Indicate the most important intermolecular force in the solids for each of the following substances.

1. CH₂O  a) LDF  b) dipole-dipole  c) ionic  d) H-bonding
2. SO₃  a) LDF  b) dipole-dipole  c) ionic  d) H-bonding
3. Highest vapor pressure at 25°C  a) CH₃OCH₃  b) NH₂CH₂CH₃  c) NH₄Cl
4. Which of the following solutions has the lowest boiling point?
   a) A solution of glucose (C₆H₁₂O₆) in water with X.glucose = 0.01
   b) A solution of NaCl in water with X.NaCl = 0.01.
   c) A solution of Na₂SO₄ in water with X.Na₂SO₄ = 0.01.
5. Which of the following solutions has the highest osmotic pressure?
   a) A solution of glucose (C₆H₁₂O₆) in water with X.glucose = 0.01
   b) A solution of NaCl in water with X.NaCl = 0.01.
   c) A solution of Na₂SO₄ in water with X.Na₂SO₄ = 0.01.
6. A solution is prepared by diluting 25.0 mL of 0.4 M solution of CaCl₂ to a final volume of 100 mL. Determine the concentration of chloride ions in the final solution.
   a) 0.1 M  b) 0.2 M  c) 0.3 M  d) 0.4 M  e) 0.5 M
7. Write the electron configuration for Fe\(^{2+}\). How many unpaired electrons are there?
   a) 0   b) 1   c) 3   d) 4   e) 5

8. Which complex ion has the larger crystal field splitting, \(\Delta\)?
   a) \([\text{CoCl}_2(\text{H}_2\text{O})_2]\)  b) \([\text{Co(H}_2\text{O})_6]^{2+}\)

9. Cyano is a strong field ligand. How many unpaired electrons are there in \([\text{Fe(CN)}_6]^{3-}\)?
   a) 0   b) 1   c) 3   d) 4   e) 5

10. The complex \([\text{Co(NH}_3)_6]^{3+}\) is orange and the \([\text{Co(NH}_3)_5(\text{H}_2\text{O})]^{3+}\) complex is purple. Which complex ion absorbs light with shorter wavelength? \(\Delta = \frac{hc}{\lambda}\)
   a) \([\text{Co(NH}_3)_6]^{3+}\)  b) \([\text{Co(NH}_3)_5(\text{H}_2\text{O})]^{3+}\)

The visible region of the electromagnetic spectrum:

<table>
<thead>
<tr>
<th>Color</th>
<th>(\lambda) (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>violet</td>
<td>400</td>
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<tr>
<td>blue</td>
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<tr>
<td>orange</td>
<td></td>
</tr>
<tr>
<td>red</td>
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</table>

Spectrochemical series

\(\Gamma < \text{Br}^- < \text{Cl}^- < \text{F}^- < \text{OH}^- < \text{H}_2\text{O} < :\text{NCS}^- < \text{NH}_3 < \text{en} < \text{NO}_2^- < \text{CO}, \text{CN}^-\)

ANSWERS

1. b  2. a  3. a  4. a  5. c  6. b  7. d  8. b  9. b  10. a