Ferrofluid Assessment

Name	
Date	Hour

Matching

Mat	ch t	ha	word	with	tha	hoct	definition	
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Matcl	h the word with the best definition.		
	1. stoichiometry	a.	weak forces of attraction between molecules
	2. spikes	b.	a 3-D parallelpiped that, when shifted along each edge by the length of the edge creates the entire structure of
	3. ferromagnetism		atoms in a crystal
	4. colloid	c.	regions where unpaired electrons strongly interact with one another and align, even in the absence of a
	5. hole		magnetic field
	6. ferrimagnetism	d.	a pattern of uplifted suspended particles that results from placing a magnet near a ferrofluid
	7. magnetic domain		
	8. Unit cell	le.	a word describing that part of chemistry that deals with the relative amounts of substances involved in chemical
	9. Nanoparticle		reactions
	10. empirical formula	f.	a dispersion of particles from ~1 nm to 1000 nm
	11. surfactant	g.	a phenomenon in which the internal magnetic moments
	12. ferrofluid		of multiple spin sets of unpaired electrons within the magnetite domain of a solid partially cancel and thus
	13. magnetite		leave a net spin
	14. Van der Waals forces	h.	a phenomenon in which the internal magnetic moments of unpaired electrons within a domain of the solid are aligned and act cooperatively
		i.	an empty site in a crystalline solid
		j.	a very small particle on a scale of nanometers (10 ⁻⁹ m)
		k.	the name for Fe ₃ O ₄
		1.	information that gives the simplest ratio between the atoms of the elements present in a compound
		m	a molecule that surrounds particles and isolates them from the attractive forces of their neighbors

n. a suspension of a magnetic solid in a liquid that responds to an external magnetic field

Multiple Choice

Choose the best answer.

Corner _

	15.	Ferrofluids exhibit magnetic properties because
		a. they consist of a magnetic solid suspended in a liquid medium.
		b. they become magnetic under the influence of the earth's magnetic field.
		c. they consist of positively and negatively charged ions.
		d. none of the above.
	16.	The potential advantage of using a ferrofluid to administer medication is
		a. that it is cheaper.
		b. that it also acts as an iron supplement.
		c. that it tastes better.
		d. that it can be directed to specific sites in the body.
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	17.	In the production of a ferrofluid, the van der Waals attractions can be overcome by
		a. shielding the reaction vessel from the earth's magnetic field.
		b. adding a substance called a surfactant.
		c. adding a substance called a catalyst.
		d. adding a coagulating agent.
Probl	lems	
18. a.	Not	all of the atoms occupying each site in a unit cell belong to that unit cell. What fraction of each
		the following belong to a given unit cell?

b. Based on your answers in part a, sodium thallide was constructed and contained the following

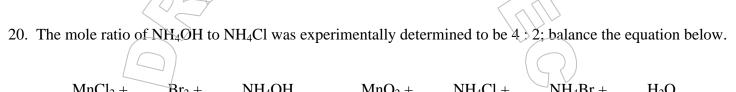
Inside

Sodium Atoms	Sites in the Unit Cell	Atoms in the Unit Cell	
		From that Site	
8	Corners		
0	Edges		
4	Faces		
4	Inside		
	Total in Cell		

Thallium Atoms	Sites in the Unit Cell	Atoms in the Unit Cell	
		From that Site	
0	Corners		
12	Edges		
0	Faces		
4	Inside		
	Total in Cell		

c.	What is the total	number of each	type of atom in	this compound?	
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19.	d. What is the emipirical formula for this compound? Determine the percent composition of each element in magnitite.



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$_{}$ MnCl ₂ + $_{}$ Br ₂ + $_{}$	_ NH ₄ OH	$_{}$ MnO ₂ + $_{}$	_ NH4Cl + _	NH ₄ Br +	$_{}$ $_{1}$ $_{2}$ $_{2}$ $_{3}$