TECHNICAL MAGAZINE

2022-2023

ER PERUMAL MANIMEKALAI POLYTECHNIC COLLEGE

Koneripalli, Hosur -635117

AN ISO 9001:2015 CERTIFIED INSTITUTION, AFFILIATED TO TNDOTE

ACCREDIATED BY NBA

https://www.pmctechpoly.org

DEPARTMENT OF CHEMICAL ENGINEERING

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VISION OF THE INSTITUTE

PMC Tech Polytechnic College shall emerge as a premier Institute for valued added technicaleducation coupled with Innovation, Incubation, Ethics and Professional values

Mission of the Institution

1. To foster the professional competence through excellence in teaching and learning.
2. To nurture overall development of students by providing Quality Education & Training.
3. To provide innovative environment to learn, innovate and create new ideas for the betterment ofoneself and society.

VISION OF THE DEPARTMENT

To prepare the chemical engineers who can pursue their goals which will benefit the society and environment.

Mission of the Department

1. **Impart** Quality education and training in Chemical Engineering and associated fields to enable the students to imbibe technical and analytical skills through logical thinking.
2. **Groom** the students with leadership skills, professional Ethics, transparency and accountability with technical knowledge.
3. **Inculcate** sense of social and environmental responsibility among students which inspires them to apply Chemical Engineering principles in solving industrial problems through sustainable and eco-friendly technologies for betterment of society and nation.

Programme Educational Objectives (PEO's)

PEO 1: Have good training in fundamental and advanced concepts of Chemical and alliedEngineering for good career in industry or for Higher Studies.

PEO 2 : Demonstrate professional excellence, ethics, soft skills and leadership qualities throughskill development.

PEO 3 : Contribute to the economic and environment of their communities by providingopportunities for innovation and lifelong learning

Programme Specific Outcomes (PSO's)

PSO 1: Apply knowledge of the basic science, mathematics and chemical engineering in thedesign and Operations of chemical process

PSO 2: Have an ability to Identify, formulate, and solve complex problems in the various domains of Chemical engineering such as momentum transfer, heat transfer, mass transferand mechanical operation in industries.

PSO 3: Possess the attitude of innovation and lifelong learning as per the need of wider context of Technological changes in the field of chemical engineering.

PROGRAMME OUTCOMES

PO1: **Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

PO2: Problem analysis: Identify and analyse well-defined engineering problems using codified standardmethods.

PO3: Design/ development of solutions: Design solutions for well-defined technical problems and assistwith the design of systems components or processes to meet specified needs.

PO4: Engineering Tools, Experimentation and Testing: Apply modern engineering tools andappropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyse individual needs and engage in updating in the context oftechnological changes.

Messages

FOUNDER'S MESSAGE

Er.P.Perumal Founder
PMC TECH Group of Institutions

"Any place that anyone can learn something useful from someone with experience is an Educational Institution"

Time has now come to realize your dream to be in the main stream of your professional career and must be a great feeling to be a part of most prestigious one. PMC TECH has a history of more than 15 years. In recent years degree in the technical education like Engineering, has become the foremost academic qualification for all leading Industries, Government and Non-Government sectors. Academicians and Industrialists alike have recognized the value of the degree in the developing challenges of the rapidly changing technical environment. One of the strength of our campus is the diversity of programs and members background and experience. The range of functional, professional and vocational skills and knowledge that participants bring to the program allow the lecturing faculty to test the validity of theoretical concept against of rich background of personal and organizational outlooks. The Campus environment and work culture will encourage individuals from all walks of life and from all special and economic backgrounds. To be Engineers and other technical – based professionals, can all benefit from the experience at this beautiful campus.

CHAIRMAN'S MESSAGE

Shri P.Kumar
Chairman

"The object of education is to prepare the young to educate themselves throughout their lives"

True Education indeed paves the path for the children to learn new things in a correct manner. It heals them, broadens their perspectives and enriches their knowledge to face the globally competitive era. PMC TECH- Polytechnic started in 1996 with an objective to provide quality education and excellence in ever changing field of technical education. Technology is moving at a very fast pace. What was breakthrough yesterday is obsolete today. This has made it imperative that future technocrats must be familiar not only with technical skill but also with the technology of tomorrow. The maximum "survival of fittest" is more relevant now than ever before. We believe in value based quality education and faculty Members at PMC TECH – Polytechnic are striving hard for it, so that product of our Polytechnic college is well received by the industry, public and private sector organization and others. I hope young Diploma engineers passing from the institute will create difference in Indian and Global scenario.

SECRETARY'S MESSAGE

Smt. P. MALLAR
Secretary

"Education is a progressive discovery of our own ignorance"

At PMC TECH, we value every individual and it is our aim to provide the best possible environment where students can succeed. Our campus has grown from its inception in 2002 to accommodate almost 3000 pupils in first-class teaching facilities which are amidst beautifully kept grounds. We are fortunate to have a talented, highly committed teaching and supporting staff here to ensure the learning environment of our students is the best it can be. We seek to prepare our young men and women with the very best preparation for life after PMC TECH. Our departing Collegians should be well rounded individuals who are grounded in the Anglican way of faith, hope and love. We seek to instill in our students a passion for learning which brings knowledge and makes them to understand that they need to make a positive contribution to the community where they live and work. The likelihood of achieving this is strengthened by the fact that we offer an academic program that includes indepth,rigorous coaching and which can be tailored to individual needs. We encourage high academic standards and have high expectations of personal discipline and motivation from our students.

Director Message

Er.Peurmal Manimekalai Polytechnic College is an institution that aims at the complete development of the student and our staff are a hand picked and trained to ensure that the students are given every possible support in all their Endeavour's academic or otherwise it is a multi disciplinary institution and this also ensures that the students have ready access to a wide range of academic material.

Our brand of education does not have narrow horizons, we believe in exposure. Our students are encouraged to widen their knowledge base and study beyond the confines of the syllabus.

Principal Message

Prof N. Balasubramaniam
Principal

Er.Perumal Manimekalai Polytechnic College is continuously strive to impart Quality Education along with high ethical and Moral values which enable us, not only to mould our students as successful Diploma Engineers but also as disciplined citizens of our Nation. Also, we continuously upgrade and maintain world class infrastructure keeping in pace with the rapid technological developments.

We are committed to innovation and continuous improvement. We seek to work closely in partnership with the students and their parents to maximize student performance and success regardless of their ability levels.

Creative Desk

"Chemical engineering: where the magic of science meets the ingenuity of engineering."

"In chemical engineering, we don't just solve problems; we create solutions."

"Chemical engineers: transforming ideas into reality, one reaction at a time."

"In the world of chemical engineering, every molecule has a story to tell."

"Chemical engineering is the art of converting raw materials into value-added products.

