Process engineering

The “ chemical engineer” of these years was either a mechanical engineer who had gained some knowledge of chemical recess equipment, a chemical plant foreman with a lifetime Of experience but little education, or an applied chemist with knowledge of large scale industrial chemical reactions. Chemical Engineer a) An Engineer who manufactures chemicals, b) A Chemist who works in a factory, or c) A glorified Plumber?

This is actually a trick question as the correct answer is “ None of the above. ‘ 0 More typically, chemical engineers concern themselves with the chemical processes that turn raw materials into valuable products. C] The necessary skills encompass all aspects of design, testing, scale-up, operation, control, and optimization, and require a detailed understanding of the various “ unit operations”, such as distillation, mixing, and biological processes, which make these conversions possible.

D Chemical engineering science utilizes mass, momentum, and energy transfer along With thermodynamics and chemical kinetics to analyze and improve on these “ unit operations. ” Chemical and Process Engineering: a generalized process Raw materials Energy Utilities Operational Characteristics ; Economic ; Efficient ; Controllable ; Safe ; Flexible ; Environmental issues

PROCESS (INDUSTRY) Effluents By-products PRODUCTS Some products whose manufacture involves the application of Chemical Engineering Product grouping or production process Some of the more familiar examples House hold products in daily use Health care products Detergents, polishes, disinfectants Pharmaceuticals, toiletries, antiseptics, anesthetics Automotive

fuels/Petroleum refining Other chemicals in daily use Petrol, diesel, kerosene, lubricants, bitumen Latex paints, anti freeze, refrigerants, insulation materials Horticulture products Metals Fertilizers, fungicides, insecticides

Steel manufacture, zinc production Count. Polymers Electronics Fats and oils Fermentation Dairy products Gas treatment and transmission Vehicle accessories, kitchen-ware, furniture Silicon, departs (gallium arsenide), Salad and cooling oils, margarine, soap Beer, certain antibiotics such as penicillin, yoghurt’s Milk, butter, cheese, baby food Gas for heating and cooking What is a process ? A process is a series of steps (sequence of events) known as “ unit operations” in which material is chemically, physically biologically or In any combination of these transformed or changed Egg.

Distillation: Drying Evaporation Crystallization Extraction Petroleum refining Food processing (milk, cereal) Salt production Sugar and pharmaceutical Oil from seeds Unit Operations C] The “ unit operations” concept had been latent in the chemical engineering profession ever since George Davis had organized his original 12 lectures around the topic. It was Arthur Little who first recognized the potential of using “ unit operations” to separate chemical engineering from other professions.

C] While mechanical engineers focused on machinery, and industrial chemists concerned themselves with products, ND applied chemists studied individual reactions, no one, before chemical engineers, had concentrated upon the underlying processes common to all chemical products, reactions, and machinery. C The chemical engineer, utilizing the conceptual tool that

was unit operations, could now claim to industrial territory by showing his or her uniqueness and worth to the chemical manufacturer.

Chemical and Process Industry Sulfuric Acid Production TO Create sulfuric acid the long used (since 1749), and little understood, Lead- Chamber Method required air, water, sulfur dioxide, a nitrate, and a large dead container. Of these ingredients the nitrate was frequently the most expensive. This was because during the final stage of the process, nitrate (in the form of nitric oxide) was lost to the atmosphere thereby necessitating a make-up stream of fresh nitrate.

D Because of its importance, sulfuric acid was considered an excellent indicator of a country’s industrial well-being. Synthetic Ammonia Production Shortly before the outbreak of World War l, two patriotic Germans developed a method for producing synthetic ammonia. The first plants using this Huber-Busch Process” were constructed shortly after the outbreak of the war. They had discovered that ammonia could be made by placing nitrogen gas and hydrogen gas in a high pressure chamber.

With the addition of a suitable catalyst, and a little heat to speed things up, vast quantities of fixed nitrogen could be produced. Alkali & The El Blanch Process Another very competitive (and ancient) chemical industry involved the manufacture of soda ash (Nuance) and potash (KICKS). These Alkali compounds found use in a wide range of products including glass, soap, and textiles and were there for in tremendous demand.