1. Two objects A and B were placed in two vials with different liquids C and D in them. This diagram shows what happened to each object when placed in the vial.

Which of the following choices has the objects and liquids in increasing density?

1) D, C, A, B
2) D, C, B, A
3) D, A, C, B
4) not enough information

2. Why is it easier for a person to float in a salt water of the ocean than in a fresh water lake?

1) salt water is less dense than fresh water
2) Salt water is denser than fresh water
3) salt water has more bubbles
4) salt water is lighter than fresh water

3. A rock is determined to have a volume of 50 cubic centimeters and a mass of .10 kilograms. What is the density of the rock?

1) .002 g/cc
2) 2.0 g/cc
3) 500 g/cc
4) 5 g/cc

4. The diagram below show an enlarged view of the beams of a triple-beam balance.

What is the correct reading of the triple-beam balance?

1) 455.2 g
2) 545.2 g
3) 5,452 g
4) 50,052 g

5. 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?

1) 1
2) 2
3) 3
4) 4
6. The material in sample A and B will expand when heated. Which graph best represents the relationship between the volume and the density of the material when it is heated?

1) 2) 3) 4)

7. Because sample A and sample B are of the same uniform material, what conclusion could be made about their densities?

1) The densities of A and B are equal despite their different sizes and shapes.

2) The density of A is greater than B because of A’s larger volume.

3) The density of B is greater than A because B has been weathered.

4) The density of A is greater than B because of A’s larger mass.
8. What will occur when the sphere is heated and expands?

1) Its mass will increase and its volume will remain the same.
2) Its mass will remain the same and its volume will increase.
3) Its mass will remain the same and its volume will decrease.
4) Its mass will decrease and its volume will remain the same.

9. Which graph best represents the relative densities of the objects?
10. What is the density of the bar?

1) 9 g/cm³
2) 30 g/cm³
3) 3 g/cm³
4) 90 g/cm³
Base your answers to questions 11 and 12 on the diagrams below which represent five substances, A through E, at the same temperature. Some mass, volume, and density values are indicated for each substance. Substance C is a liquid in a graduated cylinder. [Note that 1 cubic centimeter = 1 milliliter. Objects are not drawn to scale.]

___11. Which two substances could be made of the same material?

1)  A and B  
2)  B and E  
3)  C and D  
4)  A and E  

___12. What is the volume of liquid C?

1)  25.0 mL  
2)  50.0 mL  
3)  75.0 mL  
4)  125.0 mL
13. A student used the ruler shown above to measure the side of a square block. She recorded the length as 4.325 cm. What is wrong with her answer?

1) She placed the decimal in the wrong place.
2) She should have measured all sides of the block.
3) Her ruler did not allow measurement as precise as 4.325 cm.
4) She should have squared the answer to determine the correct length.

14. The diagram below represents a solid object with a density of 3 grams per cubic centimeter. What is the mass of this object?

1) 0.5 g
2) 2 g
3) 18 g
4) 36 g

15. The property of water which is expressed as 1 gram per cubic centimeter is known as

1) solubility
2) density
3) conductivity
4) vapor pressure

16. A quantity of water is frozen solid and then heated from 0°C to 10°C. Which statement best describes the properties of the water during this time?

1) Mass changes but volume remained constant.
2) Volume changes but density remained constant.
3) Volume and density changed.
4) Mass and volume changed.

17. The device below is used for directly measuring which of the following?

1) length
2) time
3) volume
4) mass
18. Any substance that has mass and takes up space is called

1) energy.
2) work
3) matter.
4) force

19. What is the volume of a solid having a mass of 12 g and a density of 3 g/cm³?

1) 6 cm³
2) 36 cm³
3) 3 cm³
4) 4 cm³

20. A 1 kilogram sample of water has a volume of

1) 1 milliliter
2) 5 milliliters
3) 0.5 liters
4) 1 liter

21. Which is the density of an object with a volume of 5 cubic centimeters and a mass of 25 grams?

1) 125 g/cm³
2) 5 g/cm³
3) 5 g
4) 25 cm³

22. The diagram below represents a solid object weighing 50 grams being placed in water. What is the density of this object?

1) 0.1 g/ml
2) 5.0 g/ml
3) 10 g/ml
4) 25 g/ml

23. The diagram below shows a graduated cylinder filled with a substance whose density is 2 grams per milliliter.

What is the mass of the liquid in the graduated cylinder?

