



EDUCATION SOURCE

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Section-B

7) Define Unit operation.

=> * In industrial chemistry, a unit operation refers to a specific step or process that brings about a physical ~~or~~ or chemical change in materials during manufacturing.

* operations such as mixing, separation or chemical reactions are the basic building blocks of industrial processes.

8) What is Unit Process?

=> * In industrial chemistry, a unit process involves a specific chemical transformation or operation that contributes to the overall production of a substance or product.

* Examples include oxidation, hydrogenation and Polymerization.

Section-C

9) Explain the importance of industry.

=> The importance of industry:-

(i) Job creation: Industries provide jobs for many people, helping them support themselves and their families.

(ii) Product Production: Industries make things we use every day, from clothes to gadgets, contributing to our daily lives.

- (iii) Economic Growth: By Producing goods and services, industries contribute to the overall economic growth of a country.
- (iv) Innovation Hub: Industries do innovation, creating new technologies and products that can improve our lives.
- (v) Trade opportunities: Industries can open up opportunities for international trade, boosting a country's economy.
- (vi) Skill Development: Working in industries helps people develop specific skills, and increase their expertise and employability.
- (vii) Infrastructure Development: Industries help to develop the infrastructures like roads, ports, buildings etc.

10) write the merits and demerits of industry.



⇒ Merits of Industry

(Same write all points of importance of industry.)

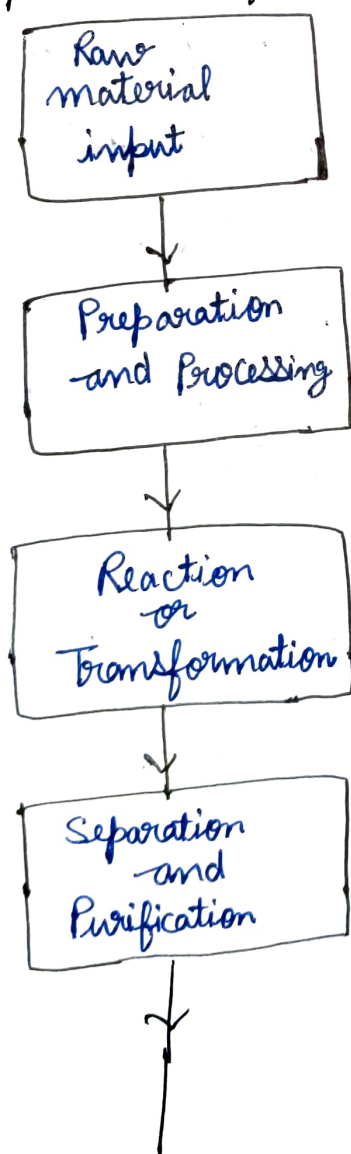
⇒ Demerits of Industry

- (i) Health impact: workers get health risks in industry due to exposure to hazardous substances or unsafe working conditions.
- (ii) Environmental impact: Industries pollute air and water by releasing lots of hard chemicals. which impact the environment.

- (iii) **Waste Generation:** Industries produce heavy amount of waste, which can be challenging to manage and dispose safely.
- (iv) **Energy Consumptions:** Some industries consume large amounts of energy, due to this the demand of non-renewable resources increases.
- (v) **Risk of Accidents:** In industry the risk of Accident is high and which can be effect the life of workers and the surrounding Community.

II) Explain the flow chart used in industries.

⇒

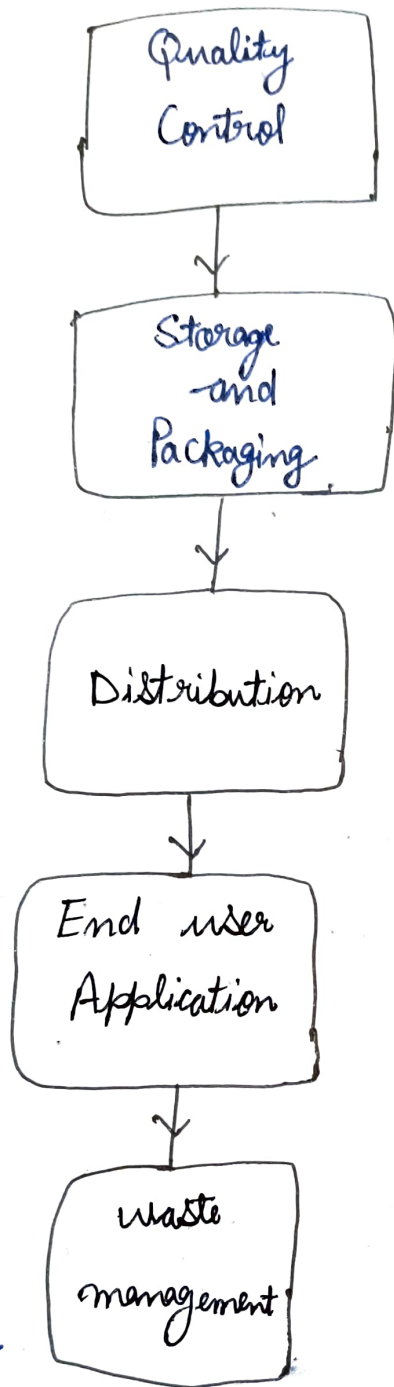


[The Process begins with the introduction of raw materials into the industrial system].

