

KATHMANDU UNIVERSITY

End Semester Examination

January/February 2024

Level : B.E.
Year : III
Time : 2 hrs. 30 mins.

Course : CHEG 311
Semester : I
F.M. : 40

SECTION "B"

[4 Q. × 5 = 20 marks]

Attempt *ANY FOUR* questions.

1. Explain the gasification process of coal, highlighting the key steps involved? Discuss the advantages and disadvantages of coal gasification compared to traditional methods of coal utilization? [3+2]
2. Describe the process of extracting edible oil from oilseeds, highlighting the key steps involved in both mechanical and solvent extraction methods? Discuss the advantages and disadvantages of each extraction method, considering factors such as efficiency, oil yield, and quality of the extracted oil? [2+3]
3. Explain the steps involved in pre-processing & refining of crude oil to get petroleum as final product along with block diagram. [5]
4. Explain the principles of polymerization? Discuss about polymer processing techniques and their applications in polymer manufacturing. [2+3]
5. Explain different types of spinning techniques used in fiber production. Compare and contrast these methods in terms of their advantages, limitations, and applications. [5]

SECTION "C"

[5Q. × 4 = 20 marks]

Attempt *ANY FIVE* questions.

6. Explain the steps involved in 'production of Soap'. [4]
7. Provide a detailed overview of the microbial fermentation process used in the production of acetic acid. Highlight key factors influencing fermentation efficiency and yield. [4]
8. Explain the process of paper production from recycled newspaper to the final paper product that to be used for newsprint. [4]
9. Explain how 'Methanol' is produced from Synthesis Gas, along with block diagram. [4]
10. What is the primary purpose of a vacuum distillation unit & why it's used after atmospheric distillation unit in crude oil refining? How does a hydrocracker contribute to the upgrading of heavy feedstocks in a refinery? [2+2]
11. Explain the various methods used in shaping and forming rubber products? Explain the use of vulcanization process in rubber manufacturing. [2+2]

KATHMANDU UNIVERSITY
End Semester Examination
January/February 2024

Marks Scored:

Level : B.E.
Year : III

08 FEB 2024

Course : CHEG 311
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"

[20Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate option from each set of choices

- What is the primary purpose of coal gasification?
 - Electricity generation
 - Liquid fuel production
 - Hydrogen production
 - All of these
- In the context of sugar evaporation, what is meant by the term "boiling point elevation"?
 - The temperature at which sugar caramelizes
 - The increase in boiling point due to dissolved solutes
 - The temperature required for sugar crystallization
 - The reduction in water vapor pressure during evaporation
- What is the primary advantage of the soda pulping process?
 - Low environmental impact
 - High pulping yield
 - Reduced energy consumption
 - Cost-effectiveness
- In starch processing, what is the function of the hydro-cyclone separator?
 - Separating starch from water
 - Heating the starch slurry
 - Adding enzymes to the mixture
 - Concentrating the starch
- In edible oil refining, oil is
 - Dehulled / Pressed / Extracted / Filtered / Centrifuged / Packed
 - De-acidified / Steam blown through oil in vacuum / Packed
 - Filtered / Centrifuged, De-acidified / Steam blown through oil in vacuum
 - Steam blown through oil with activated charcoal & filtered
- What is the purpose of winterization in edible oil processing?
 - Increase shelf life
 - Improve color
 - Remove waxes
 - Reduce free fatty acids
- What is the primary microorganism used in the fermentation of acetic acid?
 - Escherichia coli
 - Saccharomyces cerevisiae
 - Acetobacter
 - Lactobacillus
- Which type of fatty acids is commonly used in soap production?
 - Unsaturated fatty acids
 - Saturated fatty acids
 - Aromatic fatty acids
 - Branched-chain fatty acids
- What is the typical method used for desalting crude oil in refineries?
 - Distillation
 - Filtration
 - Centrifugation
 - Crystallization

10. In hydrotreating, what is the purpose of removing sulfur from hydrocarbons?
 - a. To increase octane rating
 - b. To reduce corrosion in pipelines
 - c. To meet environmental regulations
 - d. To improve color and appearance

11. What is the primary purpose of isomerizing naphtha in a refinery?
 - a. Sulfur removal
 - b. Color improvement
 - c. Aromatics reduction
 - d. Increasing octane number

12. What is naphtha primarily composed of in the petroleum refining process?
 - a. Heavy hydrocarbons
 - b. Light hydrocarbons
 - c. Aromatic compounds
 - d. Alkanes and alkenes

13. In polymer blending, what term is used to describe the situation where the polymers do not fully mix at the molecular level?
 - a. Homogeneous blending
 - b. Incompatibility
 - c. Cross-linking
 - d. Crystallization

14. What is the primary purpose of extrusion in polymer processing?
 - a. Polymer synthesis
 - b. Polymer blending
 - c. Shaping polymer into a continuous profile
 - d. Polymer crosslinking

15. Which polymerization technique allows for the incorporation of two or more different monomers into a single polymer chain?
 - a. Step-growth polymerization
 - b. Chain-growth polymerization
 - c. Copolymerization
 - d. Crosslinking polymerization

16. The process of polymerization can be initiated by:
 - a. Heat
 - b. Light
 - c. Chemical initiators
 - d. All of these

17. What is the primary raw material used in the production of nylon?
 - a. Cotton
 - b. Rayon
 - c. Polyethylene
 - d. Caprolactam

18. What role do accelerators play in the rubber vulcanization process?
 - a. Increase curing time
 - b. Decrease curing temperature
 - c. Reduce cross-linking density
 - d. Inhibit vulcanization

19. What is the primary function of antidegradants in rubber processing?
 - a. Increase cross-linking density
 - b. Protect against rough use degradation
 - c. Protect against deterioration from heat and oxygen
 - d. Accelerate vulcanization

20. What is the purpose of the quenching process in fiber spinning?
 - a. To add color to the fibers
 - b. To increase fiber diameter
 - c. To solidify the polymer fibers
 - d. To enhance fiber flexibility