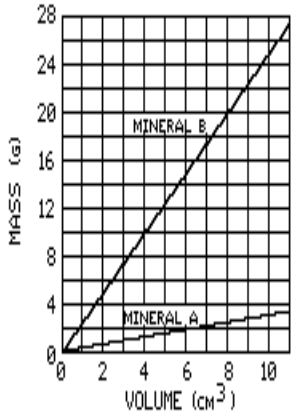
A)



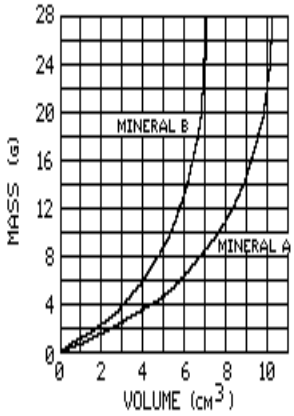
B)



C)



D)



46) One sample of mineral *B* is heated until it melts. Compared to the density of the original sample, the density of the melted sample most likely will be

A) greater
B) the same
C) less

47) Sample 2 of mineral *A* and sample 2 of mineral *B* have the same

A) volume
B) mass
C) color
D) density

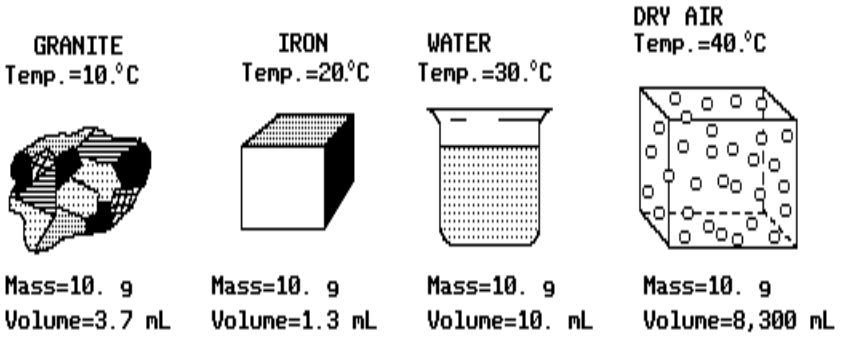
48) Comparing the samples of mineral *B* in Table *II* shows that the sample with the

A) smallest volume has the greatest density
B) largest volume has the least mass
C) largest volume has the greatest density
D) smallest volume has the least mass

49) What is the density of sample 3 of mineral *A*?

A) 4.0 g/cm^3
B) 2.5 g/cm^3
C) 10.0 g/cm^3
D) 25.0 g/cm^3

50) The diagram below shows equal masses of four different earth materials at different temperatures.



Which material has the *greatest* density?

A) granite B) iron C) dry air D) water