Indian Institute of Technology, Kharagpur
Department of Chemical Engineering

Name & Roll no:

CH 62028 Project Engineering & Management (2024-25)
Test-1 **11/02/2025**
(6 x0.5= 3M)

1. HAZOP is an
   a. Risk identifying technique
   b. Risk solving technique
   c. Risk assessment technique
   d. A and B
   e. A and C
   f. B and C
2. When to conduct HAZOP study
   a. During Preliminary project assessment
   b. During final stages of construction
   c. During normal operation
   d. All the above
   e. None of the above
3. Which of the following is NOT considered while calculating the break-even point?
   a. Fixed costs
   b. Variable costs
   c. Selling price per unit
   d. Income tax rate
4. CO_2 fire extinguisher is used on
   a. Flammable liquid fires
   b. Live electrical equipment fires
   c. Wood, paper and textiles fires
   d. Flammable metal fires

   A. All the above
   B. Only I and II
   C. Only I and III
   D. Only II and III
   E. Only II and Iv
5. The lowest temperature at which a liquid can gives off vapor to form an ignitable mixture in air near the surface of the liquid.
   a. Flash point
   b. Fire point
   c. Auto ignition temperature
   d. *lower flammable limit (LFL)*
6. A negative net cash flow indicates:
   a. A company is generating more revenue than expenses
   b. A company is spending more cash than it is receiving
   c. The company has excess profit
   d. The company is increasing shareholder equity

7. A gas mixture containing 3 mol CO_2, 5 mol H_2 and 1 mol water is undergoing the following reactions: What is the mole fraction of methanol in the final mixture if the extent of reaction is 0.6 for first reaction and 0.4 for second reaction. [2]

$$CO_2 + 3H_2 \rightarrow CH_3OH + H_2O$$
$$CO_2 + H_2 \rightarrow CO + H_2O$$

8. An investigation of a proposed investment has been made. The following result has been presented to management: The payback period is 5 years. Annual depreciation is 10 percent per year of the fixed-capital investment; and fixed-capital investment is 85 percent of total capital investment. Using this information, determine the rate of return on the investment. [2]

9. In the design of a chemical plant, the following expenditures and revenues are estimated after the plant has achieved its desired production rate: [3]

Total capital investment	$10,000,000
Working capital	$ 1,000,000
Annual sales	$8,000,000
Annual expenditures	$2,000,000

tax rate = 30%.

Assuming straight-line depreciation over a 10-year project analysis period, determine

a. The return on the investment after taxes

b. The payback periods