

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, Nov-Dec 2021

Programme Name: B.Tech Chemical R&P

Semester : 7th

Course Name : Chemical Process and plant safety

Time : 03 hrs.

Course Code : CHCE 3015

Max. Marks: 100

Nos. of page(s) : 02

Instructions :

SECTION A

S. No.		Marks	CO
1	Explain the modern concept and understanding of safety, hazard and risk.	4	CO1
2	Why is the study of toxicology important in an industry? What are toxins and toxicants?	4	CO1
3	Explain briefly the important steps involved in industrial hygiene.	4	CO2
4	What is Bernoulli's equation? Discuss importance of this equation.	4	CO2
5	What are the different elements involved in a fire triangle? Draw a sketch and discuss.	4	CO2

SECTION B

6	Apply the "what-if" analysis for hazard identification in propane/butane distillation column.	10	CO3
7	Analyze the different entry routes of toxins to human body and their respective effects.	10	CO3
8	Air contains 2 ppm of di-ethyl-amine (TLV-TWA of 10 ppm), 15 ppm of cyclohexanol (TLV-TWA of 50 ppm), and 14 ppm of propylene oxide (TLV-TWA of 20 ppm). What is the mixture TLV-TWA and has this level been exceeded?	10	CO4
9	Deduce the expression for the liquid mass flow rate through a hole. Assume the necessary parameters as required. Explain briefly some applications of the equation.	10	CO4

SECTION C

10	Discuss the root causes, consequences, and societal impact of Bhopal gas tragedy.	20	CO5																		
11	a) <table border="1"><thead><tr><th>Response</th><th>No of individual affected</th></tr></thead><tbody><tr><td>0</td><td>0</td></tr><tr><td>1</td><td>2</td></tr><tr><td>2</td><td>12</td></tr><tr><td>3</td><td>8</td></tr><tr><td>4</td><td>10</td></tr><tr><td>5</td><td>9</td></tr><tr><td>6</td><td>6</td></tr><tr><td>7</td><td>15</td></tr></tbody></table> <p>Response is in the scale of 0 (no response) to 8 (maximum response). Determine</p> <ol style="list-style-type: none">Mean and Standard deviationPlot a histogram (by hand)	Response	No of individual affected	0	0	1	2	2	12	3	8	4	10	5	9	6	6	7	15	10+10 = 20	CO5
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b)

What are the LFL and UFL of a gas mixture composed of 1% hexane, 3% methane, and 2% ethylene by volume? The rest is air in the gas mixture.

Component	LFL (vol%)	UFL (vol%)
Hexane	1.2	7.5
Methane	5	15
Ethylene	2.7	36