SAMPLE QUESTIONS

CHEMISTRY

1. Which one of the substituted benzene molecules has the largest dipole moment?

   A) Phenylamine B) Nitrobenzene C) Methylbenzene D) Phenol

2. The meaning of ψ^2 is

   A) the wave function of an electron
   B) the orbital in an atom
   C) the probability of finding an electron in a small volume in space
   D) the nodal plane in an orbital

3. A molecule is chiral because it has

   A) plane of symmetry B) centre of symmetry C) neither a plane nor a centre of symmetry D) plane of rotation

4. Which atom has the same number of neutrons as ^{55}Mn?

   A) ^{59}Co B) ^{51}V C) ^{56}Fe D) ^{52}Cr

5. Which ion is colourless in aqueous solution?

   A) $[Zn(H_2O)_6]^{2+}$ B) $[Fe(H_2O)_6]^{2+}$ C) $[Co(H_2O)_6]^{2+}$ D) $[Cu(H_2O)_6]^{2+}$

6. A sample of an ideal gas has internal energy U and is then compressed to one-half of its original volume while the temperature remains the same. What is the new internal energy of the ideal gas in terms of U?

   A) U B) 0.5U C) 2U D) 4U

7. Which of the following aldehydes or ketones would react positively in the iodoform reaction?

   A) benzaldehyde B) butanal C) pentan-3-one D) pentan-2-one

8. The C–O bond in ethers can be cleaved by refluxing with

   A) concentrated solution of HI
   B) Br_2 in ethanoic acid
   C) concentrated H_2SO_4
   D) KI + I_2 solution

9. Which process is accompanied by a decrease in entropy of the materials?

   A) expansion of a gas into a vacuum
   B) solution formation
   C) crystal formation
   D) thermal equilization between two regions in thermal contact

10. Given that Λ_m^∞ for HCl, NaCl, and NaOAc are 426.1, 126.5, and 91.0 $\Omega^{-1}\ cm^2\ mol^{-1}$, the value of the molar conductivity in Ω^{-1} cm^2 mol^{-1}at infinite dilution for acetic acid is

    A) 643.6 B) 390.6 C) 461.6 D) 208.6

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