

GUJARAT TECHNOLOGICAL UNIVERSITY**BE-MINOR - SEMESTER-V EXAMINATION – WINTER 2022****Subject Code:115AA02****Date:27-02-2023****Subject Name:Safety in Chemical Industry****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

	Marks
Q.1 (a) Define: CVCE, UCVCE, BLEVE	03
(b) With significance of LD ₅₀ , explain toxicity of chemicals in brief.	04
(c) Write a note on Material safety datasheet.	07
Q.2 (a) Explain the effect of pressure in process safety.	03
(b) Explain the instrumentation for Chlorine vaporizer.	04
(c) List the criteria for safety checklist to be made at Process Design level.	07
OR	
(c) With example explain the effect of corrosion on process vessel and how it will affect safety.	07
Q.3 (a) Explain fault tree analysis.	03
(b) Explain in brief: Adverse effects of toxic release on aquatic life.	04
(c) With neat sketch explain working of magnetic flow meter.	07
OR	
Q.3 (a) Explain the types of head used in Storage tank.	03
(b) Explain the unloading process of any hydrocarbon.	04
(c) Explain the working of Pressure relief valves with construction.	07
Q.4 (a) Discuss the use of trips, alarms and sensors.	03
(b) Write merits and demerits of magnetic flow meter & ultrasound flow meter.	04
(c) Explain safety measures to be considered in storage of radioactive substances.	07
OR	
Q.4 (a) Water flow rate in pipeline 500 m long is 1500 m ³ /h. Pipeline diameter is 0.5 m. A valve is suddenly closed. Consider water sound velocity is 1490 m/s. (4.8) Calculate: The resulting overpressure and force acting on valves considering downstream of the valve is supplied to free basin.	03
(b) What is the difference between detonation and deflagration? Explain with suitable example.	04
(c) Explain how DCS system will aide to safety of plant operations.	07
Q.5 (a) List the color coding system to be adapted for gas cylinders	03
(b) Write a note on fluid hammer in pipelines.	04
(c) Explain the causes of thermal runaway and runaway reaction.	07

OR

- Q.5** (a) Explain the reasons for Pressure piling. **03**
 (b) Explain water hammer in pipeline. **04**
 (c) Using the concept of operability studies, write the consequences and action for the Nitric acid plant for the following section: (Refer Fig. 1) **07**
1. Vessel: Air Filter
 2. Vessel: Air Compressor

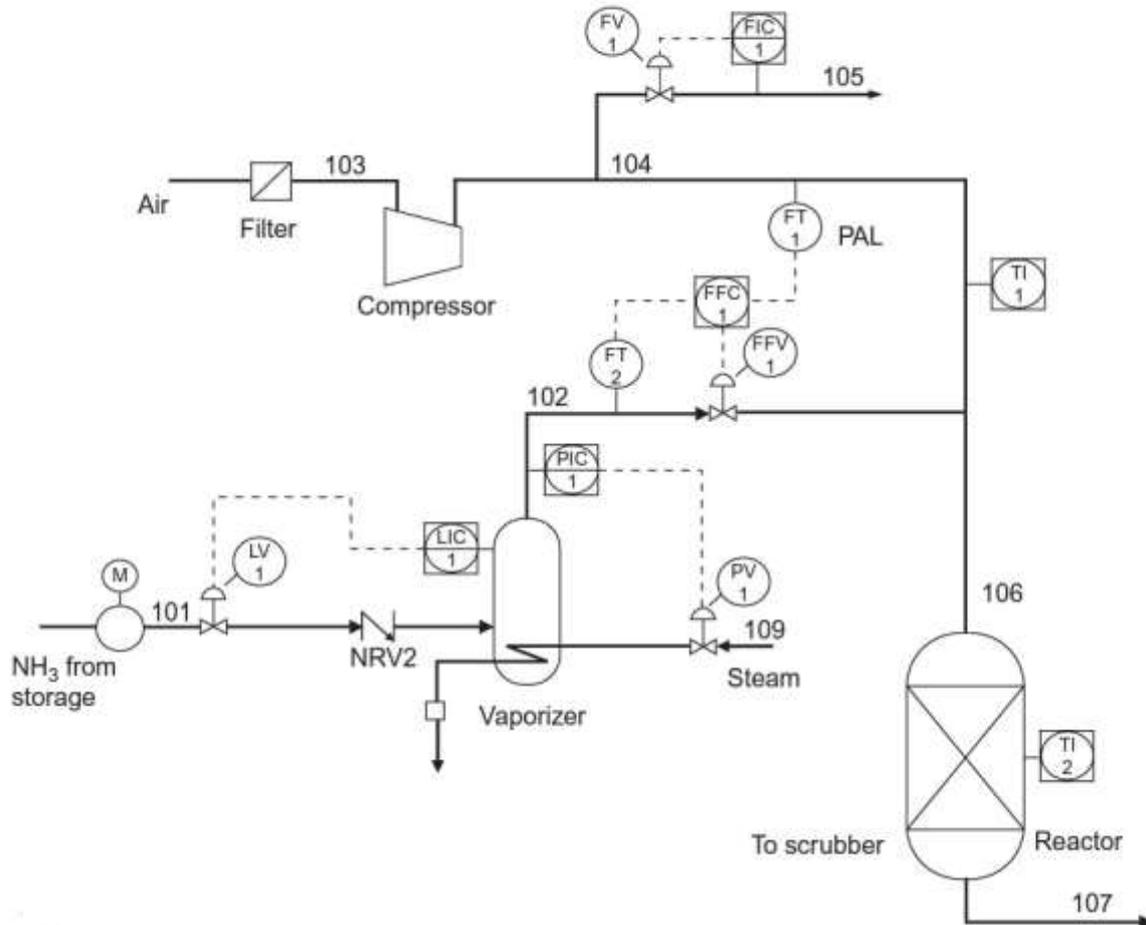


Fig 1. Nitric Acid Plant