[Raw materials undergo initial Preparation and Processing to make them suitable for the next stage].

[Chemical reactions in which transformation takes place from the Reactant to the desired products].

[The mixture is subjected to separation and Purification processes to isolate the target Product from other components].



[The Separated Product undergoes quality Control checks to ensure the quality of Products].

[The finalized Product is stored temporarily before Packaging .

Packaging is done to make the Product ready for distribution].

[Finished Products are distributed to various markets or Consumers through a network of transportation]

[Consumers use the products for various purposes , contributing to their daily needs].

[Throughout the Process, waste and by- products are managed responsibly, either through recycling or safe disposal]

12) write about Chemical Conversion.

=> Chemical Conversion in industrial Chemistry involves transforming raw materials into desired Products through Controlled Chemical reactions.

(i) Raw material Selection:-

The Process begins with Carefully

(write all points of above question).

13.) Explain the types of industrial wastes.

⇒ Industrial wastes in industrial chemistry can be categorized into various types

(i) Solid wastes:

These include by-products, residues or materials that are in solid state.

(ii) Liquid wastes:

These include by-products, residues or materials that are in liquid state which is produced from industrial processes.

(iii) Gaseous wastes:

Emissions of gases into the atmosphere, ~~and~~ produced from combustion processes or chemical reactions. These include pollutants like SO_2 , NO_2 etc.

(iv) Hazardous wastes:

Waste containing substances that are harmful to human health or the environment. This includes chemicals, heavy metals and other toxic materials.

(v) Biological wastes:

organic wastes from biological processes, such as food processing or fermentation. These can contribute to pollution if not managed appropriately. Properly.

(vi) Electronic wastes (E-wastes)

Rejected electronic devices or components, including computers, smartphones and appliances.

These contains various metals and plastic material which can be pollute if not recycled properly.

(vii) Radioactive wastes

wastes containing radioactive materials, produced in nuclear power plants or medical facilities.

(viii) Chemical wastes

wastes containing unused or residual chemicals from manufacturing processes. These includes solvents, acids or other substances.

Section - D

14) Explain batch versus Continuous Processing.

=> Batch Processing:

(i) Nature: In batch processing, a set amount of raw materials is processed together as a single batch.

(ii) Workflow: The process occurs in sequential steps, with each step completed before moving on to the next.

(iii) Flexibility: offers flexibility, in adjusting the process parameters for each batch.

(iv) Equipments usage: Equipment is set for a specific batch and turn off the equipments between batches for cleaning and setup.

(V) Examples:- Small Scale Production, Pharmaceuticals etc.

Continuous Processing:-

- (i) Nature: In continuous processing, raw materials are constantly fed into the production line, and the product is continuously removed.
- (ii) Work flow: The process runs continuously, with no interruption between production cycles.
- (iii) Efficiency: Generally more efficient for large-scale production, providing a regular output with less variations.
- (iv) Equipment usage: Equipment is continuously operational, minimize to stop the equipment to produce products.
- (V) Examples: Petrochemicals, large-scale chemical manufacturing and some food production using continuous process.

15) Explain chemical process selection and chemical process control.

⇒ Chemical process selection:-

Chemical process selection is choosing the most suitable methods and techniques to transform raw materials into desired products in industrial chemistry.

Factors influencing selection:-

- (i) Raw material Properties:- Identify and assess

available raw materials for the chemical process, considering factors such as cost, availability, and sustainability.

(ii) Reaction Kinetics

understand the kinetics of chemical reactions involved in the process to determine reaction rates, mechanisms and optimal conditions.

(iii) Thermodynamics

Consider thermodynamic principles

Chemical Process Control:

(i) Feedback Control:

Monitor and adjust chemical processes based on feedback signals to maintain desired conditions.

(ii) Sensor integration:

Use sensors to measure variables like temperature, pressure and concentration.

(iii) Automated valves:

Use automated valves to control the flow of chemicals.

(iv) Safety systems:

Safety controls measures and shut down system in emergency time.