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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Program: B.E. **Semester: VIII**
Branch: Institutional Elective **Duration: 3 hrs.**
Course Code: 19CH8OEISO **Max Marks: 100**
Course: Industrial Safety And Occupational Health **Date: 06.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT – I	CO	PO	Marks
1	a)	Discuss the concept of PDCA cycle in implementation of ISO 45001.	*CO1*	*PO6*	**08**
	b)	Explain the rationale for the OS& H and its purpose.	*CO1*	*PO6*	**06**
	c)	Describe the role of organization and workers in implementation of safety norms and regulations.	*CO4*	*PO9*	**06**
		UNIT – II			
2	a)	Discuss the function of man element in man-machine system.	*CO2*	*PO7*	**10**
	b)	Sivakasi is a small municipal town in Ramanathapuram district. It is famous for three types of industries – fireworks, match sticks and printing. 90% of India's fireworks is produced here. There are nearly 450 fireworks factories in Sivakasi employing almost 40,000 workers directly and about 1 lakh indirectly such as paper tube making, wire cutting, box making in the country side. Due to lack of modern machines child labour is extensively used. Economic factor is also one of reasons responsible for child labour. Poverty forces parents to send their children to work in these industries. According to studies, children earn around Rs. 20-30 per day inspite of working for 12 hrs continuously in a day. Talking about the working conditions, according to sources children are taken to industries like animals in buses filling almost 150-200 children in a bus. And they have to leave their house as early as 3a.m. in the morning and come back at 9p.m. at night. There are agents to make sure that they get up and go for work. Some children stay at home and work. Even they have to work for long hours. According to a magazine Sumathi age 11 of Ammapatti village rolls 2300 paper pipes a day for just Rs. 20 though she had been working for a year in a firewoks unit. Also Chellaiyan age 12 working in a factory in Anaikuttam village earns Rs. 30 though working 12 hours a day. Adults are also working more than 10 hrs in day due to peer pressure and also workers have not been paid any OT wages. The factory is not following any safety rules and	*CO1*	*PO6*	**10**

			regulation in their premises to provide safe working environment to the workers. i. Identify various sections of act applicable to this case study. ii. List the salient features of the act which is strongly applicable to this case study.			
			OR			
	3	a)	Enlist and discuss briefly about non-respiratory PPE.	*CO2*	*PO7*	**10**
		b)	Four laborers were installing underground PVC in trenches. There were two journeymen and two apprentices. The foreman was working on site but at a distant location. Early one morning, the crew was told that the job was running behind schedule. As they rushed to put the pipes together, one end of a PVC pipe sprang up and struck one of the apprentices in the face, causing severe damage to the apprentice's lips and teeth. Immediately after the incident, the workers could not decide what to do. The injured worker climbed out of the trench and drove to the supervisor's trailer looking for the foreman. There were no signs posted inside the trailer stating what do in an emergency. There wasn't a radio available to contact the foreman. The injured worker drove around the job site looking for the foreman. Once the foreman was located, he got the worker medical treatment. i. Identify what went wrong in this situation? ii. How could this emergency have been prevented?	*CO5*	*PO10*	**10**
			UNIT – III			
	4	a)	On the afternoon of October 16, 2014, the petrochemical company workers were performing repairs on an 8-ft-diameter pipeline that carried hot oil. Since the workers were already aware of the particular area's hazards, they had adequately locked and tagged pumping stations, pipeline valves, and the control room before beginning repairs. When the work was completed and inspected, all Lockout Tagout safeguards were safely removed, and all the tools, equipment, machine guards, and other elements were returned to their operating state. At this point, control-room personnel was alerted that the work was completed, and they were requested to start up the system 5 hours earlier than was scheduled. Two supervisors, who were not aware of the early start-up, decided to inspect the repairs themselves. They were required to walk inside the pipe with lights to perform the inspection. They neglected to notify control-room personnel of their last-minute decision to inspect. Meanwhile, the control-room operators started the system as instructed earlier. When operated, the oil began to flow through the pipe, killing the two supervisors. i. List the gaps in safety practices in this incident. ii. According to you, what is the procedure of general LOTO/ZMS and steps to be followed to release LOTO.	*CO5*	*PO10*	**10**

		b)	Discuss briefly the step by step procedure to machine safety risk assessment.	*CO2*	*PO7*	**10**
			UNIT – IV			
	5	a)	With the help of a neat sketch, elucidate the different steps involved in accident investigation.	*CO5*	*PO10*	**10**
		b)	A 16-year-old girl was employed at a famous seven-star hotel to cook fries at a frying range. She slipped on water leaking from an ice-making machine and instinctively put out her hand to break her fall. Unfortunately, her hand went into the deep fat fryer containing oil at a temperature of 360°F and she sustained severe burns to her left hand and forearm. The outlet was short staffed on the day of accident and the Team Leader was working on the tills instead of monitoring workplace safety. Although the company policy was to mop up spillages it was common practice to leave spillages at busy times and cover them with a sheet of cardboard, which itself can create a tripping hazard. At busy times it was usual to give greater priority to serving customers than to cleaning spillages. The ice-making machine had been leaking for several days and various attempts had been made by different contractors to cure the leak. No-one had sole responsibility to coordinate the repair of faulty equipment and a lack of communication between different shift managers left the equipment leaking over a long period of time. i. List at least two people from the company to include on the investigation team, including their job titles. ii. Who has to be interviewed? Give a reason for why that person should be interviewed iii. What are the questions that need to be answered? List at least two. iv. What documents need to be checked? List at least two. v. What other information is required to solve the problem? Provide reasons for wanting that information.	*CO4*	*PO9*	**10**
			UNIT – V			
	6	a)	Explain about the electrical causes of fire and explosion.	*CO5*	*PO10*	**10**
		b)	Highlight the salient features of national electrical safety code.	*CO6*	*PO12*	**10**
			OR			
	7	a)	Explain construction and safety tips of earth pits.	*CO6*	*PO12*	**10**
		b)	Differentiate between fuse and circuit breaker. List the duties of circuit breakers.	*CO6*	*PO12*	**10**

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