

C-1294

Sub. Code

70111

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

First Semester

Industrial Safety & Hygiene

FIRE DESIGN AND INSTALLATION

(2023 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 1 = 10)

Answer **all** the questions.

1. Which of the following is a common feature of a fire-resistant door?
 - (a) Lightweight construction
 - (b) Insufficient insulation
 - (c) Self-closing mechanism
 - (d) Decorative glass windows

2. What is the fire tetrahedron?
 - (a) A four-sided fire alarm
 - (b) A pyramid-shaped building that houses firefighters
 - (c) A geometric shape used in fire safety planning
 - (d) The four elements required for a fire: fuel, heat, oxygen, and a chemical chain reaction

3. When selecting a fire extinguisher, which factor is crucial in determining the appropriate type of extinguisher to use?
 - (a) The color of the extinguisher
 - (b) The size of the extinguisher
 - (c) The type of fire it will be used to extinguish
 - (d) The location of the fire extinguisher

4. What does the "RACE" acronym stand for in the context of fire safety?
 - (a) Run, Alert, Crawl, Exit
 - (b) Rescue, Activate, Contain, Extinguish
 - (c) Reach, Announce, Cover, Escape
 - (d) Remove, Alarm, Check, Extinguish

5. Which type of fire alarm system is best suited for homes and small businesses?
 - (a) Addressable fire alarm system
 - (b) Conventional fire alarm system
 - (c) Wireless fire alarm system
 - (d) Two-wire fire alarm system

6. In the event of a false alarm in a fire alarm system, what is the best course of action?
 - (a) Ignore the alarm
 - (b) Evacuate the building immediately
 - (c) Investigate the cause and reset the system if no fire is present
 - (d) Call the fire department without investigation

7. Internal fire hydrants are typically connected to which water supply source within a building?
 - (a) Municipal water mains
 - (b) Underground rivers
 - (c) Rainwater collection tanks
 - (d) Natural springs

8. What is the color of a standard fire hydrant used for municipal firefighting operations?
 - (a) Yellow (b) Blue
 - (c) Red (d) Green

9. What is the first step in ensuring safety during a demolition project?
 - (a) Clearing the area of debris and materials
 - (b) Conducting a thorough hazard assessment
 - (c) Starting the demolition immediately
 - (d) Notifying nearby residents

10. What type of fire hazard can result from the accumulation of materials like paper, cardboard, and other combustibles in a workplace?
 - (a) Class A fire hazard
 - (b) Class B fire hazard
 - (c) Class C fire hazard
 - (d) Class D fire hazard

Part B

(5 × 5 = 25)

Answer **all** the questions.

11. (a) How do the physical and chemical properties of fire influence fire safety strategies?

Or

- (b) Define BLEVE and its prevention strategies in industrial settings for ensuring fire safety.
12. (a) What are the key terminologies related to fire extinguishers, and how do they contribute to understanding their functionality?

Or

- (b) Discuss the importance of regular inspection in ensuring the operational efficiency of fire extinguishers.
13. (a) Explain the concept of the detection zone and its role in effective monitoring of specific areas for potential fire risks.

Or

- (b) Explain the significance of maintaining spare parts in fire detection and alarm systems.
14. (a) Explain the role of fire pumps and pump houses for fire fighting operations during emergencies.

Or

- (b) Explain the significance of hose reels in fire fighting operations and the specific requirements for their installation.

15. (a) Discuss the various types of exits and their roles in accommodating occupant loads and facilitating efficient evacuations.

Or

- (b) Discuss the hazards related to hot work activities and the precautionary measures to minimize fire risks.

Part C (5 × 8 = 40)

Answer **all** the questions.

16. (a) Discuss the components of the fire triangle and fire tetrahedron in relation to fire prevention and control.

Or

- (b) Explain the classification of fires based on fuel sources and how it determines the choice of fire extinguishing methods.

