**Assignment # 01**

**Pharmaceutical Chemistry**

**Protocol of Chemicals**



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**ACETIC ACID:**

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| **NATURE**  When acetic acid dissolve in water, seperation of (H+) ion occurs and that’s why it clearly show that it is acidic in nature but acetic acid is a weak acid beacause it is notcompeletly seperated in water | **PROPERTIES**  **CHEMICAL**  **PROPERTIES:**  1:ACETIC ACID have higher melting and boiling point as compare to alchol  2:There is high solubility in aqeous medium  3:It is prepared by methanol with carbon mono-oxide in the presence of rhodium-iodine catalyst  **PHYSICAL PROPERTIES**:  1:BOILING POINT: The boiling point of acetic acid is 117.9C  2:MELTING POINT: The melting point of acetic acid is 16.6C  3: DENSITY: The density of acetic acid is 1.05g/cm3  4:TASTE AND ODOUR : It has a sour taste and a pungent smell | **PREVENTION**   1. Don’t inhale it. 2. It causes many diseases. | **HAZARDS**  ACETIC ACID can be hazardeous acid if it not used in a safemanner  1: it can damage your skin  2:it is very dangerous for your eyes  3: it is also harmful for internal organ ,so avoid ingestion of ACETIC ACID | **STORAGE CONDITION**  THE safe storage temperature is -4 degree centigrade  2:keep away acetic acid from metal and alkali  3:It is must be stored in asealed container in a well ventilated container |

**ACETONE**:

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| **NATURE**  1:Acetone occur naturally in plant,tree,volacnic gases and forest fires.  2:The PH of Acetone is 7 which mean it is neither acidic nor basic it is Alkaline in nature | **PROPERTIES**  **PHYSICAL PROPERTIES**:  1. Odour: fruity  2. Melting point: -95.4  3.Boiling point:56.53C  4:Specific gravity:0.819  **CHEMICAL PROPERTIES:**  1:SOLUBLE in water,etanol and ether etc.  2:chemical formula: (CH3)2CO  3: It is found purely but it can also prepared in laboratory. | **PREVENTION**  1: If u use nail polish remover because it also contain acetone then it is not harmful but if you use a large amount of acetone then it may crack your skin or make it dry  2: if acetone irritate your eyes then use safety glasses.  3:harmful for your internal organ also so wear mask to avoid bad inhalation. | **HAZARD**  1: IT is usually iritate your nose and throat  2:it is also harmful for you nervous system it can cause NAUSEA,DIZZZINESS,DROWSINESS , CONFUSION. | **STORAGE CONDITION:**  The safely storage temperature is 15-20  Keep it away from sunlight  Must be in a cool container in a well ventilated container. |

**BENZENE**:

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| **NATURE**  1:Benzene is an organic compound. benzene is classed as a hydrocarbon.  2:According to lewis theory benzene is a base because it donates a pair of electrons . | **PROPERTIES**  **Physical properties:**  1: It has a density of 0.87g cm-3. .  2:benzene have high melting and boiling point  3: Benzene is not soluble in water but soluble in organic solvents.  **CHEMICAL PROPERTIES:**  1:The chemical formula of benzene is (C6H6)  2: Benzene is highly flammable liquid  3: It is chemically characterized by six carbon atoms linked in a hexagonal shape | **PREVENTION:**  1: Don’t smoke or use any unnecessary heat when benzene is heating  2:Remove benzene from your skin with large amounts of soap and water.  3: avoid excess inhalation of benzene because it can cause cancer in your body such as leukemia | **HAZARDS:**  1:benzene is hazerdeous in case of inhalation, ingestion through the skin, leading to health problems  2: it is harmful for reproduvtive organ.  3: excess inhalation of benzene can cause cancer. | **STORAGE CONDITION:** |

**CHLOROFORM**:

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| **NATURE:**  Chloroform is acidic in nature because its ph is 4.5  2: it is naturally occuring compund but also producecd in laboratory. | **PROPERTIES:**  **Physical properties:**  1:it is a colorless liquid . 2:Its density is 1.489 g mL-1 3:its melting point is -63.5 ºC 4:its boiling point is 61.15 °C.  5:it is slightly soluble in water  6: it is soluble in ether and benzene  **CHEMICAL PROPERTIES:**  1: Chloroform chemical formula is CHCl3  2: its MOLECULAR MASS is 119.37 g mol-1 | **PREVENTION:**  1:Don’t inhale chloroform it cause suffocation in your throat   1. 2: Do not mix or store with acidsmay form toxicity 2. 3:Thoroughly wash hands after using it because it can cause damage to your skin | **HAZARDS:**  1:hazaedeous for inhalation causes damage to the liver and kidneys.  2:don’t mix it with phenol phenol become more reactive.  3:it is also harmful for reproductive system. | **STORAGE CONDITION:**  It should be store away from sunlight. |

