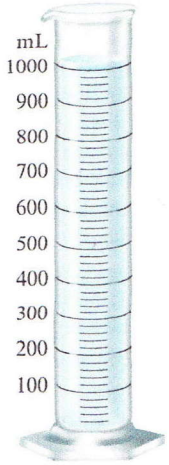
AP Multiple-Choice Review Questions

1. When each of the following is heated to 50°C and the temperature is held constant for 5 minutes, which one undergoes *only* a physical change?

(A) egg
(B) steak
(C) ice cream
(D) cake batter

2. A graduated cylinder contains multiple different liquid layers.



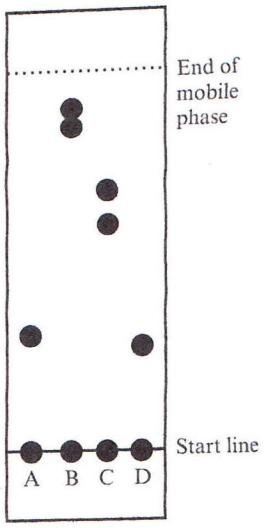
Very small samples are taken from the liquids at various heights and tested for density, viscosity, and boiling point. The data are listed below.

mL Mark	Density (g/mL)	Viscosity (Pa · s)	Boiling Point (°C)
1000	0.83	0.72	242.4
900	0.83	0.71	242.3
800	1.07	0.93	99.7
700	1.08	0.92	99.8
600	1.08	0.93	99.7
500	2.05	1.86	153.5
400	2.06	1.87	153.5
300	2.05	1.85	153.6
200	2.04	1.86	153.6
100	2.05	1.86	153.5

How many different liquids are present in the graduated cylinder?

(A) 1
(B) 2
(C) 3
(D) 4

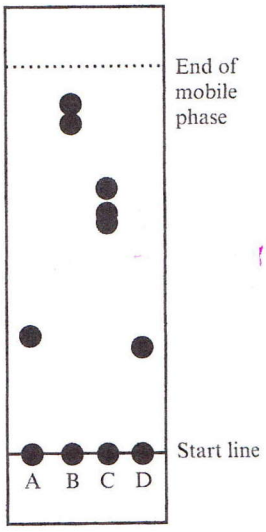
3. *Four different kinds of inks are placed on chromatography paper, and a solvent is introduced and allowed to move up the paper.*



From the diagram shown above, which two inks are likely to contain molecules that have the most similar molecular structures?

(A) A and D
(B) B and D
(C) B and C
(D) A and C

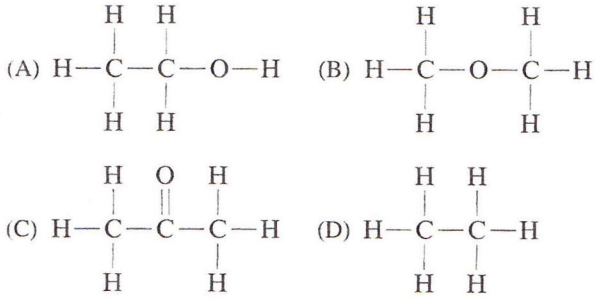
4. Four different inks are placed on chromatography paper, and a solvent is introduced and allowed to move up the paper.



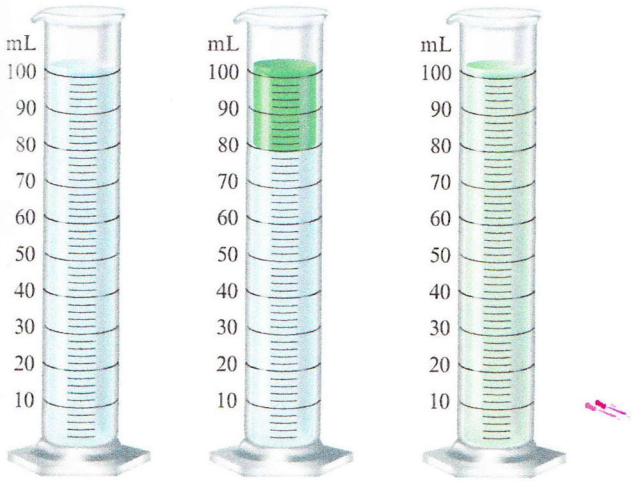
From the diagram shown above, which ink contains a component likely to have a molecular structure most similar to that of the solvent?

(A) A
(B) B
(C) C
(D) D

5. Four substances with the following structures are placed on chromatography paper with water as the mobile phase. The paper is allowed to touch the water. After an hour, which substance will have moved the farthest on the paper? Water consists of H—O—H molecules.



The following diagram is used for questions 6–8.



A 100-mL graduated cylinder is filled with 100 mL of water. A few drops of food coloring are added to the top of the water, without mixing. Initially, the top of the graduated cylinder appears to be very dark, while the bottom remains clear and colorless. After 5 minutes the liquid in the graduated cylinder appears to be uniformly colored.

6. Classify the contents in the graduated cylinder before any food coloring is added.
   (A) element
   (B) compound
   (C) heterogeneous mixture
   (D) homogeneous mixture

7. Classify the contents in the graduated cylinder just after the food coloring is added.
   (A) element
   (B) compound
   (C) heterogeneous mixture
   (D) homogeneous mixture

8. Classify the contents in the graduated cylinder after the 5 minutes has elapsed.
   (A) element
   (B) compound
   (C) heterogeneous mixture
   (D) homogeneous mixture

9. Several of Jupiter's moons are believed to have a liquid layer, possibly water, below their icy surfaces. NASA and the European Space Agency are planning several interplanetary probes that will visit the moons of Jupiter. It has been suggested that a probe could land on one of the moons and drill through the surface of ice to the liquid layer. The probe would then sample the liquid at five different depths. Why will the probe test the liquid at five different depths?
   (A) to determine whether the liquid layer is water
   (B) to determine whether the liquid layer could support life
   (C) to determine the chemical composition of the liquid layer
   (D) to determine whether the liquid layer is a homogeneous solution or heterogeneous mixture

10. A 10.00-g piece of metal is submerged in a graduated cylinder initially containing 20.00 mL of water. With the metal in the cylinder, the level of the water is recorded as 21.40 mL. Determine the identity of the metal.
    (A) aluminum (density = 2.70 g/mL)
    (B) zinc (density = 7.13 g/mL)
    (C) silver (density = 10.49 g/mL)
    (D) gold (density = 19.32 g/mL)