

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO/24)**

**CLASS: BTECH
BRANCH: CHEMICAL ENGG.**

**SEMESTER: VI
SESSION: SP/24**

SUBJECT: CL235 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
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| Q.1(a) Discuss the various effective steps to be followed for the implementation of safety procedures in a chemical plant. | [5] | Co-1 | BL2 |
| Q.1(b) Explain the salient features of Factory Act and Workers Compensation Act. | [5] | Co-1 | BL2 |
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| Q.2(a) Define and discuss the differences between the following terms:
(i) Detonation and Deflagration
(ii) Confined vapour cloud explosion and Unconfined vapour cloud explosion | [5] | Co-2 | BL2 |
| Q.2(b) Define the following terms:
(i) Sprays (ii) MSDS
(iii) LEL (iv) UEL | [5] | Co-2 | BL2 |
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| Q.3(a) Discuss the phenomena of Boiling Liquid Expanding Vapour Explosion (BLEVE). | [5] | Co-3 | BL2 |
| Q.3(b) If the BLEVE takes place in a Horton Sphere of capacity 200 Ton. What will be the radiative flux incident on object at a distance of 300 m? What will be the duration of fire ball. [E=270 Kw/m ²] | [5] | Co-3 | BL2 |
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| Q.4(a) What are the important safety factors that are to be followed while designing a process layout? | [5] | Co-4 | BL2 |
| Q.4(b) Discuss the various health hazards in a chemical plant. | [5] | Co-4 | BL2 |
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| 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 significance of Fault-tree Analysis. What is the difference type Fault-tree analysis of associated chlorine storage plant? | [5] | Co-5 | BL2 |

:::29/04/2024:::M