

**JK Lakshmipat University Jaipur**  
**INSTITUTE OF ENGINEERING AND TECHNOLOGY**

End Term Examination, May 2022  
M. Tech. (HSEE), Semester II, 2021-22

Roll No.....

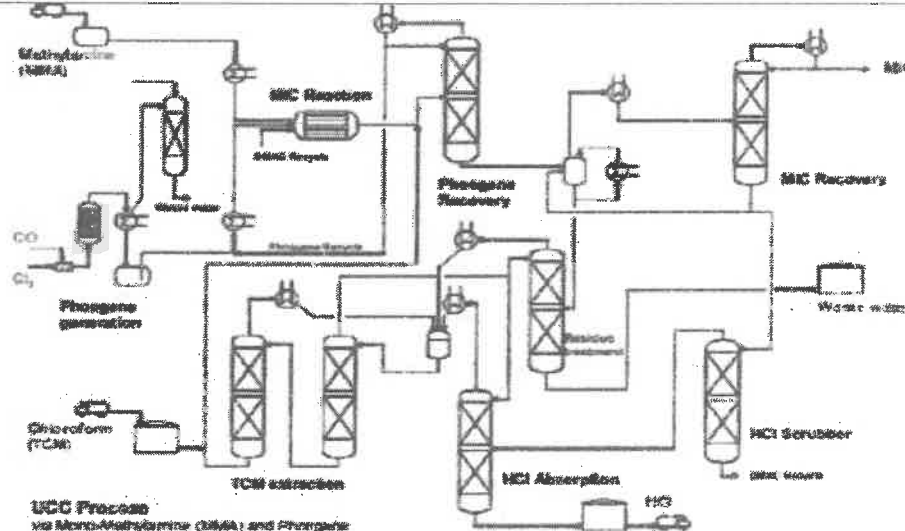
IL2103A: RISK AND HAZARD MANAGEMENT

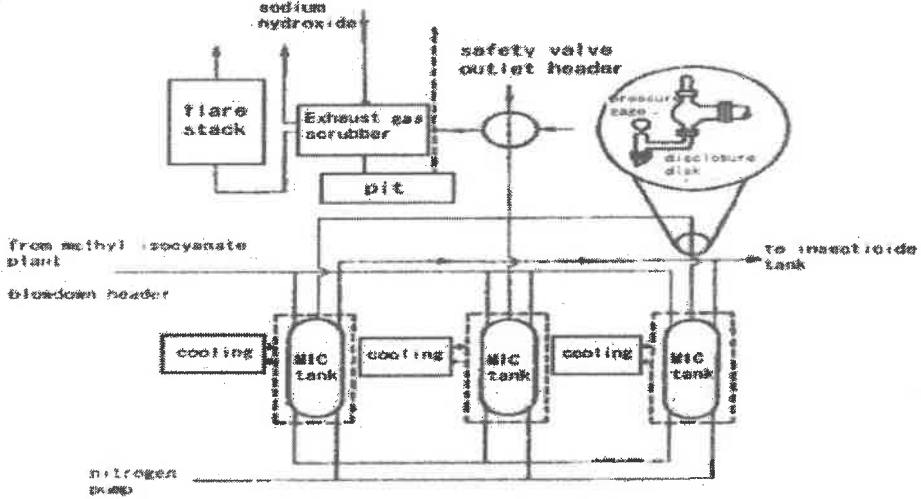
Time: 3 hours

Max. Marks: 60

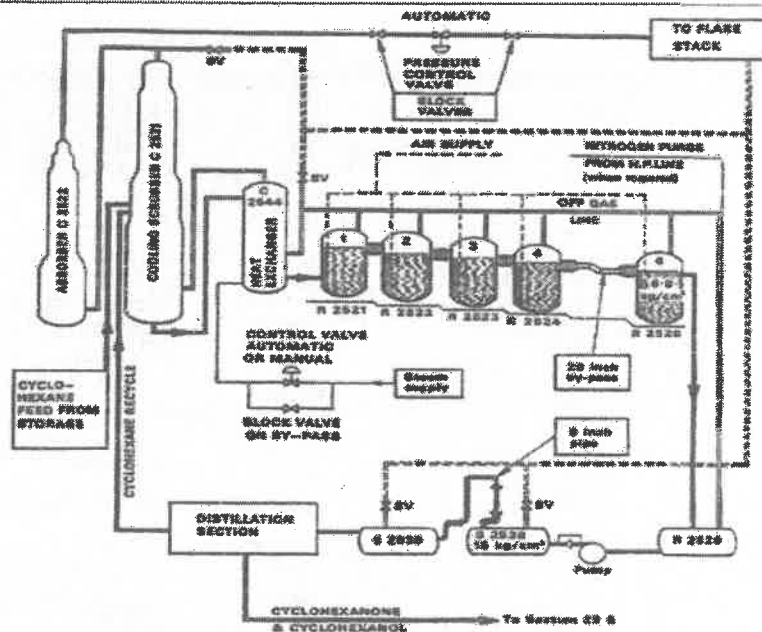
**Instructions to students:**

1. Do not write anything other than your roll number on question paper.
2. Mention all the assumptions for your answers clearly.

|        |                                                                                                                                                                                                |                 |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Q. 1.1 |  <p align="center">Figure-1: Process Flow Sheet to Manufacturing MIC</p>                                    | 10.0<br>(CO1,2) |
| Q. 1.2 | <p>Conduct the HAZOP study/FMEA and quantify the risk for the above figure-1</p> <p>Develop the preventive/ corrective action plan on the basis quantify the risk for spillage of the MIC.</p> | 10.0<br>(CO2,3) |

|        |                                                                                                                                                                                                                                                                                                                                    |                |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Q. 2.1 |  <p style="text-align: center;"><b>MIC storage facility</b></p> <p style="text-align: center;"><b>Figure-2: MIC Storage Facility</b></p> <p>List out the techniques for identification of the hazards and risk for the MIC storage facility.</p> | 05.0<br>(CO4)  |
