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PASSAGE III

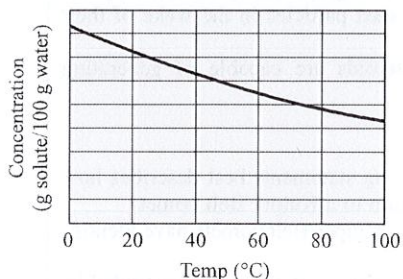
A *solute* is any substance that is dissolved in another substance, which is called the *solvent*.

A student tested the *solubility* (a measure of how much solute will dissolve into the solvent) of six different substances. The solubility of a substance at a given temperature is defined as the concentration of the dissolved solute that is in equilibrium with the solvent.

Table 1 represents the concentration of dissolved substances in 100 grams of water at various temperatures. The concentrations are expressed in grams of solute per 100 grams of water.

Temp (°C)	Concentration of solute (g/100 g H ₂ O)					
	KCl	NaNO ₃	HCl	NH ₄ Cl	NaCl	NH ₃
0	28	72	83	29	37	90
20	33	86	72	37	37	55
40	39	105	63	46	38	36
60	45	125	55	55	38	23
80	51	145	48	66	39	14
100	57	165	43	77	40	8

13. According to Table 1, the concentrations of which of the following substances varies the least with temperature?
- HCl
 - NH₃
 - NaCl
 - KCl
14. The graph below best represents the relationship between concentration and temperature for which of the following substances?



- HCl
- NaNO₃
- NaCl
- KCl

15. The data shown in Table 1 support the conclusion that, for a given substance, as the temperature of the water increases, the amount of solute that can be dissolved:
- increases only.
 - decreases only.
 - varies, but there is a trend depending on the substance.
 - varies, but with no particular trend.
16. According to Table 1, HCl would most likely have which of the following concentrations at 70°C?
- 25.5 g/100g H₂O
 - 37.0 g/100g H₂O
 - 48.5 g/100g H₂O
 - 51.5 g/100g H₂O

17. A scientist wants to dissolve at least 50 grams of NH₄Cl in 100 g of water in order for the solution to be the proper concentration for use in an experiment. A reasonable minimum temperature for the solution would be:
- 25°C
 - 30°C
 - 35°C
 - 50°C

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