CREATIVE DESK

1.MRS.K.RENUGADEVI.M.E, HOD

REVIEWER

2.MRS.P.SIVARANJANI.B.Tech, LECTURER

CONVENOR

3.MR.M.DHILIP .M.E, LECTURER

EDITOR INCHARGE

4.MR.C.BASAVARASU.B.E, LECTURER

EDITOR MEMBER

5.MR.S.RANJITH KUMAR.B.Tech, LECTURER

EDITOR MEMBER

6.SELVAN M.YESHWANTH, III YEAR

STUDENT MEMBER

7.SELVAN S.JAISANKAR, II YEAR

STUDENT MEMBER

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DIGITALIZATION IN CHEMICAL ENGINEERING

By Mr.DHILIP M, M.E., /Lecturer

Introduction

Digitalization in chemical engineering has revolutionized the way processes are designed, monitored, and optimized, leading to significant improvements in efficiency, safety, and sustainability. This transformation encompasses various aspects, including data acquisition, analysis, modelling, and automation, all of which play crucial roles in enhancing the performance of chemical processes. One of the primary benefits of digitalization is the ability to gather vast amounts of data from sensors distributed throughout the production facility. These sensors continuously monitor parameters such as temperature, pressure, flow rates, and chemical compositions, providing real-time insights into the process dynamics. This data serves as the foundation for advanced analytics, enabling engineers to identify patterns, detect anomalies, and predict potential issues before they escalate. Furthermore, digital twins have emerged as powerful tools in chemical engineering, allowing engineers to create virtual replicas of physical processes. By combining real-time data with high-fidelity models, digital twins provide a holistic view of the operation, facilitating scenario analysis, optimization, and decision-making.

This technology enables engineers to simulate various operating conditions, assess the impact of design changes, and optimize process parameters to maximize efficiency and minimize resource consumption. In addition to process monitoring and optimization, digitalization plays a crucial role in ensuring safety and regulatory compliance. Advanced algorithms can analyze historical data to identify potential safety hazards and predict equipment failures, allowing operators to take proactive measures to mitigate risks. Furthermore, digitalization enables better traceability and documentation of process data, simplifying compliance with stringent regulatory requirements. Automation is another key aspect of digitalization in chemical engineering. By integrating control systems with advanced algorithms and machine learning techniques, engineers can automate routine tasks, optimize set points in real-time, and implement closed-loop control strategies.

This not only improves process efficiency but also reduces the reliance on manual intervention, minimizing the risk of human error and ensuring consistent product quality. Moreover, digitalization facilitates collaboration and knowledge sharing across interdisciplinary teams. Cloud-based platforms enable engineers to access and analyse data remotely, collaborate in real-time, and leverage collective expertise to solve complex problems. This collaborative approach accelerates innovation, fosters cross-functional collaboration, and drives continuous improvement across the organization. However, along with its numerous benefits, digitalization also poses challenges, including cyber security risks, data privacy concerns, and the need for workforce up skilling. Protecting sensitive data and ensuring the integrity of digital systems are paramount considerations in the digitalization journey. Additionally, organizations must invest in training programs to equip employees with the necessary skills to leverage digital tools effectively and adapt to evolving technologies.

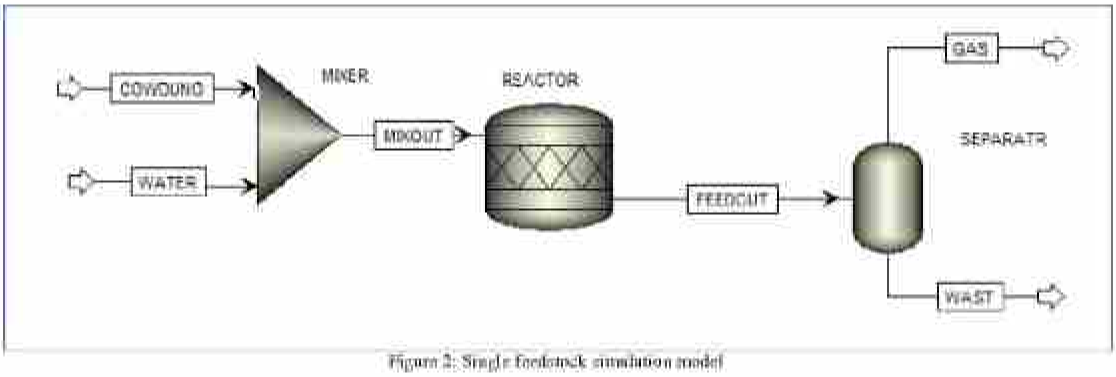
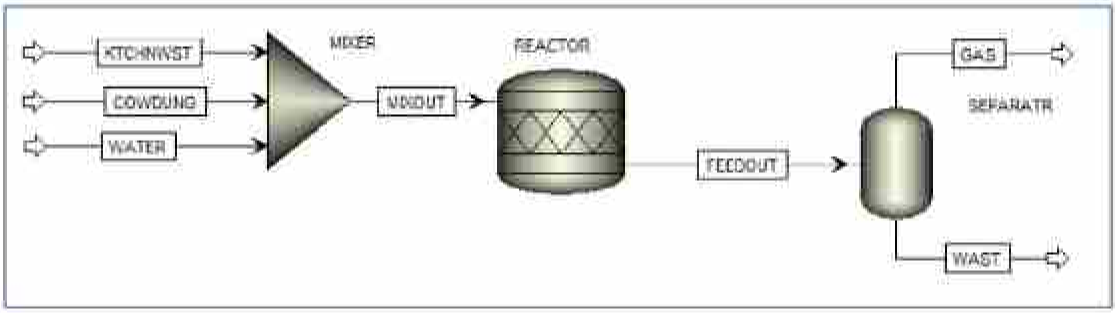
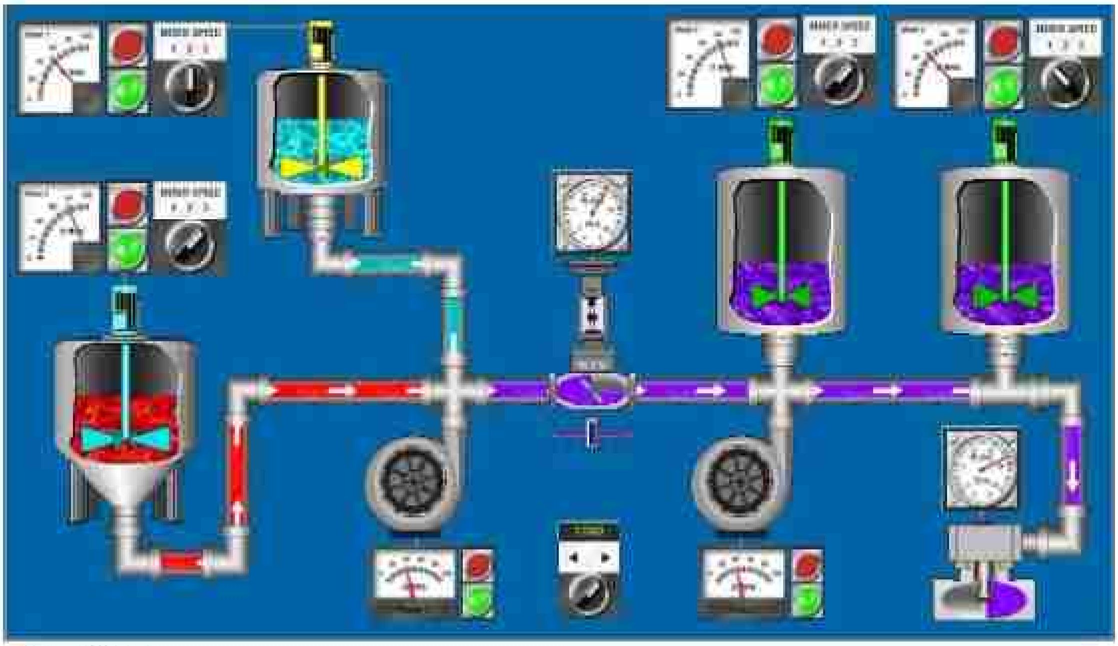


