


Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2021

Programme Name: M. Tech Chemical Engineering	Semester : I
Course Name : Process Design and Flow Sheeting	Time : 3 Hrs.
Course Code : CHPD7008P	Max. Marks: 100
Nos. of page(s) : 03	

Instructions: 1) Answer the questions section wise in the answer booklet. 2) Assume suitable data wherever necessary. 3) The notations used here have the usual meanings.

SECTION A (Total Marks: 5 x 4 = 20)

➤ Attempt all the questions.

S. No.	Question	Marks	CO
Q 1	Write short note on a process design objective.	04	CO1
Q 2	Discuss about fitness testing step of a process design.	04	CO1
Q 3	List out the synthesis steps involved in process creation	04	CO2
Q 4	Explain in short about block flow diagram.	04	CO3
Q 5	What is the importance of alarm in a control system?	04	CO4

SECTION B (Total Marks: 4 x 10 = 40)

➤ Attempt all questions.

Q 6	Explain in brief the various principal factors that are considered in plant location.	10	CO1
Q 7	Discuss about the intensification and the substitution approaches used in ISD towards the safe chemical plants.	10	CO2
Q 8	What equipment description should be mentioned on a Process Flow Diagram for the following equipment? a) Heat Exchanger b) Tower c) Pumps d) Vessels <p style="text-align: center;"><u>OR</u></p> Draw the standard symbols used in a Process Flow Diagram for following equipment. a) Floating roof tank b) Centrifugal compressor	10	CO3

	c) Mixing reactor d) Furnace		
Q 9	Often, during the distillation of liquid mixtures, some non-condensable gases are dissolved in the feed to the tower. These non-condensable come out of solution when heated in the tower and may accumulate in the overhead reflux drum. In order to operate the column satisfactorily, these vapors must be periodically vented to a flare or stack. Sketch the P&ID representing the top portion of the tower, to show all the instrumentation needed for this control loop.	10	CO4

SECTION C (Total Marks: 2 x 20 = 40)

Attempt all questions.

Q 10	<p>Determine all the errors in the section of a P&ID shown in Figure 1 and redraw the corrected P&ID.</p> <p align="center">Figure 1: A Section of a P&ID</p> <p align="center"><u>OR</u></p> <p>Read a section of P&ID shown in Figure 2 and complete the following information.</p> <p>a) Major Equipment b) Instrumentation details c) Pipeline details d) Type and size of valves used in piping loops</p>	20	CO4
		[03] [05] [05] [07]	

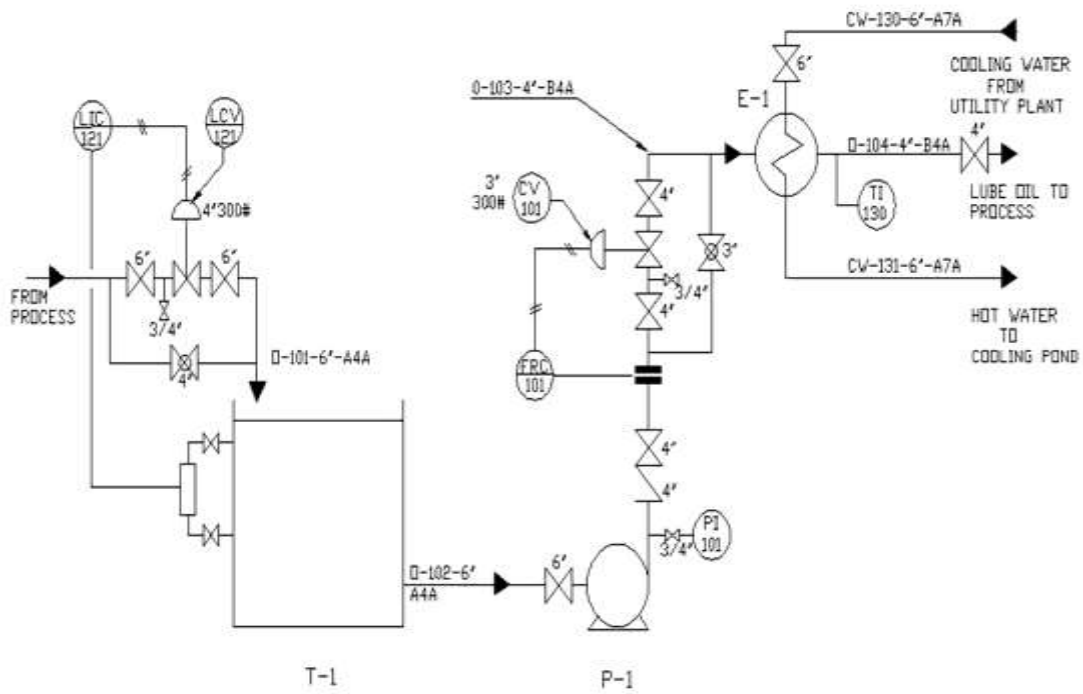


Figure 2: A Section of a P&ID

Q 11

What is the role of a process simulation software in chemical process design? Explain in brief the various steps involved in flowsheet simulation using the software.

20

CO5