UNIVERSITY OF VETERINARY MEDICINE AND PHARMACY
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Admission requirements – CHEMISTRY (Academic Year 2018/2019)

1. **Matter:** Classification of matter, states of matter, the chemical elements and their symbols, pure substance, compound, mixture. Atomic weight, relative atomic weight, molecular weight, relative molecular weight.
2. **Atom:** Structure of atom, orbitals, shells, subshells, quantum numbers. Electronic structure of atom, electron configuration, Pauli Exclusion Principle, Hund's rule, Build up principle. Atomic number, mass number, nuclide, isotope. Mole, Avogadro's number, molar mass. Conversion of units.
3. **Periodic table:** groups or families, periods, representative elements, transition elements, inner transition elements, alkali metals, alkaline earth metals, halogens, noble gases.
4. **Chemical bond:** Electronegativity, ionic bond, covalent bond, multiple covalent bonds.
5. **Naming:** IUPAC naming of inorganic compounds (binary compounds, salts, acids bases).
6. **Chemical reaction:** Chemical equations, balancing chemical equations. Classification of chemical reactions, protolytic reactions, redox reactions, precipitation, reaction rate, factors affecting reaction rate, catalysts, exothermic and endothermic reactions, chemical equilibrium, equilibrium constant.
7. **Solution:** definition of solution, solubility, composition of solutions, mass percentage, molar concentration, units of concentration, calculation of solution composition.
8. **Dissociation:** electrolytes, acids, bases, salts. Brönsted-Lowry theory of acids and bases, acid/bases dissociation, acid and base strength, dissociation constant, ionization of water, pH definition, pH of acid/base solutions, hydrolysis of salts.
9. **Organic chemistry:** Families of organic molecules, functional groups, molecular structure of organic compounds. Principles of IUPAC nomenclature. Reactions of organic compounds.
10. **Hydrocarbons:** Alkanes, cycloalkanes, alkenes, alkynes, aromatic compounds – naming, properties, reactions, some important structures, common names.
11. **Derivatives of aliphatic and alicyclic hydrocarbons:** Halides, sulfonic acids, nitro derivatives, amines, alcohols, ethers, thiols, disulphides, aldehydes, ketones, carboxylic acids, naming, physical and chemical properties, reactions, some important structures.

12. **Derivatives of aromatic hydrocarbons:** Aromatic halides, benzene sulfonic acids, nitro derivatives, aromatic amines, phenols, aromatic aldehydes, ketones and carboxylic acids – naming, physical and chemical properties, reactions, some important structures.
13. **Derivatives of carboxylic acids:** Salts, esters, anhydrides, amides, acyl halides – naming, basic properties, reactions.
14. **Derivatives of carboxylic acids:** Halide acids, amino acids, keto (oxo) acids, hydroxy acids – naming, basic properties, reactions, some important structures.
15. **Carbohydrates:** Classification, physical and chemical properties, stereoisomerism, important reactions (oxidation, reduction, formation of hemiacetals and acetals), glycosidic bond, oligosaccharides, important disaccharides, polysaccharides (starch, glycogen, cellulose).
16. **Lipids:** classification, physical and chemical properties, fatty acids, alcohols in lipids, fats and oils, waxes. Esterification and hydrolysis.
17. **Proteins:** Formation and structure of peptides, properties, primary, secondary, tertiary and quaternary structure of proteins, isoelectric point.
18. **Heterocyclic compounds:** 5-membered and 6-membered heterocycles, classification, naming, chemical properties, some important structures.

EXAMPLE of questions from Chemistry test:

1. Name the compound: $NaNO_2$ …….

2. Which of the solutions is the most basic?
   a/ pH = 12.0
   b/ pOH = 12.0
   c/ pH = 3.0
   d/ pOH = 3.0

3. Give the common name for the following compound: …….