**ETHANOL**:

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| **NATURE:**  1:By the Arrhenius definition of an acid and base, alcohol is neither acidic nor basic when dissolved in water,  2: the ph of ethanol is 7.33 | **PROPERTIES**:  **Physical properties:**  1: Pure ethanol is a flammable, colorless liquid  2: its boiling point78.5° C.  3:it has low melting point -114.5° CIt has a pleasant odor  **Chemical properties:**  1:chemical formula of ethanol is C2H5OH  2: it isvolatile, and flammable liquid  3:it is soluble in water. | **PREVENTION:**  1:don’t use ethanol seperately mix it with some sort of chemical otherwise it can cause death or coma  2:make sure that you are wearing mask when you are working with ethanol otherwise it is harmful for throat. | **HAZARD:**  1: etahnol is not much hazerdous because it is commonly used  2:but excess of it can cause vomitting ,daziness etc. | **STORAGE CONDITION:**  1: store it in adry area  2:The safely storage temp is 55 F (13 C). |

**AMMONIUM HYDRO-OXIDE**

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| **NATURE**:   1. It is basic in nature. 2. It’s ph is 13.3 3. It is produced in salt water brine. | **PROPERTIES:**  **PHYSICAL PROPERTIES:**  1: Ammonium hydroxide is a colorless liquid with a highly pungent odor. 2;Ammonium hydroxide density is 0.91 g mL-1. The melting points are -57.5 ºC and 3:its boiling point is 37 ºC. It is high  **CHEMICAL PROPERTIES:**  1: Ammonia is a compound of nitrogen and hydrogen with the formula NH3.  2;A stable binary hydride.  3: CHEMICAL FORMULA: NH4OH | **PREVENTION:**  1: it cause skin irritation or burn your hand so wear gloves  2: excess inhalation can cause vomiting, nausea, gastric irritation so wear mask when using it. | **HAZARD:**  1: it is really hazaerdous causesvomiting, nausea, gastric irritation.  2: severe cases, perforation, central nervous system depression, shock, convulsions and pulmonary edema. | **STORAGE CONDITION**:   1. It is stored in a room temperature 2. The safely store temperature is 77 C. |

SODIUM HYDRO-OXIDE:

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| NATURE:   1. It is basic in nature. 2. It’s ph is 12. | PROPERTIES:  Physical properties:  1: it melts at 318 °C (604 °F) without decomposition, 2: the boiling point is 1,388 °C (2,530 °F).  3:it is highly soluble in water  Chemical properties:  1: chemical formula isNaOH  2: it isinsoluble in ether and other non-polar solvents. | PREVENTION:  1: use safely glases when using high amount of NAOH.  2:use mask when using it to prevent ur throat  2: make sure that your hands arew safe while using the NAOH. | HAZARD:  1: Sodium hydroxide is very corrosive. It can cause irritation to the eyes, skin  2: harmful for eyes .  .3:The level of harm depends upon the dose, duration, and work being done. | STORAGE CONDITION:   1. It is stored in a room temperature 2. The safely store temperature is 70 C. |

SULPHURIC ACID:

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| NATURE:   1. It is neutral in nature. 2. It’s ph is 7. | PROPERTIES:  PHYSICAL PROPERTIES:  1:it is a colorless or slightly yellow viscous liquid with a pungent odor.  2: It has a density of 1.84 g/Ml.  3:its boiling point of 337 °C, and melting point of 10 °C.  Chemical properties:  1:chemical formula: H2SO4  2:Concentrated" sulfuric acid is 98% in water.  3:  Sulfuric acid is a very strong, diprotic acid. | PREVENTION  1:use gloves while usind sulphuric acid  2:don’t inhale too much of it otherwise it cause irritation. | HAZARD:  1: Sulfuric acid is a highly corrosive chemical.  2: cause heat burn in your skin.  3: it can cause major difficulties in inhalation. | STORAGE CONDITION:   1. It is stored away from the sun light. |

XYLENE:

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| NATURE:   1. It is basic in nature. 2. It’s ph is 9.5. | PROPERTIES:  PHYSICAL PROPERTIES:   1. The melting point ranges from −47.87 °C to 13.26 °C 2. It is more readily in the crystal structure. 3. The boiling point for each isomer is around 140 °C. 4. The density of each isomer is around 0.87 g/mL   CHEMICAL PROPERTIES:   1. The chemical formula of Xylene is C8H10 2. The molar mass is 106.16 g/mol 3. It is practically insoluable. | PREVENTION  1:use gloves while usind sulphuric acid  2:don’t inhale too much of it otherwise it cause irritation. | HAZARD:   1. The most common route of exposure is via inhalation. 2. Symptoms of xylene poisoning include CNS effects (headache, dizziness, ataxia, drowsiness, 3. It also causes nausea, vomiting, and reversible hepatic impairment. | STORAGE CONDITION:   1. It is stored in well ventilated container. 2. It is safely stored temperature 20 to 25 C. |

