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# Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



M.Tech. (Second Semester - Regular) Examinations, May – 2026

## 24MISCPC12002 – Safety in Engineering Industry

Time: 3hrs

Maximum: 60 Marks

**Answer ALL questions**

**(The figures in the right hand margin indicate marks)**

### PART – A

**(2 x 5 = 10 Marks)**

Q.1. Answer **ALL** questions

|                                      | CO # | Blooms Level |
|--------------------------------------|------|--------------|
| a. Define accident and incident.     | CO1  | K1           |
| b. What is a safety audit?           | CO3  | K2           |
| c. What is meant by risk assessment? | CO2  | K2           |
| d. What is ergonomics in industry?   | CO4  | K2           |
| e. What is first aid?                | CO3  | K1           |

### PART – B

**(10 x 5 = 50 Marks)**

Answer **ALL** the questions

|                                                                                                                                             | Marks | CO # | Blooms Level |
|---------------------------------------------------------------------------------------------------------------------------------------------|-------|------|--------------|
| 2. a. Explain the concept of Safety Management System(SMS) in an industry.                                                                  | 5     | CO2  | K2           |
| b. Describe its key elements and implementation challenges.                                                                                 | 5     | CO2  | K2           |
| (OR)                                                                                                                                        |       |      |              |
| c. Discuss different types of industrial hazards(physical, chemical, biological, ergonomic)with suitable examples                           | 5     | CO2  | K2           |
| d. Suggest control measures.                                                                                                                | 5     | CO2  | K2           |
| 3.a. A worker is exposed to 90dB noise for 4 hours and 100 dB noise for 2 hours. Permissible exposure limits are:                           |       |      |              |
| ● 90 dB → 8 hours                                                                                                                           | 5     | CO3  | K3           |
| ● 100 dB → 2 hours                                                                                                                          |       |      |              |
| b. Check whether the exposure is within safe limits using Noise Dose formula:                                                               |       |      |              |
| $D = \left\{ \frac{C_1}{T_1} + C_2/T_2 \right\} \times 100$                                                                                 | 5     | CO3  | K3           |
| (OR)                                                                                                                                        |       |      |              |
| c. Explain the causes of industrial accidents                                                                                               | 5     | CO2  | K2           |
| d. Discuss the Heinrich Domino Theory with a neat diagram.                                                                                  | 5     | CO2  | K2           |
| 4.a. A factory has 500 workers and recorded 10 accidents in a year.Total working hours = 10,00,000 hours.                                   | 7     | CO3  | K3           |
| Calculate Accident Frequency rate(AFR)                                                                                                      |       |      |              |
| b. Accident Severity Rate(ASR)(given total lost days = 200)                                                                                 | 3     | CO3  | K3           |
| (OR)                                                                                                                                        |       |      |              |
| c. A chemical plant stores flammable liquid with flash point 25°C.If ambient temperature is 35°C, determine: Whether it poses a fire hazard | 5     | CO3  | K3           |
| d. Suggest appropriate fire prevention measures                                                                                             | 5     | CO3  | K4           |
| 5.a. Explain Fire Triangle and Fire Tetrahedron concepts.                                                                                   | 6     | CO2  | K2           |
| b. Discuss different classes of fire and suitable extinguishing methods.                                                                    | 4     | CO2  | K2           |
| (OR)                                                                                                                                        |       |      |              |

|      |                                                                                                                                                                                            |   |     |    |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----|----|
| c.   | In a workplace, illumination required is 300 lux over an area of 50 m <sup>2</sup> . If one lamp provides 1500 lumens, calculate number of lamps required. (Assume utilization factor=0.5) | 5 | CO3 | K3 |
|      | Number of Lamps = $\frac{\text{Lux} \times \text{Area}}{\text{Lumens} \times \text{UF}}$                                                                                                   |   |     |    |
| d.   | Discuss safety training and safety audits in industries. Explain their importance in preventing accidents.                                                                                 | 5 | CO4 | K4 |
| 6.a. | Describe the safety procedures in machine operation and maintenance.                                                                                                                       | 4 | CO5 | K3 |
| b.   | Write a detailed note on emergency preparedness and disaster management in industries.                                                                                                     | 6 | CO5 | K4 |
| (OR) |                                                                                                                                                                                            |   |     |    |
| c.   | Explain the factory safety regulations and standards (like OSHA principles or Indian safety regulations).                                                                                  | 6 | CO5 | K4 |
| d.   | Discuss the role of safety training and awareness programs in preventing accidents.                                                                                                        | 4 | CO5 | K5 |

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