

ROLL No:

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Total number of pages: | |

Total number of questions: 06

**B.Tech. || Chemical || 8thSem**  
**Safety in Chemical Plants**

**Subject Code: BTCH-803**

**Paper ID:**

**Time allowed: 3 Hrs**

**Max Marks: 60**

**Important Instructions:**

- All questions are compulsory
- Assume any missing data

**PART A (2×10)**

**Q. 1. Short-Answer Questions:**

- (a) What are major ingredients of successful safety programme? Explain
- (b) Define Toxicology and Toxicity.
- (c) What is MSDS?
- (d) What is difference between Local and Dilution Ventilation? Explain
- (e) Explain about Detonation and Deflagration.
- (f) What is Fire Triangle? Explain it with the help of example.
- (g) What is Sweep through purging process?
- (h) What is Process Hazards Checklist? Explain
- (i) Define Risk Assessment and MTBF.
- (j) What is VCE? Also write down steps of sequence of occurrence of it.

**PART B (8×5)**

**Q. 2. Explain about various types of Accident and Loss statistics methods used to measure the effectiveness of safety programme.**

OR

What is Threshold limit value (TLV). Explain about its types. Air contains 5 ppm of diethylamine (TLV-TWA of 10 ppm), 20 ppm of cyclohexanol (TLV-TWA of 50 ppm), and 10 ppm of propylene (TLV-TWA of 20 ppm). What is mixture TLV-TWA.

**Q. 3. What is HAZOP Study? Perform a HAZOP study on the system consisting of chemical reactor. Reaction is exothermic. In the event cooling system fails, temperature of reactor would increase. Result could be a runaway reaction. Temperature is measured within a reactor and is used to control cooling water flow rate by a valve & controller. Also explain advantages and disadvantages of HAZOP Study.**

OR

Explain Dow fire & explosion index method. How it is determined

Q. 4. What is meant by LFL and UFL. Estimate the values of LFL and UFL for butane.

OR

What is Inerting. Obtain an expression to calculate the quantity of inert required to reduce oxidant concentration to tolerable limit in sweep through purge process

Q. 5. What are revealed and unrevealed failures in a system. Show that for unrevealed failures the process is unavailable during a period equal to half of inspection interval.

OR

What is fault tree analysis? Give symbols of various events for drawing fault tree

Q. 6. Explain about the following:  
i) BLEVE ii) Inherent Safety iii) Fire and Flash point iv) Lethal dose

OR

Explain about the following Chemical plant disasters:  
i) Flixborough, England ii) Bhopal Gas Accident