Reg. No.																

Question Paper Code	14689

M.E. / M.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Second Semester

M.E. - Industrial Safety Engineering

24PISPC201 - FIRE ENGINEERING AND EXPLOSION CONTROL

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	K – Level	CO
1.	Identify the phenomenon in which a flammable vapour cloud burns rapidly without generating significant overpressure. a) Flash fire b) Jet fire c) Pool fire d) BLEVE	1	K1	CO1
2.	Select the parameter responsible for generation of shock waves during explosions. a) Slow oxidation b) Reduction in fuel concentration c) Rapid pressure rise d) Thermal insulation	1	K2	CO1
3.	Determine the major hazard associated with jet fires. Answer: option a) High directional thermal radiation a) High directional thermal radiation b) Reduced combustion rate c) Low flame temperature d) Absence of pressure release	1	K3	CO1
4.	Recall the common sources of ignition. a) Electrical sparks and open flames b) Water leakage and cooling systems c) Hot surfaces and static electricity d) Compressed air and lubricants	1	K1	CO2
5.	Identify the materials involved in Class B fires. a) Flammable liquids such as petrol and diesel b) Oil-based products and solvents c) Oil-based products and solvents d) Combustible metals only	1	K2	CO2
6.	Describe the role of fire watchers. a) Monitoring hazardous areas for fire risks b) Operating heavy machinery only c) Detecting unsafe conditions during hot work operations d) Detecting safe conditions during hot work operations	1	K3	CO2
7.	Compare sprinkler and deluge systems. a) Sprinkler systems activate individual heads near fire b) Both operate without fire detection systems c) Deluge systems release water through all outlets together d) Deluge systems are used only in offices	1	K3	CO3
8.	Describe the fire hazards associated with flammable liquids. a) Rapid vapour formation and ignition b) Non-combustible vapour production c) High risk of flash fires and explosions d) Absence of thermal radiation	1	K2	CO3
9.	Explain the need for halon replacement. a) Halons increase smoke generation b) Halons are highly combustible c) Environmental regulations restrict halon usage d) Halons damage the ozone layer	1	K1	CO3

10.	Describe the purpose of fire testing.		*1*	*K2*	*CO4*
	a) Evaluating fire resistance and safety performance	b) Measuring water pressure in hydrants			
	c) Determining the behaviour of materials during fire exposure	d) Testing electrical conductivity only			
11.	Define the concept of egress design.		*1*	*K1*	*CO4*
	a) Facilitating rapid evacuation during emergencies	b) Increasing building occupancy			
	c) Planning safe escape routes for occupants	d) Designing underground fuel storage			
12.	Infer the role of staircases in fire safety design.		*1*	*K3*	*CO4*
	a) Providing protected escape routes during emergencies	b) Increasing fire load in buildings			
	c) Assisting firefighters in rescue operations	d) Reducing structural strength			
13.	Detonation can be described as.		*1*	*K2*	*CO5*
	a) Supersonic combustion accompanied by shock waves	b) Slow burning without pressure increase			
	c) Rapid pressure rise travelling faster than sound	d) Combustion without flame propagation			
14.	Describe the characteristics of blast-resistant structures.		*1*	*K3*	*CO5*
	a) Minimizing structural damage from shock waves	b) Ability to withstand high explosion pressures			
	c) Increasing flame propagation speed	d) Eliminating all vibrations completely			
15.	Identify commonly used inert gases in industries.		*1*	*K1*	*CO6*
	a) Argon and helium	b) Oxygen and hydrogen			
	c) Nitrogen and carbon dioxide	d) Methane and propane			
16.	Assess the importance of industrial gas hazard management.		*1*	*K3*	*CO6*
	a) Preventing accidents, explosions, and toxic releases	b) Increasing hazardous material storage			
	c) Improving plant safety and emergency preparedness	d) Eliminating all chemical processing operations			

PART – A (ii) (Short Answer Questions)
(6 × 3 = 18 Marks)
Answer ALL Questions

17.	Differentiate between fire and flame.	*3*	*K4*	*CO1*
18.	Explain why water cannot be used to extinguish an alcohol tank fire.	*3*	*K3*	*CO2*
19.	Discuss Halon and explain how it works.	*3*	*K3*	*CO3*
20.	Explain the objectives of fire safe building design.	*3*	*K3*	*CO4*
21.	Classify the various explosion protection techniques used in process industries.	*3*	*K4*	*CO5*
22.	Analyze on why do we use ruptured discs.	*3*	*K4*	*CO6*

PART - B (Descriptive Answer Questions)
(6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	Differentiate between flash fire, jet fire, and pool fire based on causes, characteristics, and effects.	*11*	*K4*	*CO1*
		OR			
	b)	Analyse the causes and lessons learned from the Bombay Victoria Dock Explosion and Peterborough Explosion.	*11*	*K4*	*CO1*

24.	a)	Classify fires into Classes A, B, C, D, and E and explain the characteristics of each class.	*11*	*K4*	*CO2*
		OR			
	b)	Analyse the procedures involved in fire escape and rescue operations during emergencies.	*11*	*K4*	*CO2*
25.	a)	Explain the construction and working principle of sprinkler systems used in fire protection.	*11*	*K3*	*CO3*
		OR			
	b)	Infer the operation and applications of foam systems and Dry Chemical Powder (DCP) systems in firefighting.	*11*	*K3*	*CO3*
26.	a)	Explain the importance of structural integrity during fire accidents and discuss methods to maintain it.	*11*	*K3*	*CO4*
		OR			
	b)	Describe the fire safety requirements and regulations applicable to high-rise buildings.	*11*	*K3*	*CO4*
27.	a)	Explain the phenomenon, parameters, causes, and control measures of explosions, detonations, and blast waves.	*11*	*K3*	*CO5*
		OR			
	b)	Discuss the construction and working principle of flame arrestors with suitable applications.	*11*	*K3*	*CO5*
28.	a)	Illustrate the operation of explosion suppression systems based on carbon dioxide (CO_2).	*11*	*K3*	*CO6*
		OR			
	b)	Examine the hazards associated with Liquefied Petroleum Gas (LPG) handling, storage, and transportation.	*11*	*K3*	*CO6*