Figure 2: Single feedstock simulation model





In conclusion,

Digitalization has transformed the landscape of chemical engineering, enabling companies to achieve unprecedented levels of efficiency, safety, and sustainability. By harnessing the power of data, analytics, and automation, chemical engineers can optimize processes, drive innovation, and navigate the complexities of modern manufacturing with confidence. Embracing digitalization is not just a strategic imperative but a necessity for staying competitive in today's rapidly evolving market.

RECENT TRENDS IN CHEMICAL ENGINEERING

By Mrs.SIVARANJANI P, B.Tech/Lecturer

1. Process Intensification:

Process intensification involves the development of more efficient and sustainable processes by increasing the throughput, reducing energy consumption, and minimizing waste generation. Techniques such as micro reactors, membrane separations, and continuous manufacturing are gaining popularity in chemical engineering to achieve these goals.

2. Sustainable Manufacturing: There is a growing emphasis on sustainability in chemical engineering, with a focus on reducing the environmental impact of manufacturing processes. This includes the use of renewable feedstocks, green solvents, and eco-friendly catalysts, as well as the implementation of circular economy principles to minimize waste and maximize resource efficiency.

3. Digitalization and Industry 4.0:The adoption of digital technologies, such as data analytics, artificial intelligence, and the Internet of Things (IoT), is transforming the chemical industry. Digitalization enables real-time monitoring, predictive maintenance, and optimization of processes, leading to improved efficiency, productivity, and safety.

4. Advanced Materials: Chemical engineers are at the forefront of developing advanced materials with tailored properties for various applications. This includes nanomaterials, biomaterials, and smart materials that exhibit unique characteristics such as self-healing, shape memory, and stimuli responsiveness, opening up new opportunities in areas such as healthcare, electronics, and energy storage.

5. Biotechnology and Bioprocessing: The integration of biotechnology into chemical engineering is driving innovation in areas such as biopharmaceuticals, biofuels, and bio products. Advances in genetic engineering, synthetic biology, and fermentation technology are enabling the production of high-value compounds from renewable resources, reducing reliance on fossil fuels and minimizing environmental impact.

6. Energy Transition: Chemical engineers are playing a crucial role in the transition to a low-carbon economy by developing sustainable energy technologies. This includes renewable energy sources such as solar, wind, and bioenergy, as well as energy storage systems, carbon capture and utilization, and hydrogen production technologies to support the decarbonisation of sectors such as transportation, industry, and power generation.

7. Health and Safety: There is an increasing focus on health and safety in chemical engineering, driven by stricter regulations, public awareness, and advances in technology. This includes the development of safer chemicals and processes, risk assessment

methodologies, and process safety management systems to prevent accidents and minimize the impact of chemical hazards on human health and the environment.

8. Collaboration and Interdisciplinary: Chemical engineers are collaborating with experts from diverse fields such as materials science, biology, computer science, and environmental science to tackle complex challenges and drive innovation. Interdisciplinary research and cross-sector partnerships are becoming increasingly common, leading to breakthroughs in areas such as nanotechnology, biomedicine, and sustainable manufacturing. Overall, these trends reflect the evolving landscape of chemical engineering, characterized by a focus on sustainability, innovation, and collaboration to address global challenges and create a more resilient and prosperous future.

CAREER OPPORTUNITIES IN CHEMICAL ENGINEERING

By S.RANJITH KUMAR B.Tech/Lecturer

Certainly! Chemical engineering offers a wide range of career opportunities across various industries. Here are some common career paths for chemical engineering students:

1. Process Engineer: Process engineers are responsible for designing, optimizing, and troubleshooting chemical processes and manufacturing facilities. They work closely with production teams to ensure efficient operation, minimize waste, and maximize product quality and yield.

2. Research and Development (R&D) Engineer: R&D engineers work on developing new products, processes, and technologies. They conduct experiments, analyze data, and collaborate with multidisciplinary teams to innovate and improve existing products or create entirely new ones.

3. Environmental Engineer: Environmental engineers focus on addressing environmental challenges related to pollution prevention, waste management, and sustainable development. They design and implement solutions to mitigate the impact of industrial activities on air, water, and soil quality.

4. Energy Engineer: Energy engineers work on developing renewable energy sources, improving energy efficiency, and optimizing energy systems. They may be involved in the design and operation of renewable energy facilities, energy audits, and energy management programs.

5. Bioprocess Engineer: Bioprocess engineers specialize in the production of biopharmaceuticals, biofuels, and bio products using biological systems such as enzymes, microorganisms, and cell cultures. They design and optimize bioreactor systems, fermentation processes, and downstream purification methods.

6. Materials Engineer: Materials engineers focus on the design, development, and characterization of materials with specific properties for various applications. They may work on designing polymers, ceramics, metals, or composites for use in industries such as aerospace, automotive, and electronics.

7. Quality Control/Assurance Engineer: Quality engineers ensure that products meet regulatory requirements and quality standards. They develop and implement quality control procedures, conduct inspections and tests, and analyze data to identify and address deviations or defects in manufacturing processes.

8. Project Engineer/Manager: Project engineers/managers oversee the planning, execution, and completion of engineering projects. They coordinate resources, manage budgets and schedules, and communicate with stakeholders to ensure project success within specified constraints.

9. Consulting Engineer: Consulting engineers provide technical expertise and advisory services to clients in various industries. They may work for consulting firms or as independent contractors, offering solutions to complex engineering problems, conducting feasibility studies, and providing recommendations for process improvements.

