

Enrollment No.....



Faculty of Engineering
End Sem (Odd) Examination Dec-2022
FT3EL12 Safety in Chemical Industries

Programme: B.Tech.

Branch/Specialisation: FT

Duration: 3 Hrs.**Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. Mass Discharge Rate stands for? **1**
(a) Qm (b) MDR (c) 65mm (d) 85mm
- ii. What does PASS stand for? **1**
(a) Pull Arm Shout Squeeze
(b) Push Arm Shoot Sweep
(c) Pull Aim Squeeze Sweep
(d) Push Aim Shoot Shout
- iii. An extinguisher rated as 10-B can extinguish how many square feet of a flammable liquid? **1**
(a) 1 (b) 5 (c) 10 (d) 20
- iv. Probability of the event that might occur X Severity of the event if it occurs- **1**
(a) Accident (b) Hazard (c) Risk (d) None of these
- v. FFFP stands for- **1**
(a) Film forming fluoro protein foam
(b) Film formation foam protein
(c) Foam firming protein foam
(d) None of these
- vi. The following is(are) physical hazard agent(s)- **1**
(a) Falls (b) Electricity (c) Inhalation (d) All of these
- vii. Check list for Job Safety Analysis (JSA) consists of- **1**
(a) Work area, material, machine, tools
(b) Men, machine, material, tools
(c) Men, machine, work area, tools
(d) Men, work area. material, tools

P.T.O.

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- viii. What are the two main causes of incidents in the workplace? **1**
 (a) Unsafe acts and unsafe people
 (b) Unsafe people and unsafe machines
 (c) Unsafe conditions and unsafe machines
 (d) Unsafe acts and unsafe conditions
- ix. A good lubricant should have high- **1**
 (a) Volatility (b) Viscosity index
 (c) Pour point (d) None of these
- x. Pour point and freezing point is equal for- **1**
 (a) Petrol (b) Water (c) Diesel (d) Crude petroleum
- Q.2 i. How toxicants enter biological organism? **2**
 ii. Determine the 8-hr TWA worker exposure if the worker is exposed to toluene vapors as follows: **3**
- | | | | |
|------------------------------|-----|-----|----|
| Duration of exposure (hr) | 2 | 2 | 4 |
| Measured concentration (PPM) | 110 | 330 | 90 |
- iii. A cylindrical tank having 15mm diameter & 20m height is used to store benzene the tank is covered with nitrogen blanketing at 1atm pressure to prevent fire explosion inside the tank. The liquid level within the tank is 15m presently. A 6.5mm hole occurs in the tank 5m of the ground due to carelessness estimate? Find. **5**
 (a) The quantity of benzene is spilled
 (b) The time required for benzene to leak out
 (c) The maximum mass flow rate of benzene through the leak if specific gravity of benzene is 0.8794
- OR iv. What are the parameters which affecting dispersion? Explain with neat diagram. **5**
- Q.3 i. Define placards & pool fire. **2**
 ii. Explain the petroleum loading & unloading procedures & what are storage containers? **8**
- OR iii. Explain with diagram cone roof tank, vertical flat roof tank, open floating roof tank, covered floating roof tank. **8**
- Q.4 i. Write the possibility and methods of preventing BLEVE in process plants. **3**

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- ii. What is VCE and what are the preventions for VCE in plants. **7**
 Discuss workplace hazards.
- OR iii. Explain storage hazard assessment of LPG and LNG hazards during transportation. **7**
- Q.5 i. How chemicals are pumped or transport through pipelines? **4**
 Explain with neat diagram.
- ii. What are cargo trucks? Explain MC307/DOT407 with diagram. **6**
- OR iii. Explain any major chemical industry accidents. **6**
- Q.6 Attempt any two:
- i. Write in detail about FTA. **5**
 ii. Describe the HAZOP procedure. **5**
 iii. Explain ETA, SOP. **5**

Marking Scheme
FT3EL12 Safety in Chemical Industries

| | | | | |
|-----|-------|---|---------|----------|
| Q.1 | i. | Mass Discharge Rate stands for? | | 1 |
| | | (a) Qm | | |
| | ii. | What does PASS stand for? | | 1 |
| | | (c) Pull Aim Squeeze Sweep | | |
| | iii. | An extinguisher rated as 10-B can extinguish how many square feet of a flammable liquid? | | 1 |
| | | (c) 10 | | |
| | iv. | Probability of the event that might occur X Severity of the event if it occurs- | | 1 |
| | | (c) Risk | | |
| | v. | FFFP stands for- | | 1 |
| | | (a) Film forming fluoro protein foam | | |
| Q.2 | vi. | The following is(are) physical hazard agent(s)- | | 1 |
| | | (d) All of these | | |
| | vii. | Check list for Job Safety Analysis (JSA) consists of- | | 1 |
| | | (a) Work area, material, machine, tools | | |
| | viii. | What are the two main causes of incidents in the workplace? | | 1 |
| | | (d) Unsafe acts and unsafe conditions | | |
| | ix. | A good lubricant should have high- | | 1 |
| | | (a) Volatility | | |
| | x. | Pour point and freezing point is equal for- | | 1 |
| | | (b) Water | | |
| Q.3 | i. | Three ways toxicants enter biological organism | | 2 |
| | ii. | Determine the 8-hr TWA worker exposure | | 3 |
| | iii. | (a) The quantity of benzene is spilled | 2 marks | 5 |
| | | (b) The time required for benzene to leak out | 2 marks | |
| | | (c) The maximum mass flow rate of benzene through the leak if specific gravity of benzene is 0.8794 | 1 mark | |
| | OR | iv. | | |
| | | Parameters which affecting dispersion | 3 marks | 5 |
| | | Diagram | 2 marks | |
| | i. | Define placards | 1 mark | 2 |
| | | Pool fire | 1 mark | |
| Q.3 | ii. | Petroleum loading & unloading procedures | 5 marks | 8 |

| | | | | |
|-----|------|--|---------|----------|
| OR | iii. | Storage containers | 3 marks | 8 |
| | | Explain with diagram cone roof tank, vertical flat roof tank, open floating roof tank, covered floating roof tank. | | |
| | | 2 marks for each | | |
| Q.4 | i. | Principle of BLEVE in process plants. | | 3 |
| | ii. | VCE | 2 marks | 7 |
| | | Preventions for VCE in plants | 3 marks | |
| OR | iii. | Workplace hazards | 2 marks | 7 |
| | | Storage hazard assessment of | | |
| | | LPG during transportation | 4 marks | |
| Q.5 | i. | LNG during transportation. | 3 marks | 4 |
| | | Chemicals are pumped or transport through pipelines | | |
| | | | 2 marks | |
| OR | ii. | Diagram | 2 marks | 6 |
| | | Cargo trucks | 2 marks | |
| | | MC307/DOT407 | 2 marks | |
| Q.6 | iii. | Diagram. | 2 marks | 6 |
| | | Any major chemical industry accidents. | | |
| | | As per the explanation | | |
| Q.6 | i. | Attempt any two: | | 5 |
| | | Write in detail about FTA. | | |
| | | As per the explanation | | |
| OR | ii. | Describe the HAZOP procedure. | | 5 |
| | | As per the explanation | | |
| | | Explain ETA, | 3 marks | |
| Q.6 | iii. | SOP. | 2 marks | 5 |
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