17. (a) What are the essential steps in the initial inspection and installation of fire extinguishers to meet safety standards?

Or

- (b) Explain the significance of maintaining comprehensive records and the management of rejected extinguishers.

18. (a) Discuss the general requirements for the installation and maintenance of fire detection and alarm systems, emphasizing safety standards.

Or

- (b) Discuss the key elements of a comprehensive checklist for maintaining and operating fire detection and alarm systems effectively.
19. (a) Discuss the testing procedures for internal and external fire hydrant systems.

Or

- (b) What are the main components of risers and fire service inlets, and how do they contribute to the effective functioning of fire hydrant systems?
20. (a) Outline the necessary precautions for the proper management of combustible liquids to prevent fire hazards and potential accidents

Or

- (b) Discuss the key components of an emergency response plan and evacuation strategy during fire emergencies and special hazards.
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C-1295

Sub. Code

70112

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

First Semester

Industrial Safety and Hygiene

SAFETY EQUIPMENT AND PPE

(2023 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Section A

(10 × 1 = 10)

Answer **all** the questions.

1. When should PPE be worn in the workplace?
 - (a) Only when the worker prefers it
 - (b) Only during safety inspections
 - (c) Whenever there is a risk of exposure to hazards
 - (d) Only during coffee breaks

2. Which color of hard hat is typically worn by supervisors or managers on a construction site?
 - (a) Red
 - (b) Blue
 - (c) Yellow
 - (d) White

3. Which type of gloves are typically used for protection against chemicals and hazardous substances?
 - (a) Leather gloves
 - (b) Cotton gloves
 - (c) Rubber or chemical-resistant gloves
 - (d) Fingerless gloves

4. What is the primary purpose of wearing leg protection, such as steel-toed boots or knee pads, in the workplace?
 - (a) To keep your legs cool in hot weather
 - (b) To protect against punctures, impacts, and abrasions
 - (c) To improve posture and balance
 - (d) To promote fashion-forward workers
5. Which of the following is a common skin protection method when working with chemicals or irritants?
 - (a) Applying a moisturizing lotion
 - (b) Wearing gloves and protective clothing
 - (c) Using strong perfume to mask odors
 - (d) Frequent washing with hot water
6. Which color is typically used for warning signs, indicating potential hazards or dangers?
 - (a) Green (b) Yellow
 - (c) Blue (d) Red
7. Which type of respirator provides the highest level of respiratory protection against hazardous particles and chemicals?
 - (a) Dust mask
 - (b) Half-face respirator
 - (c) Powered air-purifying respirator (PAPR)
 - (d) Full-face respirator

8. Which type of respirator uses a battery-powered blower to assist with breathing and filter out harmful airborne contaminants?
- (a) N95 respirator
 - (b) Escape respirator
 - (c) Supplied-air respirator (SAR)
 - (d) Self-contained breathing apparatus (SCBA)
9. What does the “ANSI Z87.1” standard primarily cover in the realm of PPE?
- (a) Head protection
 - (b) Foot protection
 - (c) Eye and face protection
 - (d) Hand protection
10. Which type of fall protection system relies on a horizontal lifeline and a full-body harness to protect against falls when working at heights?
- (a) Guardrail system
 - (b) Safety net system
 - (c) Travel restraint system
 - (d) Fall arrest system

Section B

(5 × 5 = 25)

Answer **all** the questions.

11. (a) Elaborate on the various types of safety helmets, outlining their specific characteristics and use cases in different industries.

Or

- (b) Explain the permissible exposure levels for noise in the workplace and the potential hazards that excessive noise poses to workers.
12. (a) Discuss the importance of hand protection in various work environments, outlining the common types of injuries and hazards that workers may encounter without proper hand protection.

Or

- (b) Discuss the importance of using appropriate legging and leg guards.
13. (a) What role does housekeeping play in preventing skin-related injuries?