10. Entrepreneurship: Some chemical engineering students choose to start their own businesses or pursue entrepreneurship opportunities. They may develop and commercialize new technologies, products, or services, or establish consulting firms or engineering start-ups to address specific market needs. These are just a few examples of the diverse career opportunities available to chemical engineering students. Depending on their interests, skills, and professional goals, students can explore a wide range of roles and industries to build rewarding and impactful careers in the field of chemical engineering.

PERSONAL SAFETY IN CHEMICAL INDUSTRIES

By Mrs.RENUGADEVI K, M.E., HOD

Personal Safety in Chemical Industries: Ensuring Worker Well-being Chemical industries play a vital role in producing essential materials for various sectors, including pharmaceuticals, agriculture, manufacturing, and energy. However, working in these industries poses inherent risks due to exposure to hazardous chemicals, high-pressure equipment, and potentially dangerous processes. Therefore, ensuring personal safety is paramount to protect the health and well-being of workers in chemical plants and facilities. In this article, we'll explore the key aspects of personal safety in chemical industries, including risk assessment, safety protocols, protective equipment, training, and regulatory compliance. Risk Assessment and Hazard Identification The first step in ensuring personal safety in chemical industries is to conduct thorough risk assessments and identify potential hazards associated with various tasks, processes, and substances used in the workplace. This involves analyzing the properties of chemicals, assessing potential exposure routes (inhalation, ingestion, skin contact), and evaluating the risks of fire, explosion, and other accidents. Risk assessments help prioritize safety measures and develop appropriate control measures to mitigate identified risks effectively.

Safety Protocols and Procedures Chemical industries rely on stringent safety protocols and procedures to prevent accidents and minimize the impact of potential hazards. These protocols include guidelines for handling, storage, and transportation of chemicals, as well as procedures for emergency response, spill containment, and evacuation. Workers must be familiar with these protocols and follow them diligently to ensure their safety and the safety of their colleagues.

Personal Protective Equipment (PPE) Personal protective equipment (PPE) is essential for protecting workers from exposure to hazardous chemicals and potential workplace hazards. Common types of PPE used in chemical industries include: Protective Clothing: Chemical-resistant coveralls, aprons, and suits protect the skin from contact with hazardous substances. Respiratory Protection: Respirators, such as masks and respirator cartridges, filter out harmful vapors, gases, and particulates from the air.

Eye and Face Protection: Safety goggles, face shields, and chemical-resistant goggles shield the eyes and face from splashes, dust, and chemical fumes.

Hand Protection: Chemical-resistant gloves provide protection against chemical spills, burns, and abrasions.

Foot Protection: Safety boots with chemical-resistant soles protect the feet from chemical spills, punctures, and impact injuries. Proper selection, use, and maintenance of PPE are crucial to ensure its effectiveness in preventing injuries and illnesses in chemical workplaces. Training and Education Effective training and education programs are essential for promoting a culture of safety and ensuring that workers have the knowledge, skills, and awareness to perform their jobs safely.

Training topics may include: Hazard communication and chemical safety Safe handling and storage of chemicals Emergency response procedures Use of PPE and other safety equipment Workplace ergonomics and injury prevention Fire safety and evacuation drills Health and wellness initiatives Regular refresher training and on-going education help reinforce safety practices and keep workers informed about the latest regulations and best practices in chemical safety.

Regulatory Compliance Chemical industries are subject to various regulations and standards aimed at protecting worker health and safety, as well as safeguarding the environment and the surrounding community. Regulatory compliance involves adhering to laws and regulations enforced by government agencies such as the Occupational Safety and Health Administration (OSHA) in the United States or the Health and Safety Executive (HSE) in the United Kingdom. These regulations set minimum requirements for workplace safety, chemical handling, hazard communication, and emergency preparedness. Compliance with regulatory requirements is essential to avoid fines, penalties, and legal liabilities and to ensure a safe and healthy work environment for all employees. Continuous Improvement and Incident Investigation Continuous improvement is a fundamental aspect of personal safety in chemical industries. Companies should regularly review their safety programs, conduct safety audits, and solicit feedback from workers to identify areas for improvement. Incident investigation is an essential tool for learning from accidents, near misses, and safety incidents and implementing corrective actions to prevent similar occurrences in the future. Root cause analysis techniques, such as the fishbone diagram or the 5 Whys method, help uncover underlying causes and contributing factors to incidents, allowing organizations to implement preventive measures and enhance safety performance.

Conclusion

Personal safety is a top priority in chemical industries, where workers are exposed to numerous hazards and risks on a daily basis. By implementing robust risk assessment processes, safety protocols, PPE measures, training programs, and regulatory compliance initiatives, companies can create a safe and healthy work environment for their employees. Continuous improvement and incident investigation are essential components of a proactive safety culture that prioritizes prevention, learning, and continuous learning. By investing in personal safety, chemical industries can protect their most valuable asset—their people—and ensure sustainable operations and long-term success.

GREEN FUELS

By Mr.BASAVARASU C, B.E., LECTURER

Introduction

Green fuels,

Also known as renewable fuels or alternative fuels, are energy sources derived from renewable resources that produce minimal or no net greenhouse gas emissions when burned. These fuels play a crucial role in mitigating climate change, reducing dependence on fossil fuels, and promoting sustainable energy production and consumption. In this discussion, we will explore various types of green fuels, their production processes, benefits, challenges, and their potential to transform the global energy landscape. Types of Green Fuels

1. Biofuels:

Biofuels are derived from organic materials such as plants, algae, and waste biomass. The most common types of biofuels include: Bioethanol: Produced from crops such as corn, sugarcane, or cellulose-rich materials through fermentation and distillation processes. Biodiesel: Made from vegetable oils, animal fats, or recycled cooking oil through trans esterification, a chemical process that converts triglycerides into fatty acid methyl esters. Biogas: Generated from the anaerobic digestion of organic waste, such as agricultural residues, municipal solid waste, and wastewater sludge.

2. Hydrogen: Hydrogen fuel is produced through various methods, including electrolysis of water using renewable electricity, steam reforming of biogas or biomass, and thermochemical processes such as gasification or pyrolysis. Hydrogen can be used directly in fuel cells to produce electricity or converted into synthetic fuels like ammonia or methanol.