1) 350 g
2) 370 g
3) 700 g
4) 740 g
24. A mineral sample is found to have a density of 3.0 grams per cubic centimeter. It is then broken into two pieces, with one piece twice as large as the other. The smaller of the two pieces will have a density of

1) 1.0 g/cm\(^3\)
2) 1.5 g/cm\(^3\)
3) 3.0 g/cm\(^3\)
4) 6.0 g/cm\(^3\)

25. All samples of H\(_2\)O at the same temperature must have the same

1) density
2) weight
3) mass
4) volume

26. A 5.0-milliliter sample of a substance has a mass of 12.5 grams. What is the mass of a 100-milliliter sample of the same substance?

1) 40.0 g
2) 125 g
3) 250 g
4) 400 g

27. Consider the table below.

<table>
<thead>
<tr>
<th>Liquids</th>
<th>Volume</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid 1</td>
<td>5 ml</td>
<td>3 g</td>
</tr>
<tr>
<td>Liquid 2</td>
<td>20 ml</td>
<td>6 g</td>
</tr>
<tr>
<td>Liquid 3</td>
<td>15 ml</td>
<td>5 g</td>
</tr>
<tr>
<td>Liquid 4</td>
<td>10 ml</td>
<td>4 g</td>
</tr>
</tbody>
</table>

If you pour equal amounts of the liquids into a glass cylinder, the densest liquid will settle to the bottom and the least dense will be at the top. Which of the following represents the correct order for these liquids?

1) 3)
2) 4)
3) 2)
4) 1)

28. The density of a substance is 5 grams per milliliter. What is the volume occupied by 40 grams of this substance?

1) 8 mL
2) 35 mL
3) 45 mL
4) 200 mL
29. The data table below shows the masses and volumes of three objects (A, B, and C).

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass</td>
<td>4 g</td>
<td>6 g</td>
<td>8 g</td>
</tr>
<tr>
<td>Volume</td>
<td>2 cm³</td>
<td>6 cm³</td>
<td>4 cm³</td>
</tr>
</tbody>
</table>

The formula for calculating an object’s density is: \( \text{Density} = \frac{\text{Mass}}{\text{Volume}} \)

Which statement about the densities of these three objects is correct?

1) B is more dense than A.
2) A is more dense than C.
3) B and C have equal densities.
4) A and C have equal densities.

30. 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

1) 1.7 g/ml
2) 1.4 g/ml
3) 0.8 g/ml
4) 0.6 g/ml

31. A piece of copper metal is correctly placed on a triple beam balance. The riders are all at the zero mark except for the rider on 0-10 gram beam which is located at the position shown.

What is the mass of the copper metal?

1) 4.56 g
2) 0.455 g
3) 0.55 g
4) 5.50 g
32. What is the density of the object?

1) 1.3 g/cm³
2) 5.5 g/cm³
3) 3.2 g/cm³
4) 0.3 g/cm³

33. The mass of the object could best be determined by

1) calculating its circumference
2) placing it in a beaker of water
3) counting the number of flat surfaces it contains
4) using a balance

34. The graduated cylinder shown below contains 500 grams of liquid.

What is the density of the liquid?

1) 2.50 g/ml
2) 2.00 g/ml
3) 0.5 g/ml
4) 4.00 g/ml

35. The diagram below represents a rectangular object with a mass of 450 grams. What is the density of the object?

1) 1 gram per cubic centimeter
2) 2 grams per cubic centimeter
3) 3 grams per cubic centimeter
4) 4 grams per cubic centimeter
36. For this question read the cartoon below.

The correct explanation of why ice floats is that, compared to liquid water, solid ice

1) has less mass
2) is more dense
3) is less dense
4) has more mass

37. The mineral shown below is of uniform composition and has a density of 4 grams per cubic centimeter. What is the mass of this mineral?

![Mineral cube diagram]

1) 9 g
2) 12 g
3) 54 g
4) 108 g

38. While on a field trip to a large lake, an observer recorded four statements about this lake. Which of these statements is most likely an inference?

1) The water is clear enough to see the bottom of the lake.
2) The lake was formed by a glacier.
3) The surface temperature of the lake is 18.5°C.
4) A log is floating in the lake.
39. 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?

1) 1.00 g/mL
2) 1.05 g/mL
3) 1.30 g/mL
4) 0.95 g/mL
40. Base your answer to the following question on the cross section below. The cross section shows a typical bedrock structure where oil and natural gas deposits are found.

The natural gas, oil, and saltwater have formed layers at different levels in the same rock layer due to the

1) differences in the density of the three materials
2) differences in the geologic age of the three materials
3) principle of superposition
4) principle of original horizontality