Nirma University

Institute of Technology

Semester End Examination (IR), February - 2022

B. Tech. in CL/CH/EE/CSE, Semester-VII

2CHOE26 Introduction to Fire and Safety Engineering

Roll/ Exam No. [ ]

Supervisor's initial with date [ ]

Time: 2 Hr **Max. Marks: 50**

Instructions:

1. *Attempt all questions.*
2. *Assume suitable data and draw neat sketches wherever necessary.*
3. *Numbers shown on right side of questions are marks for it.*

Q-1	**Answer the following:**	**(35)**	
(A)	Huge fire breaks at Mumbai high-rise building on 21 Jan 2022. Elaborate the types of losses occurs in such giant fire. Opine for the possible causes of fire.	(10)	**CO1 BL5**
(B)	Elaborate light obstructing, light scattering and optical flame detectors. Draw schematic diagram wherever it is necessary.	(10)	**CO2 BL4**
(C)	**Answer the Following:**	**(15)**	**CO2 BL5**
(i)	State importance of the First-Aid firefighting extinguishers. Suggest and discuss suitable extinguisher for combatting D class metal fire.	(05)	
(ii)	Suggest the application of foam fire extinguishers. Justify your answer.	(05)	
(iii)	Elaborate Modular Automatic fire extinguisher.	(05)	
Q-2	**Answer the Following:**	**(15)**	
(A)	Develop Fault tree analysis and calculate possibility of fire turn into accident and fire extinguish. A fire fighting systems containing following components has been installed in a university building: Automatic Fire Sprinklers, Standpipes, Fire Alarm Systems, Smoke Control Systems, Fire Command Center, Fire Department Connections, Fire Pumps, Post-Fire Smoke Purge, Auxiliary Radio Communication System (ARCS). Failure rate data for a number of typical process components are provided in Table. These are average values	**(15)**	**CO4 BL4**

determined at a typical fire protection facility. Actual values would depend on the manufacturer, materials of construction, the design, the environment and other factors. The assumptions in this analysis are that the failures are independent, hard and not intermittent and that the failure of one device does not stress adjacent devices to the point that the failure probability is increased.

Data Table: failure rate data for selected process components

fire protection system component	Faults/year for 100 incidents
Automatic Fire Sprinklers	149
Standpipes	0.1
Fire Alarm Systems	129
Smoke Control Systems	242
Fire Command Center	22
Fire Department Connections	4
Fire Pumps	9
Post-Fire Smoke Purge	128
Auxiliary Radio Communication System (ARCS)	219

OR

(k) Answer the followings: **(15)**

(i) 'risk can never be reduced, it can only be eliminated' agree or not? Support your opinion using an example. What is a good target of risk reduction? 05 **CO3 BL5**

(ii) As a fire accident investigator, suggest the indicators to be identify the path of fire growth. Give appropriate example. 10 **CO4 BL5**