BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION SP/25)

CLASS: BTECH **SEMESTER: VI**
BRANCH: CHEMICAL ENGG. **SESSION: SP/25**

SUBJECT: CL235A SAFETY AND HAZARDS IN PROCESS INDUSTRIES

TIME: 03 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will not be supplied to the candidates**

Q.1(a)	Why safety is a must in an industry? Discuss. How will you create safety awareness among the workers?	[5]	Co-1	BL2
Q.1(b)	What is a fire triangle? Explain the salient features of Factory Act and Workers Compensation Act.	[5]	Co-1	BL2
Q.2(a)	Define and discuss the differences between the following terms: i. Fire and Explosion ii. Confined vapour cloud explosion and Unconfined vapour cloud explosion	[5]	Co-2	BL2
Q.2(b)	Define the following terms: (i) Detonation (ii) Deflagration (iii)LEL (iv) UEL	[5]	Co-2	BL2
Q.3(a)	Discuss the phenomena of Boiling Liquid Expanding Vapour Explosion(BLEVE) and condition for its occurrence.	[5]	Co-3	BL2
Q.3(b)	A LPG industrial cylinder is leaking inside an industrial shed having the dimension length 10 meter, width 15 meter, and height 5 meter, for 5 min before stopping the leakage. If the rate of leakage of liquid LPG is 2 lit/min and the liquid LPG to gaseous LPG volume expansion is 260 time. Then predict the following: i. Whether there is probability of vapour cloud explosion after getting source of ignition. ii. What will be the nature of vapour cloud inside the industrial shed.	[5]	Co-3	BL2
Q.4(a)	Which safety precautions should be taken into consideration while designing a process layout?	[5]	Co-4	BL2
Q.4(b)	Discuss the various health hazards in a chemical process plant.	[5]	Co-4	BL2
Q.5(a)	Perform HAZOP study on the exothermic CSTR reactor with cooling coil unit in the attached process flow diagram. List your assumption and the final recommendation.	[5]	Co-5	
Q.5(b)	Discuss the meaning of Fault-tree Analysis. What is the difference type Fault-tree analysis of associated chlorine storage plant?	[5]	Co-5	BL2

::::::01/05/2025::::::M