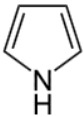


CHEMISTRY – Entrance examination sample test

1	<p>The density of aluminium is 2.70 g/cm^3. Express this value in units kg/m^3.</p> <p>A) 0.27 kg/m^3 B) 2.7 kg/m^3 C) 27 kg/m^3 D) $2.7 \times 10^3 \text{ kg/m}^3$</p>	
2	<p>Find the correct statement:</p> <p>A) Proton and neutron have the same charge. B) Electron and proton have the same mass. C) Proton and neutron have the same mass. D) Electron and neutron have opposite charges.</p>	
3	<p>Identify the weak base:</p> <p>A) 1% NaOH B) 0.1 mol/l KOH C) 1% NH_3 D) 2% $\text{Ca}(\text{OH})_2$</p>	
4	<p>Assign oxidation states to all atoms in KMnO_4:</p> <p>A) K: +3 ; Mn +5; O: -2 B) K: -1 ; Mn -7; O: +2 C) K: +4 ; Mn +4; O: -2 D) K: +1 ; Mn +7; O: -2</p>	
5	<p>$\text{CH}_3(\text{CH}_2)_7\text{CH}=\text{CH}(\text{CH}_2)_7\text{COOH}$ is formula of:</p> <p>A) palmitic acid B) stearic acid C) arachidonic acid D) oleic acid.</p>	
6	<p>Which one of the following pairs is not properly matched:</p> <p>A) maltose – disaccharide B) sucrose - monosaccharide C) fructose – monosaccharide D) glycogen - polysaccharide</p>	
7	<p>Write balanced equation for the following process: hydrogen sulfide burns in air to produce sulfur dioxide and water:</p>	
8	<p>Chloroform is a liquid that was used as a surgical anesthetic. If the density of chlorophorm is 1.49 g/ml, what is the volume of 25 g of chloroform?</p> <p>A) 16.5 ml B) 37.25 ml C) 17 ml D) 37 ml</p>	
9	<p>What is the chemical formula for the compound sodium iodate?</p> <p>A) NaI B) NaIO_3 C) Na_2I D) NaIO</p>	
10	<p>How many atoms of hydrogen are in 1 mole of water (H_2O)?</p> <p>A) 1.2×10^{25} atoms of hydrogen B) 1.20×10^{24} atoms of hydrogen C) 1.2×10^{26} atoms of hydrogen D) 1.2×10^{23} atoms of hydrogen</p>	
11	<p>What is the molarity of a solution containing 72 grams of HCl in enough water to make 500 mL of solution?</p> <p>A) 8 B) 4.8 C) 2.4 D) 4</p>	
12	<p>The ionic compound containing Fe^{3+} and SO_4^{2-} would have the formula:</p> <p>A) FeSO_4 B) Fe_2SO_4 C) $\text{Fe}_2(\text{SO}_4)_3$ D) $\text{Fe}_3(\text{SO}_4)_2$</p>	
13	<p>Balance the following equation:</p> <p>$___ \text{KOH} + ___ \text{H}_3\text{PO}_4 \rightarrow ___ \text{K}_3\text{PO}_4 + ___ \text{H}_2\text{O}$</p>	
14	<p>Which is the correct name of a compound with formula H_3PO_4:</p> <p>A) Phosphorous acid B) Phosphor (III) acid C) Phosphoric acid D) Sulphurous acid</p>	
15	<p>Optically active molecules which rotate plane-polarized light in a counterclockwise direction are said to be:</p> <p>A) levorotary B) of R configuration C) dextrorotary D) of S configuration</p>	
16	<p>What is the name of the following compound?</p>  <p>A) pyridine B) pyrimidin C) pyrrole D) piperdine</p>	

17	Name the following compounds: A) $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$ B) $\text{CH}_3\text{CH}_2\text{NHCH}_2\text{CH}_3$
18	Calculate the pH of 0.1 mol/l HCl:
19	Give the name of the following compound: $\text{CH}_3 - \text{CHNH}_2 - \text{COOH}$
20	Give the structural formula for methyl propyl ether:

In calculations, you may use these approximations of basic constants (select those you need):

Atomic mass unit	1.66×10^{-27} kg	Relative atomic mass:	
Avogadro constant	6×10^{23}	Oxygen	16
Elementary charge	1.6×10^{-19} C	Hydrogen	1
Faraday constant	9.65×10^4 C mol ⁻¹	Chlorine	35
Gas constant	$8.3 \text{ J K}^{-1} \text{ mol}^{-1}$	Sodium	23
Mass of electron	9.1×10^{-31} kg	Potassium	39
Molar volume of gases	22.4 l	Carbon	12

Solutions

- 1 D
- 2 C
- 3 C
- 4 D
- 5 D
- 6 B
- 7 $2 \text{ H}_2\text{S} + 3 \text{ O}_2 \rightarrow 2 \text{ H}_2\text{O} + 2 \text{ SO}_2$
- 8 C
- 9 B
- 10 B
- 11 D
- 12 C
- 13 $3 \text{ KOH} + __ \text{ H}_3\text{PO}_4 \rightarrow __ \text{ K}_3\text{PO}_4 + 3 \text{ H}_2\text{O}$
- 14 C
- 15 A
- 16 C
- 17 aminopropane, propylamine; diethylamine
- 18 1
- 19 alanine, aminopropanoic acid
- 20 $\text{CH}_3 - \text{O} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$