3. Synthetic Fuels: Synthetic fuels, also known as e-fuels or power-to-X fuels, are produced by combining renewable electricity with carbon dioxide (CO_2) captured from the atmosphere or industrial sources. Common examples include synthetic methane, methanol, and dimethyl ether (DME). These fuels can be used in existing infrastructure and combustion engines with minimal modifications. Production Processes The production of green fuels involves various processes, each tailored to the specific feedstock and desired end product. Here are some key production pathways: Bioethanol Production: Biomass feed stocks are converted into sugars through enzymatic hydrolysis or acid hydrolysis. The sugars are then fermented by microorganisms such as yeast to produce ethanol, which is subsequently distilled and purified. Biodiesel Production: Vegetable oils or animal fats are treated with an alcohol (usually methanol or ethanol) and a catalyst to produce fatty acid methyl esters (FAME) or fatty acid ethyl esters (FAEE), which are then separated and purified. Hydrogen Production: Electrolysis of water splits water molecules into hydrogen and oxygen using electricity from renewable sources. Other methods include steam reforming of biogas or gasification of

biomass to produce a hydrogen-rich syngas, which is then purified to obtain hydrogen. Synthetic Fuel Production: Renewable electricity and captured CO2 are used as feed stocks to produce synthetic fuels through processes such as Fischer-Tropsch synthesis, methanol synthesis, or direct electrolysis.

Benefits of Green Fuels

1. Reduced Greenhouse Gas Emissions: Green fuels produce significantly lower carbon emissions compared to fossil fuels, helping to mitigate climate change and reduce air pollution.

2. Energy Security and Independence: By diversifying the energy mix and reducing dependence on imported fossil fuels, green fuels enhance energy security and promote self-sufficiency.

3. Rural Development: The production of biofuels from agricultural crops and waste biomass can create new economic opportunities in rural areas, supporting farmers and local communities.

4. Technological Innovation: Investments in green fuel technologies drive innovation and foster the development of new industries, creating jobs and stimulating economic growth

5. Sustainable Transportation: Green fuels can be used as drop-in replacements for conventional fuels in existing vehicles and infrastructure, enabling a smooth transition to sustainable transportation.

Challenges and Limitations

1. Feedstock Availability and Competition: The availability of feedstock's for green fuel production is limited and can compete with food production, leading to concerns about land use change, deforestation, and food security.

2. Technological Maturity and Cost: Many green fuel technologies are still in the early stages of development and face challenges related to scalability, efficiency, and cost competitiveness compared to fossil fuels.

3. Infrastructure and Market Penetration: The widespread adoption of green fuels requires significant investments in infrastructure, including production facilities, distribution networks, and vehicle refueling stations.

4. Policy and Regulatory Frameworks: Effective policies and regulatory frameworks are needed to incentivize investment in green fuels, establish sustainability criteria, and ensure a level playing field for renewable energy technologies.

5. Lifecycle Analysis and Sustainability: Assessing the environmental and social impacts of green fuel production requires comprehensive lifecycle analysis to account for factors such as land use, water consumption, and indirect emissions.

Future Outlook

Despite the challenges, green fuels hold immense promise as a sustainable alternative to fossil fuels. Advances in technology, coupled with supportive policies and market incentives, are driving rapid growth in the green fuel industry. As economies transition towards low-carbon energy systems, green fuels are expected to play a central role in decarbonizing sectors such as transportation, industry, and power generation. With continued innovation and collaboration, green fuels have the potential to usher in a new era of clean, renewable energy and contribute to a more sustainable future for generations to come.

STUDENTS ACHIEVEMENTS

Sl.No	Student Name	Year	Events	Institute	Status
1	Yeswanth M	III Year	Paper Presentation	Thanthai Rover Institute of Polytechnic college , Perambalur	II Prize
2	VishnuRam T J	III Year	Paper Presentation	Thanthai Rover Institute of Polytechnic college , Perambalur	II Prize
3	Nithish M	III Year	Poster Presentation	Thanthai Rover Institute of Polytechnic college , Perambalur	III Prize
4	Rajesh Kumar R	III Year	Poster Presentation	Thanthai Rover Institute of Polytechnic college , Perambalur	Participated
5	Yeswanth M	III Year	Poster Presentation	Thanthai Rover Institute of Polytechnic college , Perambalur	Participated
6	Yeswanth M	III Year	Paper Presentation	Govt Polytechnic College Bodichipalli , Kelamangalam	Participated
7	Yeswanth M	III Year	Paper Presentation In conference	Adhiyamaan College of Engineering ,Hosur	III Prize
8	VishnuRam T J	III Year	Paper Presentation	Adhiyamaan College of Engineering ,Hosur	Participated
9	Jai sankar	II Year	Paper Presentation	Kongu Polytechnic College , Perundurai	III Prize
10	Govindharaj	II Year	Paper Presentation	Kongu Polytechnic College , Perundurai	III Prize
11	Yeswanth M	II Year	Project Presentation	Institute of Engineers , Hosur Local Center	III Prize
12	VishnuRam T J	II Year	Project Presentation	Institute of Engineers , Hosur Local Center	Participated
13	Yeswanth M	II Year	Non Technical Events	Institute of Engineers , Hosur Local Center	Participated
14	VishnuRam T J	II Year	Non-Technical Events	Institute of Engineers , Hosur Local Center	I Prize

PROJECTS

TITLE : DESIGN AND FABRICATION OF COOLING TOWER

SYNOPSIS:

INTRODUCTION:

The equipment cooling tower is used in major industries is for the cooling the water nearly to the atmospheric temperature nearly up to 33°c-36°c. the cooling tower is the cylindrical vessel which is mounted vertically. The hot water inlet is passed from top of the tower, which is sprayed through distributors. The hot water goes in contact with atmospheric air, the latent heat which is absorbed by air in the form of vapor's and causes the reduction of temperature, which is bought at bottom of the tower.

THE COMMON FACTORS WHICH DECIDES THE EFFICENCY OF TOWER:

- The amount of water exposed to the water.
- The velocity of air passing through the water to form vapour and water droplets.
- The rate of time of air bought in contact with water.

PROCESS:

The water which is obtained from various industries consist of high temperature are fed at top of the tower through distributors. The water is sprayed on pvc fall film which reduce the velocity of water passing to bottom. The fall film is made up of spring casing with free spacing with more layers are arranged. Then air is passing through the bottom of the tower, hence air and water bought in contact and air absorbs the latent heat and produces cool water at bottom of the tower. To increase the efficiency of tower. the mechanical drift fan is arranged to remove the hot air at top and provide the cool air from bottom of tower. Generally, the temperature of water coming out of the cooling tower is 3° c to 5° c above wet bulb temperature. The cooling tower efficiency is not equal to WBT due to some water losses in tower like drift losses, evaporative losses and blow down losses. Hence cooling tower efficiency will be in between 70 to 75%.