Or

- (b) Describe the different types of respirators available, their functionalities, and how they mitigate respiratory risks in various work environments.
14. (a) What distinguishes ml air-purifying respirator from a fresh air breathing apparatus and a self-contained breathing apparatus?

Or

- (b) What are the common causes of skin hazards in the workplace, and what physical hazards, chemical substances, plant products, and living agents are involved?

15. (a) What are the distinctions between active and passive fall protection systems, and how are they each employed in different workplace settings to prevent falls and injuries?

Or

- (b) How would you introduce the concept of personal protective equipment (PPE) in the context of workplace safety?

Section C

(5 × 8 = 40)

Answer **all** the questions.

16. (a) Compare and contrast different types of eye protectors available and how they cater to different workplace needs and hazards.

Or

- (b) Detail the essential components and parts of a standard safety helmet. What are the key features that ensure the helmet's functionality in hazardous conditions?

17. (a) Elaborate on the necessary emergency measures for handling hand injuries in the workplace.

Or

- (b) Describe the essential maintenance and care practices for safety shoes to prolong their lifespan.

18. (a) Explain the importance of identification labels, signboards, and barricades in promoting awareness and adherence to skin protection measures.

Or

- (b) Discuss the significance of the color code of canisters in respiratory equipment.

19. (a) What are the key regulatory standards and guidelines that companies need to adhere to regarding the use and maintenance of respiratory protective equipment in different industries?

Or

- (b) What are the potential challenges that workers may face while using respiratory protective equipment, and how can employers address these challenges to ensure worker comfort and safety?
20. (a) Describe the protocols and standards for working at heights, including the essential components of a full body harness in ensuring worker safety during elevated tasks.

Or

- (b) Discuss the key challenges that organizations face in implementing and maintaining effective fall protection systems and PPE.
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C-1296

Sub. Code

70113

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

First Semester

Industrial Safety and Hygiene

ELECTRICAL AND CHEMICAL SAFETY

(2023 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 1 = 10)

Answer **all** the questions.

1. OSHA requires the testing of a volt meter after a voltage test on voltage above _____
(a) 120v (b) 208v
(c) 277v (d) 600v
2. _____ is the flow of electrons around a circuit.
(a) Current (b) Electricity
(c) Power (d) Voltage
3. Electrical hazards include shock, electrical arcs and blasts, and _____ or faulty equipment.
(a) Broken (b) Double-insulated
(c) Polished (d) Secure
4. _____ is a measurement of how much energy you are using each second.
(a) Distance (b) Power
(c) Volume (d) Weight.

5. The minimum allowable work space around electrical equipment is _____ inches deep.
- (a) 36 (b) 48
(c) 24 (d) 30.
6. The secondary of a current transformer must never be _____ while energized.
- (a) Grounded (b) Opened
(c) Examined (d) Shortened
7. Which of the following is the most important thing to do if you spill a chemical on your skin?
- (a) Wash the affected area with soap and water immediately.
(b) Try to neutralize the chemical with another chemical.
(c) Cover the affected area with a bandage.
(d) Seek medical attention immediately.
8. Which of the following is the best way to dispose of hazardous chemicals?
- (a) Pour them down the drain.
(b) Throw them in the regular trash.
(c) Take them to a hazardous waste disposal facility
(d) Bury them in the backyard.
9. Which of the following is a hazardous chemical that is classified as a flammable liquid?
- (a) Gasoline (b) Acetone
(c) Methanol (d) All of the above

10. What does the Hazchem Code stand for?
- (a) Hazardous Chemicals Emergency Management Code
 - (b) Hazardous Chemicals Identification Code
 - (c) Hazardous Chemicals Emergency Action Code
 - (d) Hazardous Chemicals Incident Code

Part B (5 × 5 = 25)

Answer **all** the questions.