CARBON TETRACHRLORIDE:

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| NATURE:   1. It is acidic in nature. | PROPERTIES:  PHYSICAL PROPERTIES:   1. It appears as colorless liquid 2. The melting point is -23 ° C, 3. The boiling point is 76.8 ° C 4. The relative density is 1.5867.   CHEMICAL PROPERTIES:   1. Its chemical formula is CCl4. 2. The molar mass is 153.82 g/mol. 3. It is soluble in water partially. | PREVENTION  1:use gloves while usind sulphuric acid  2:don’t inhale too much of it otherwise it cause irritation. | HAZARD:   1. inhalation and oral exposures to carbon tetrachloride It 2. It include headache, weakness, lethargy, nausea, and vomiting. 3. It causes kidney damage in humans. | STORAGE CONDITION:   1. It is stored in well ventilated container. 2. It is safely stored temperature 30 C. |

HEXANE:

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| NATURE:   1. It is acidic in nature. 2. PH is 7.2. | PROPERTIES:  PHYSICAL PROPERTIES:   1. hexane is a clear colorless liquids 2. It smells similar to petroleum-like odor. 3. It is less dense than water.   CHEMICAL PROPERTIES:   1. Its chemical formula is C6H14. 2. The molar mass is 86.1 g/mol. 3. It is insoluble in water. | PREVENTION  1:use gloves while usind sulphuric acid  2:don’t inhale too much of it otherwise it cause irritation. | HAZARD:   1. Short-term exposure to air contaminated with hexane affects the nervous system 2. It can cause dizziness, nausea, headaches. 3. Chronic exposure can cause more severe damage to the nervous system. | STORAGE CONDITION:   1. It is stored in well ventilated container. |

Hydrochloric Acid:

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| NATURE:   1. HCl is a strong acid 2. It’s PH is 3.02. | PROPERTIES:  PHYSICAL PROPERTIES:   1. It is colorless with a highly pungent odor. 2. It can only release one proton (H+). 3. The melting, boiling point and density depend upon the concentration.   CHEMICAL PROPERTIES:   1. Its chemical formula is HCL. 2. The molar mass is 36.46 g/mol. 3. It is soluble in water. | PREVENTION  1:use gloves while usind sulphuric acid  2:don’t inhale too much of it otherwise it cause irritation. | HAZARD:   1. Hydrochloric acid is corrosive to the eyes, skin, 2. It causes mucous membranes. Acute (short-term) inhalation exposure 3. It may cause eye, nose, and respiratory tract irritation. | STORAGE CONDITION:   1. It is stored in well ventilated container. 2. Keep it away from organic compounds. |

**Methanol:**

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| **NATURE:**   1. It is neutral in nature. | **PROPERTIES:**  **PHYSICAL PROPERTIES:**   1. It is a light, volatile, colorless, flammable liquid 2. Methanol is however far more toxic than ethanol. 3. It is a polar liquid.   **CHEMICAL PROPERTIES:**   1. Its chemical formula is CH3OH. 2. The molar mass is 32.04 g/mol. 3. It is soluble in water and alcohol. | **PREVENTION**  1:use gloves while usind sulphuric acid  2:don’t inhale too much of it otherwise it cause irritation. | **HAZARD:**   1. Methanol is highly flammable and toxic. 2. Direct ingestion can cause permanent blindness by destruction of the optic nerve, 3. These hazards are also true if methanol vapors are inhaled. | **STORAGE CONDITION:**   1. It is stored in well ventilated container. 2. It should not be stored with oxidizing materials |

**Nitric Acid:**

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| **NATURE:**   1. HNO3 is strong acidic. 2. PH is 3.01. | **PROPERTIES:**  **PHYSICAL PROPERTIES:**   1. Nitric acid is a liquid with a pungent and suffocating odor. 2. They are colorless, yellow or red accordingly.   **CHEMICAL PROPERTIES:**   1. Its chemical formula is HNO3. 2. The molar mass is 63.01 g/mol. 3. It is soluble in water. | **PREVENTION**  1:use gloves while usind sulphuric acid  2:don’t inhale too much of it otherwise it cause irritation. | **HAZARD:**   1. Nitric acid is an extremely corrosive acid capable of causing severe chemical burns very rapidly. 2. If nitric acid mists are inhaled, health risks include corrosion of mucous membranes, delayed 3. Contact with eyes can cause permanent cornea damage. | **STORAGE CONDITION:**   1. It is stored in cold and dry well ventilated container. |

**REFRENCE WEBSITES:**

* <https://www.msds.online.com>
* <https://www.healthline.com>
* <https://www.brainly.in>
* <https://www.wikipedia.com>

**REFRENCE BOOKS:**

* Organic chemistry by Federal
* Organic spotting by Wasi Askari