| Q. 2.2 | Design the event tree and fault tree for the MIC storage facility for identifying the hazards and risk also suggest the control measures on the each branch of the tree.                                                                                                                                                           | 10<br>(CO4,6)  |
| Q. 3.1 | Identify and classify hazardous area in India for selection of the electrical equipments as per the statutory provisions.                                                                                                                                                                                                          | 5.0<br>(CO5,6) |
| Q. 3.2 | Develop a Plan for installation of electrical equipment work properly and efficiently for all class of zones.                                                                                                                                                                                                                      | 5.0<br>(CO5,6) |

Q. 4.1



07.0  
(CO1,2,6)

Figure-3A: Process flow diagram for production of caprolactam

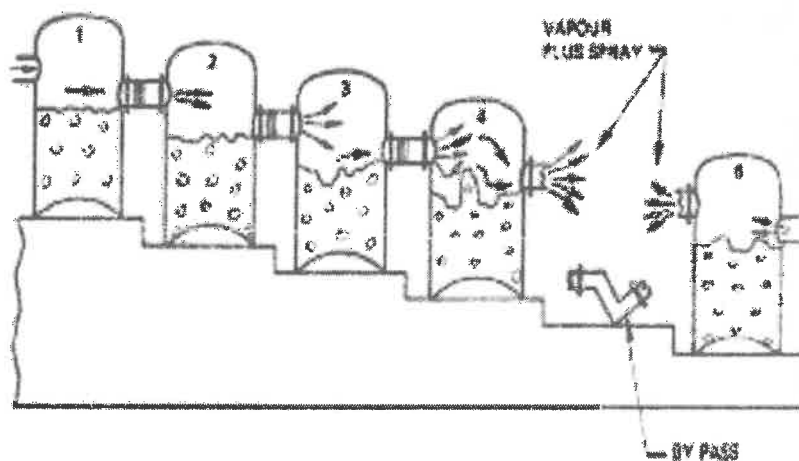


Figure3B: Accident scenario

Select the appropriate techniques/tool for identifying the possible/ root cause in the above accidents.

Q. 4.2

Develop the HSE guidelines/Procedure for preventing such type of accidents (Cyclohexane Disaster) in future for similar type of industries.

08  
(CO1,2,6)

*All the best!*

