

Chemical Engineering (Module II)

Part II
(Ten questions of one mark each)

Marks : 10

Codes and Specifications

1. BIS Codes
2. ASTM Codes
3. BS (British Standards) Codes
4. DIN (Deutsche Industrie Norm) Codes

Part III
(Ten questions of one mark each and twenty questions of two marks each)

Marks : 50

A. Plant Design and Project Engineering

- Present Trends in Chemical Industry
- Planning in Chemical Industry – Plant Siting and Layout
- Economics of Scale, Markets, Capital Charges, Feed Stocks, Utilities, Labour, Ancillary Industries
- Process Design Development
- General Design Considerations
- Optimum Design
- Materials and Fabrication Selection
- Material Transfer, Handling and Treatment Equipment – Design and Costs
- Equipment – Design and Costs
- Heat Transfer Equipment – Design and Costs
- Mass Transfer Equipment – Design and Costs

B. Production Processes

- Coal Chemicals – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Ceramic Industries – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Cement, Calcium and Magnesium Compounds – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.

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- Chloro-Alkali Industries – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Electrolytic Industries – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Phosphorus Industries – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Sulfur and Sulfuric Acid – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Nitrogen Industries – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Oils, Fats and Waxes – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Fermentation Industries – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Pulp and Paper Industries – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Plastic, Man-made Fibre and Rubber Industries – Unit Operations (Physical Principles), Chemical conversions, Flowcharts, Chemical Processing, etc.
- Petroleum Refining – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Petrochemicals – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.
- Pharmaceutical Industries – Unit Operations (Physical Principles), Chemical Conversions, Flowcharts, Chemical Processing, etc.

C. Operation and Maintenance

Operational Problems of different Chemical Process Units – Reactors, Heat Exchangers, Columns of various types (Distillation, Absorption, Extraction, etc; Dryers, Grinders, etc.)

- Maintenance of different Chemical Process Units.
- Maintenance of Ancillary Equipment – Pipes, Ducts, Fittings, Stacks, Valves, Fans, Pumps, Compressors, etc.
- Operational Problems and Maintenance of Air, Water and Solid Waste Control Equipment.
- Maintenance of utilities needed in the operation of Chemical Process Industries – Steam for Process Heating, Cooling Water, Water for General

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Use, Demineralized Water, Compressed Air, Inert Gas Supplies, Refrigeration, etc.

D. Quality Assurance and Quality Control

- Fundamentals of Automatic Control
- Process Measurements
- Indicating and Recording Instruments
- Automatic Controllers
- Final Control Elements
- Telemetry and Transmission
- Computer Process Control
- Unit Operations Control
- Control – System Analysis

E. Research and Development

- R & D in Product Development
- R & D in Process Development
- R & D in Emerging Areas – Biotechnology, Renewable Energy Sources, Catalysis, Cryogenic Technology, Modern Separation Processes, etc.