Reg. No.																

Question Paper Code	13907

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Seventh Semester

Instrumentation and Control Engineering

(Common to Electronics and Instrumentation Engineering)

20ICEL704 - INSTRUMENTATION AND CONTROL IN PETROCHEMICAL INDUSTRIES

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which of the following is the best definition of a petrochemical? (a) Mineral-based (b) Rock-based (c) Petroleum-derived (d) Salt-based	1	K1	CO1
2.	Which recovery technique is commonly used for crude oil in India? (a) Oil-Gas Separation (b) Desalting (c) Polymerization (d) Pyrolysis	1	K1	CO1
3.	Which among the following is a catalytic reforming unit used for? (a) Increase Octane (b) Decrease viscosity (c) Add colour (d) Remove sulfur	1	K1	CO2
4.	Which of the following is a product of the atmospheric distillation of crude oil? (a) Diesel (b) Methanol (c) Urea (d) Ammonia	1	K1	CO2
5.	Intrinsic safety in instrumentation aims to: (a) Increase cost (b) Ensure safe operation (c) Improve speed (d) Reduce size	1	K1	CO3
6.	Area classification in refineries is crucial for: (a) Marketing (b) Electrical installation safety (c) Exporting products (d) Increasing yield	1	K1	CO3
7.	Control of heat exchangers in refiners mainly targets: (a) Pressure stability (b) Temperature control (c) Product colour (d) Pump maintenance	1	K1	CO4
8.	What is the main function of a reboiler in a distillation column? (a) Cooling (b) Heating (c) Filtering (d) Mixing	1	K1	CO4
9.	SIL stands for: (a) Safety Instrumented Level (b) Safety Integrity Level (c) Standard Input Level (d) Signal Isolation Level	1	K1	CO5
10.	The purpose of a PLC in petrochemical automation is to: (a) Store data (b) Control processes (c) Refine oil (d) Pump water	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	State the main steps in the oil-gas production process.	2	K1	CO1
12.	List any two important operations conducted in a refinery.	2	K1	CO1
13.	State the purpose of wet gas processing in petroleum production.	2	K1	CO2
14.	Mention two benefits of atmospheric distillation.	2	K1	CO2
15.	List the two parameters commonly measured by field instruments in refineries.	2	K1	CO3
16.	What is intrinsic safety in instrumentation?	2	K1	CO3
17.	List two important control schemes used in a cooling tower system.	2	K1	CO4
18.	Why is reflux control important in distillation?	2	K1	CO4
19.	Define PLC and its role in refinery automation.	2	K1	CO5
20.	Mention any two safety interlocks required in refinery pumps or compressors.	2	K1	CO5
21.	Briefly describe how area classification impacts safety design in petrochemical plants.	2	K2	CO3

22.	State two standards applicable to safety instrumentation in refineries.		*2*	*K1*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Describe the oil-gas production process in petrochemical refineries with neat diagram.	*11*	*K2*	*CO1*
		OR			
	b)	Explain the recovery techniques used for crude oil separation in India with necessary schematic diagram.	*11*	*K2*	*CO1*
24.	a)	Explain the atmospheric and vacuum distillation processes with neat diagrams.	*11*	*K2*	*CO2*
		OR			
	b)	Discuss the catalytic cracking and reforming processes used in petroleum refining process with suitable diagram.	*11*	*K2*	*CO2*
25.	a)	Illustrate parameters measured and intrinsic safety measures adopted in petrochemical industry instrumentation.	*11*	*K2*	*CO3*
		OR			
	b)	Discuss the selection criteria for field instruments in petrochemical industries.	*11*	*K2*	*CO3*
26.	a)	Explain the control schemes for heat exchangers and cooling towers in petroleum refining.	*11*	*K2*	*CO4*
		OR			
	b)	Elucidate reflux and furnace control systems in petrochemical processes.	*11*	*K2*	*CO4*
27.	a)	Explain the use of PLCs for safety interlocks in petrochemical refineries.	*11*	*K2*	*CO5*
		OR			
	b)	Discuss the basic Safety Integrity Level (SIL) standards and their implementation.	*11*	*K2*	*CO5*
28.	a)	Explain the latest developments in automation for control and safety in petrochemical industries.	*11*	*K2*	*CO5*
		OR			
	b)	Critically explain the role of area classification in managing safety standards in refineries.	*11*	*K2*	*CO5*