

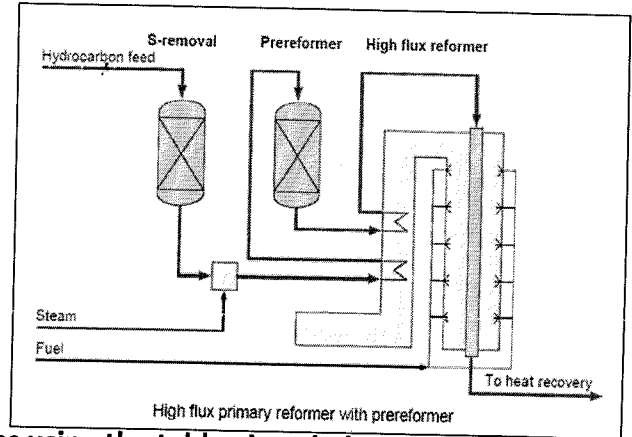
Question-1 Write the following:

(i) What is significance of safety Audit? How it is useful and effective tools for industries? 7

(ii) In the attached node, Sulphur free Hydrocarbon and HP steam react in presence of Ni-catalyst to produce hydrogen and carbon monoxide in Reformer as shown below:



The operating conditions of the steam reformer vary with temperatures ranging from 740 °C to 950 °C and pressures of up to 50 bar. Temperature of High Flux Reformer is maintained by burning of fuel.



Carryout Hazop study for the following deviations using the table given below.

(a) Less flow at inlet to Pre-reformer. (b) High temperature in High Flux Reformer 7

Deviation	Causes	Consequences	Actions Taken	P	S	RL	Remarks

OR

(i) Name important hazard detection techniques. A person fell down from a working platform at height of 10 M and died immediately. Construct an FTA to find out basic causes of the same. 7

(ii) Describe major fire barriers between a fire source and fatality. What will be the probability of fire scenario if probability of failure of each barrier is 0.2? 7

Question-2 Write the following:

(i) Carryout the Risk Assessment of the plant area shown in the figure of Q1(ii) with identifying at least 5 nos. of high potential hazards. Use the table given below: 7

Activity	Hazards	Probability	Severity	Risk Level	Evaluation	Remarks

(ii) Why Risk Assessment is carried out and when? State basic conditions. 7

OR

(i) Identify the sources of fuel & ignition and establish general fire precautions based on fire risk assessment. Describe key issues. 7

(ii) Describe important steps of FSRA. Who is responsible for carrying out Risk Assessment? 7

Question-3 Write the following:

(i) Construct an ETA using following data to identify the danger associated with the event of aterrorist attack. Find out various outcomes with probabilities: 7

P.T.O

- Initiating event : Terrorist attack with probability of success 10%
- Personnel Action to Stop Attack : Probability of success 50%
- Security Equipment to Stop Attack : Probability of success 90%
- Protection to Stop Attack : Probability of success 80%

(ii) Describe the "Checklist Method to evaluate the "Quantitative Fire Risk Assessment" with giving a suitable example. 7

OR

(i) Give overview of "Qualitative Fire Risk Assessment". Describe briefly the various ways to perform systematic Qualitative Fire Risk Assessment. 7

(ii) Explain how severe a fire event is likely to be evaluated using modeling? What other information can be predicted from fire risk assessment. 7

Question-4 Write the following:

(i) What is risk management? Describe various responsibilities of senior manager, employee, safety advisor and public in fire safety management. 7

(ii) What is risk management? Describe various responsibilities of senior manager, employee, safety advisor and public in fire safety management. 7

OR

(i) Describe the process, how a Fire Safety Risk Management should be implemented successfully in a chemical plant? 7

(ii) Describe the important functions and characteristics of risk management in detail. 7

Question-5 Attempt any seven out of twelve. 14

1. "Disorganized or inaccurate record keeping" is an example of
  - a. Environmental Risk
  - b. Health and safety risks
  - c. Operational risks
  - d. Employee risks
2. "Explosion in Switch gear" is a type of ..... hazard.
  - a. General Physical
  - b. Mechanical Plant
  - c. Material
  - d. Electrical
3. "Wrong identities" is a type of ..... hazard.
  - a. General Physical
  - b. Mechanical Plant
  - c. Material
  - d. Electrical
4. "Escape route" are to be considered during FSRA under:
  - a. Step 1
  - b. Step 2
  - c. Step 3
  - d. Step 4
  - e. Step 5

5. Permanent mains operated fire alarm is the example of :
  - a. Means of fighting fire
  - b. Means of giving warning
  - c. Means of escape
  - d. None of them
6. .... is used for flammable liquids fire:
  - a. Water extinguisher
  - b. Foam extinguisher
  - c. Carbon dioxide extinguisher
  - d. Dry powder extinguisher
  - e. (b) and (d)
7. QRAs for existing facilities have been used to justify the purchase of additional land bordering the facility, to create a ..... around it.
  - a. Green zone
  - b. Red zone
  - c. Green Belt
  - d. Forest
8. QRA is required to be carried out by management because:
  - a. It is the Legal requirement
  - b. It is for sake of duty of management
  - c. To save life of people and properties
  - d. None of the above
9. Cumulative frequency of the following three different events is .....
  - a.  $2.5 \times 10^{-3}$
  - b. 0.04
  - c.  $2.0 \times 10^{-1}$
10. Attending fire drills is the responsibility of a:
  - a. Unit Head
  - b. Senior Management
  - c. Senior Manager
  - d. Supervisor
11. Supervising the day-to-day upkeep of the policy is not a part of the duty of fire safety management system. (True / False)
12. Health and safety must be limited to the workplace or undertaken just because there is a legislative requirement. We must all undertake to the safe responsibility to create and maintain a safe environment in which we live. (True / False)

- X -