TITLE : EXTRACTION OF OIL FROM WATERMELON SEEDS

Synopsis:

Oil content in the seeds is between 35 - 40 % and the unsaturated fatty acid content in oil is 78- 86% predominantly linoleic acid (45-73 %). Watermelon seed oil is effective for skin care as it is light, easily absorbable and has humectants properties. Watermelon seed oil also known as O tenga oil or Kalahari oil suitable for cosmeceutical applications. High acid value in oil will produce soap during transesterification process. High acid value of Watermelon oil necessitated acid pretreatment of the oil before transesterification. Free fatty acids (FFA) are produced by the hydrolysis of oils and fats. The free fatty acid value measures extent to which glycerides in the oil have been decomposed by lipase action. Free fatty acids for Watermelon seed oil was 2.5-3 %. The unsaturated fatty acid content of 77.4% and the high content of 63.2% of PUFA. The time of extraction increased yield of oil also increase and up to maximum level. The extraction of date seed oil carried out 2-6 hrs. Ihe optimum time for extraction is 4 hrs. Crushed seed in powdered form gives large surface area for solid-liquid contact. Due to small size particles increase rate as well as yield of extraction of oil from watermelon seed. Extraction carried out at boiling temperature of solvent should be better for rate and yield of extraction. Temperature for extraction with petroleum ether, methanol and hexane up to 40-50° C.

TITLE : HANDMADE PAPER FROM WASTE BANANA FIBRE

Synopsis:-

Synthetic fibre to produce composite material. In the fiber extraction process, a substantial amount of lingo cellulosic wastes are generated, disposal of which creates problem in the adjacent area. In this paper, extracted banana fiber (EBF) and waste banana fiber (WBF) were characterized in terms of chemical and morphological properties to produce handmade paper. WBF was characterized with lower α–cellulose, lignin content and longer fiber length. Pulping of EBF and WBF was carried out with varying active alkali and cooking time at boiling temperature. Pulp yield of WBF was 35.9% after 120 min of cooking with 8% alkali charge. In the unbeaten state the degrees of drainage resistance i.e. SR values were 65 and 71 for EBF and WBF, respectively. The tensile, burst and tear indices of WBF were 23.7 N.m/g, 2.2 kPa.m2/g and 5.0 mN.m2/g, respectively; these were much lower as compared to EBF. These values however, meet requirement of handmade paper.

ALUMNI CORNER

By N.Sridhar Chemist/Chemplast Sanmar Limited (2017 Passed Out)

Working in the chemical process industries involves the production of various chemicals, materials, and products through chemical reactions and processes. This industry encompasses a wide range of sectors, including petrochemicals, specialty chemicals, polymers, pharmaceuticals, fertilizers, and more.

Jobs in the chemical process industries can include

1. research and development,
2. process engineering,
3. plant operations,
4. quality control,
5. environmental health and safety,
6. and sales/marketing.

Key aspects of working in this field include:

Research and Development: Developing new chemical processes, improving existing processes, and discovering novel materials and products.Process Engineering: Designing, optimizing, and scaling up chemical processes to ensure efficiency, safety, and cost-effectiveness.

Plant Operations: Overseeing the day-to-day operations of chemical manufacturing facilities, ensuring production targets are met, and maintaining safety and regulatory compliance.

Quality Control: Testing and analyzing raw materials, intermediates, and final products to ensure they meet quality standards and specifications.

Environmental Health and Safety: Implementing measures to minimize environmental impact, ensure workplace safety, and comply with regulations related to chemical handling and emissions.

Sales and Marketing: Promoting and selling chemical products, understanding market trends and customer needs, and building relationships with clients.

Working in the chemical process industries requires a strong background in chemistry, chemical engineering, or a related field. It also demands attention to detail, problem-solving skills, the ability to work in multidisciplinary teams, and a commitment to safety and environmental stewardship. While the industry offers opportunities for innovation and advancement, it also presents challenges such as regulatory compliance, supply chain management, and navigating market fluctuations.

DEPARTMENT ACTIVITIES

GUEST LECTURE

S.NO	NAME OF THE RESOURCE PERSON	DATE	TOPIC	YEAR	No of students attended
1	Mr. M. Suresh kumar, Assistant Manager, Sim Infosystems Pvt.Ltd., Chennai	05/09/2022 & 06/09/2022	Simulation Training	III	58
2	Mr. Senthil Lakshmana perumal, Safety Manager, Global calcium pvt Ltd., Hosur	24/09/2022	Safety Practices in industries	III	58
3	Mr.K.Prasath, Junior Manager-Production Syngene international Ltd., Bangalore	01/10/2022	Good Documentation practices and Data integrity	II	65
4	Mr.Saheed Mohammed S HR Manager, Omni active Health Technologies Ltd., Hosur	28/10/2022	Industry readiness and expectation from young talents	III	58

INDUSTRIAL VISIT

Sl.No	Industry Visited	Date of Visit	Year	No of students Visited
1	UNIBIC FOODS INDIA PVT LTD, BENGALURU	15/10/2022	III	58
2	HATSUN AGRO PRODUCT LTD, PALACODE	05/11/2022	II	62

Puzzles

Mystery

The Mixing Tank Mystery

Imagine you're a chemical engineer tasked with optimizing the mixing process in a large tank used for blending different liquids.

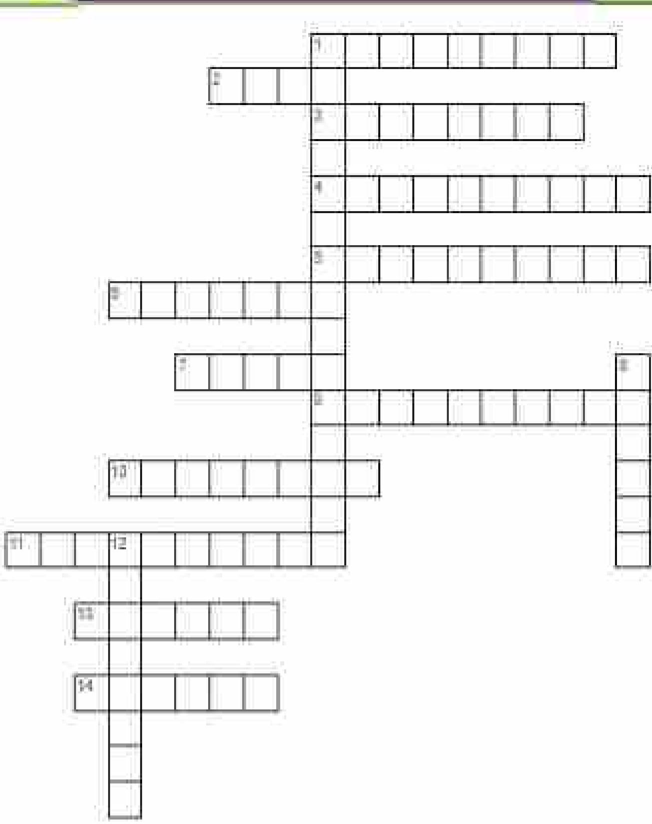
The tank has multiple inlets for introducing various components, and the goal is to achieve uniform mixing and homogeneity throughout the tank.

