Nirma University

Institute of Technology

Semester End Examination (IR), December - 2021

B. Tech. in CL / CH / ME / EE / EC / 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.

Q-1 Answer the following: **(35)**

(A)	At your home to purchase a new fire extinguisher, which are possible types of fire extinguisher will you survey? Compile the common features from all different types of fire extinguishers.	(10)	**CO1 BL5**
(B)	"Fire detector and alarm are not useful for the firefighting in today's overpopulated scenario in the world" agree or not? Justify your answer. Distinguish between fixed temperature detector and rate of rise of temperature detector.	(10)	**CO2 BL4**
(C)	In a commercial building fire took place. Fire brigade reached to extinguish the fire. As an investigator, determine the possible causes of this incident. Dissect the case to find interested parties in this incident. According to you suggest the role of fire brigade in day to day life.	(15)	**CO2 BL5**

Q-2 Answer the Following: **(15)**

(a)	A fire protection systems containing following components has been installed in a high rise building: Automatic Fire Sprinklers, Fire Alarm Systems, Smoke Control Systems, Fire Command Center. Failure rate data for a number of typical process components are provided in Table. These are average values determined at a typical fire protection facility. Actual values would depend on the manufacturer, materials of construction, the design, the environment and other	(15)	**CO4 BL4**

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.

Develop Fault tree analysis and calculate possibility of fire turn into accident and fire extinguish.

OR

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

(i) 'risk can never be eliminated, it can only be reduced' 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, how can burn patterns, smoke marks, charred timber, etc. indicate path of fire growth? Give appropriate example. (10) **CO4 BL5**

Data Table. Failure Rate Data for Various Selected Process Components

fire protection system component	Faults/year
Automatic Fire Sprinklers	1.29
Standpipes	0.01
Fire Alarm Systems	1.21
Smoke Control Systems	2.12
Fire Command Center	0.26
Fire Department Connections	0.01
Fire Pumps	0.09
Post-Fire Smoke Purge	1.21
Auxiliary Radio Communication System (ARCS)	2.11