However, after conducting several tests, you discover that certain areas of the tank consistently exhibit non-uniform mixing, leading to product inconsistencies and quality issues. Despite adjusting flow rates and mixer settings, the problem persists.

Your challenge is to identify the root cause of the non-uniform mixing and propose a solution to ensure consistent blending throughout the tank.

Hint: Consider factors such as flow dynamics, turbulence, mixing efficiency, inlet locations, and the physical properties of the liquids being blended.

Once you've identified the problem and devised a solution, you can discuss potential strategies for implementing and validating your proposed solution to optimize the mixing process effectively.



Across

1 Chemical engineers work to develop new chemical these

2 Chemical engineers must be proficient in this, relates to algebra, calculus, or trigonometry

3 When a chemical engineer examines parts he has made

4 A tool a chemical engineer may work with to look at small items

5 An important skill for chemical engineers to have in order to design new technology

6 Chemistry, biology, and physics are all types of these

7 A place where many chemical engineers work to install their devices

9 Has to do with making new, modern technology (*Blank* that excites)

10 The things chemical engineers make and work with

11 Some chemical engineers may make these and get patents for them

13 Stands for Fundamentals of Engineering Exam

14 Stands for Professional Engineering Exam

Down

1 Pharmaceuticals/A sector a chemical engineer may work in, medical drugs

8 A sector a chemical engineer may work in, something that can not be created nor destroyed

12 Chemical engineers combine these to make new chemicals, there is a periodic table of them

Find the words

R	O	T	B	L	E	M	O	N	J	U	I	C	E	J	K	R	Y
K	B	J	X	N	E	U	T	R	A	L	I	S	A	T	I	O	N
O	C	N	O	I	T	C	A	E	R	K	C	X	Z	J	O	U	S
U	X	J	S	W	F	F	E	G	P	P	G	H	N	F	Z	M	C
U	R	I	N	E	T	P	R	R	M	E	L	A	C	S	H	P	R
I	A	M	R	Q	N	D	K	E	M	G	S	O	W	X	S	E	Q
V	D	O	A	M	E	I	R	T	L	E	C	J	N	E	P	A	F
S	O	H	K	N	M	I	T	A	Q	W	U	O	L	A	C	E	S
X	S	E	K	A	I	O	Z	W	U	I	I	G	P	J	L	D	O
V	G	V	C	E	R	T	D	D	C	T	G	S	P	I	I	Y	P
M	N	H	C	A	E	L	B	E	U	O	U	T	L	C	W	H	K
O	I	I	M	X	P	B	S	L	G	M	P	A	A	R	L	N	T
D	K	X	E	Q	X	Q	O	L	T	C	K	O	A	J	R	I	J
T	A	S	T	T	E	S	W	I	T	L	Q	C	Z	E	Q	M	B
L	B	E	O	U	O	R	L	T	A	T	I	B	T	O	J	A	O
A	S	S	Z	C	R	R	I	S	X	O	R	A	J	W	H	T	I
S	S	A	G	V	Q	E	P	I	F	K	W	L	A	O	O	I	X
V	Q	B	P	C	M	E	K	D	A	I	N	O	M	M	A	V	C

ACIDS
ALKALI
AMMONIA
BAKING SODA
BASES
BLEACH
DISTILLED WATER
EXPERIMENT

GOGGLES
JUICES
LAB COAT
LEMON JUICE
LITMUS PAPER
MIXTURE
NEUTRALISATION
PH SCALE

PROTEIN
REACTION
SALT
SOLUTION
URINE
VITAMIN
WATER

TECHNICAL MCQ

1. First Empirical scale conceived is the ____________ temperature scale .
   a. Absolute b. Reaumer c. Farenhite d. Celcius
2. Which of the following is not used as a fuel in rocket propellant?

   a. Liquid Hydrogen b. Liquid Oxygen c.Liquid Hydrazine d.Kerosene oil

3. Chlorine act as a bleaching agent only in presence of
   a. Dry air b.Pure Oxygen c. Moisture d.Sunlight
4. Kinematic viscosity of water as compared to that of air is
   a. More b.Less c.15% more d. 15 % less

5. What is the specific gravity of 5 Kg of water occupied in 10 m3 with respect to 500 g/m^3?

   a) 2 b) 5 c) 0.5 d) 1

6. What is the 100°C in degree Fahrenheit?

   a) 100°F b) 212°F c) 460°F d) 0°F

7. What is thermodynamics?

   a) study of the relationship between heat and other forms of energy
   b) study of the conversion of chemical energy to other forms of energy
   c) study of the relationship between mechanical energy to other forms of energy
   d) study of the conversion of mechanical energy to other forms of energy

8. Which of the following is a thermodynamics law?

   a) Zeroth law of thermodynamics
   b) Faraday's Law of thermodynamics
   c) Ideal Gas Law of thermodynamics
   d) Boyle's Law of thermodynamics

9. Which one is not a dimension?

   a) Length b) Mass c) Time d) Kelvin

10. 1.5 nm. is equal to

   a) 1.5*10^-8 dm b) 0.15 Angstrom
   c) 5.9*10^-10 in d) All of the mentioned

DEPARTMENT GALLERY

SOCIAL RESPONSIBILITIES (EYE CAMP SERVICE BY OUR STUDENTS)


OPPO A9 2020


UPLIFTING THE CITIZENS OF TOMORROW


UNIBIC
IN THE FRUITY, NUTTY, BUTTERY


OmniActive


PAF
PAVITHRAN ASEPTIC FRUIT PRODUCTS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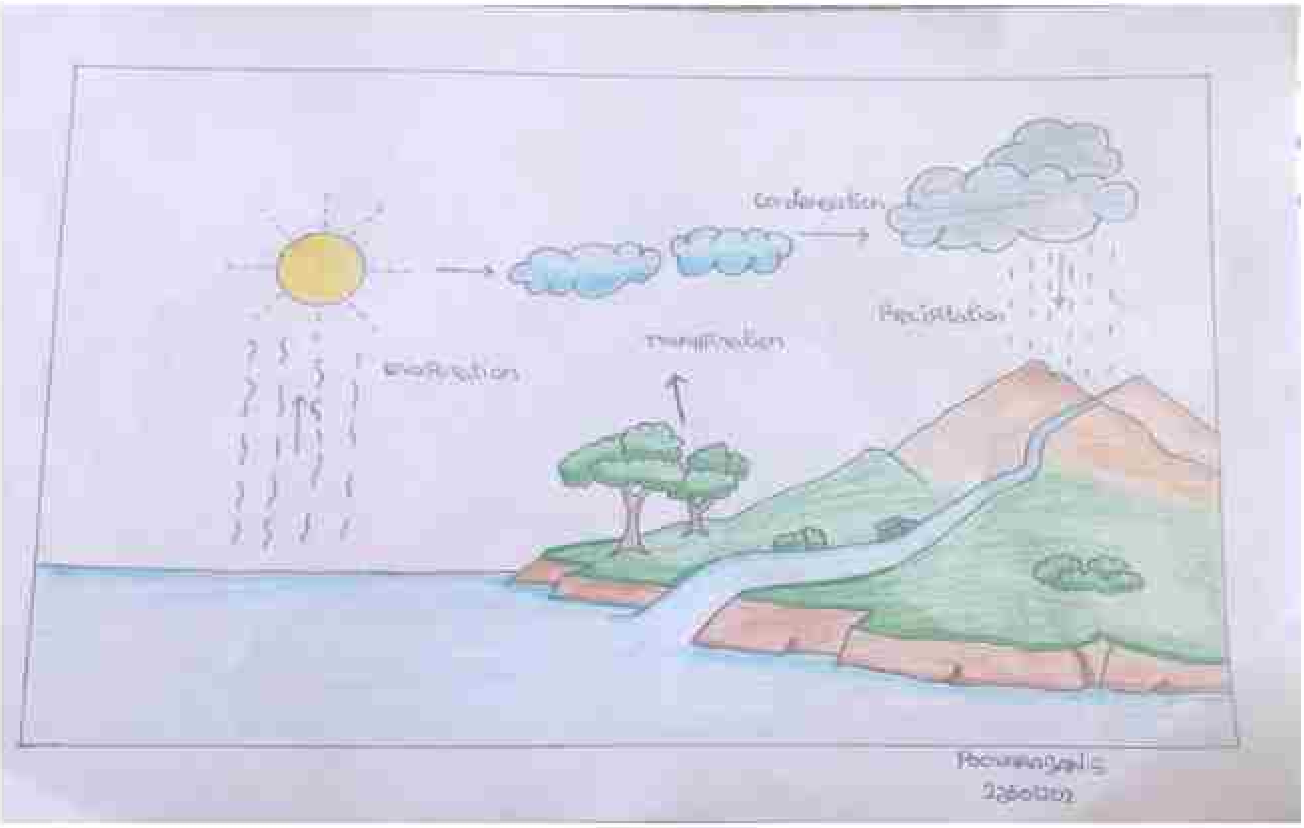
MAIVA PHARMA PVT LTD

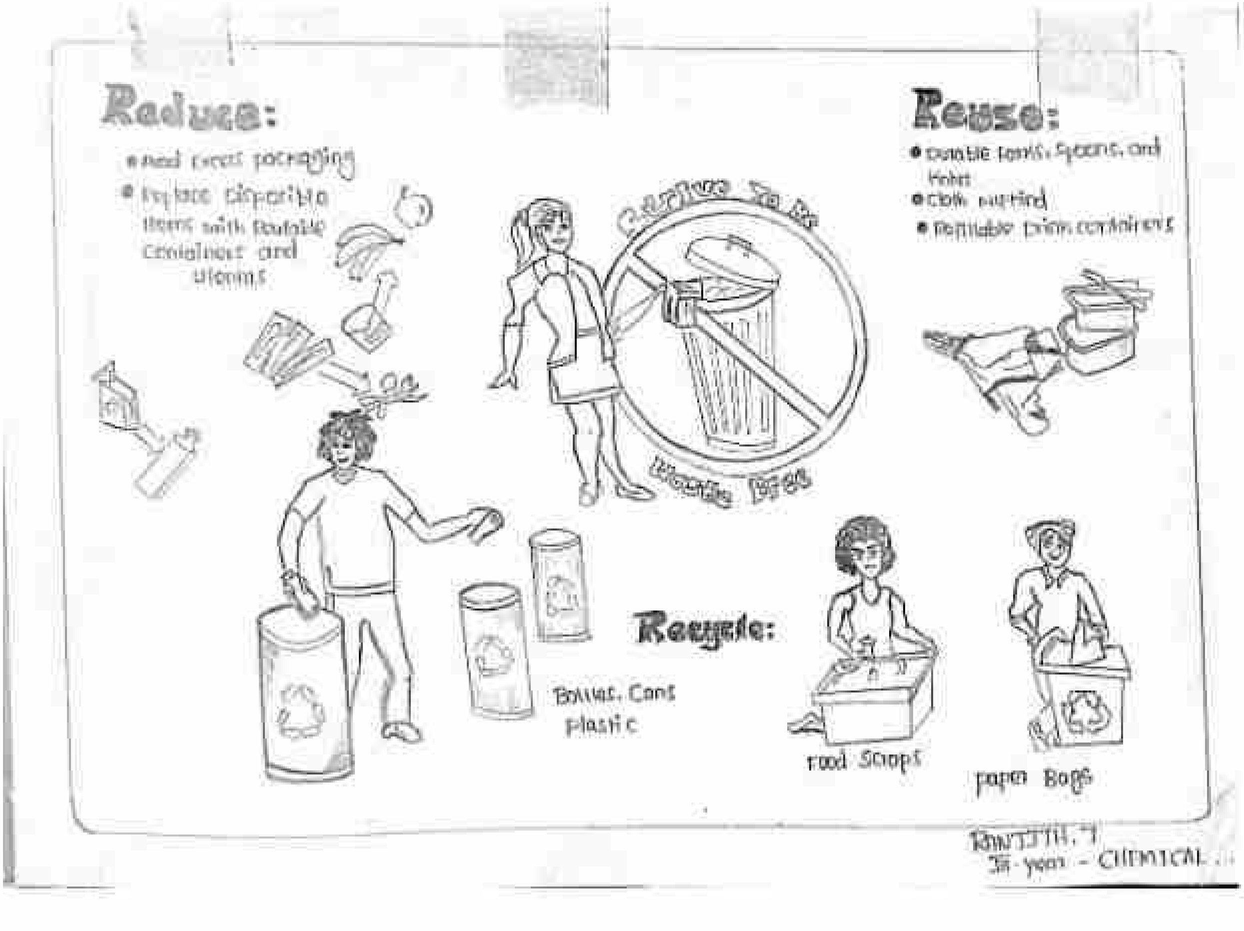




ART GALLERY




Name: Charan.M
Dep: Chemical


Reduce:
Reuse:
Recycle:
Bottles, Cans
Plastic
Food Scraps
paper Bags
RANJITH.M
III year - CHEMICAL

OUR RECRUITERS- 22-23

SANMAR

OrchidPharma

Mastercraft

SV Biofuels

MSR Venturi Tools

KANSAI NEROLAC PAINTS LIMITED

JBM Group

NEEL METAL PRODUCTS LTD

OmniActive HEALTH TECHNOLOGIES

TVS TVS Motor Company Limited