11. (a) Write short notes on CPR.
- Or
- (b) State Ohm's law and types of electrical faults.
12. (a) What are primary and secondary hazards?
- Or
- (b) List the sources of static electricity.
13. (a) Sketch and explain any two PPE used for electrical safety.
- Or
- (b) Give short notes on ELCB with a neat sketch.
14. (a) Write the significance of chemical labeling.
- Or
- (b) Discuss the term atmospheric monitoring with example.
15. (a) Explain the concepts of green chemistry.
- Or
- (b) What do you mean by chemical exposure risk assessment?

Part C

(5 × 8 = 40)

Answer **all** the questions.

16. (a) Discuss the scope and objectives of Indian electricity rules.

Or

- (b) Classify the Electrical faults and its prevention methods.

17. (a) Discuss the classes of insulation and its merits.

Or

- (b) Describe the electrical causes of fire and its protection methods.

18. (a) Discuss the equipment grounding procedure in detail.

Or

- (b) List the roles and responsibilities of safety officer for minimizing electrical hazards.

19. (a) Discuss the toxicological properties of various chemicals in detail.

Or

- (b) Sketch and explain various PPE used for chemical safety.

20. (a) Explain the safe transportation of hazardous chemicals in details.

Or

- (b) Discuss the general guidelines for safe storage.

C-1297

Sub. Code

70114

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

First Semester

Industrial Safety and Hygiene

SAFETY CONCEPTS

(2023 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 1 = 10)

Answer **all** questions.

1. What is the primary purpose of a safety performance indicator (SPI) in a workplace safety program?
 - (a) To identify the most efficient workers
 - (b) To measure the financial performance of a company
 - (c) To assess and monitor safety-related activities and outcomes
 - (d) To track employee attendance and punctuality
2. In disaster management, what does 'SAR' stand for?
 - (a) Safety and Recovery
 - (b) Search and Rescue
 - (c) Support and Resources
 - (d) Secure and Respond
3. Which of the following is not a common type of safety audit?
 - (a) Workplace safety audit
 - (b) Financial audit
 - (c) Process safety audit
 - (d) Construction site safety audit

4. Which of the following is a key element of a safety audit checklist?
 - (a) Employee attendance records
 - (b) Company financial statements
 - (c) Emergency evacuation procedures
 - (d) Marketing strategies

5. What is the immediate priority after an accident occurs?
 - (a) Resume normal operations
 - (b) Secure the accident scene
 - (c) Begin assigning blame
 - (d) Notify the media

6. When should an accident report be submitted in most workplace settings?
 - (a) Only for serious or life threatening accidents
 - (b) Within 30 days of the accident
 - (c) immediately or as soon as possible after the accident occurs
 - (d) At the end of the fiscal year

7. What does ANSI Z16.2 primarily address in the field of safety and health statistics?
 - (a) Definitions and methods for collecting data on injuries and illnesses
 - (b) Guidelines for emergency response procedures
 - (c) Standards for workplace lighting and ergonomics
 - (d) Guidelines for conducting safety inspections

8. Which of the following is an example of a proactive safety monitoring approach?
- (a) Reviewing accident reports after an incident occurs
 - (b) Regularly inspecting equipment for defects and potential hazards
 - (c) Reacting to incidents as they happen without prior preparation
 - (d) Ignoring safety concerns until they become critical issues
9. What is the primary goal of safety education in the workplace?
- (a) To assign blame for accidents and incidents
 - (b) To provide employees with the skills and knowledge to work safely
 - (c) To increase productivity at any cost
 - (d) To reduce the number of safety regulations in place
10. Which of the following is a key element of a successful safety campaign?
- (a) Focusing solely on the management team's involvement
 - (b) Providing minimal training and resources
 - (c) Consistent messaging, engagement, and participation of all stakeholders
 - (d) Ignoring safety issues and hoping they will resolve on their own

Part B

(5 × 5 = 25)

Answer **all** the questions

11. (a) How did historical safety movements shape modern safety standards and regulations in workplaces?

Or

(b) What is the role of supervisors in promoting a culture of safety, and how can they enforce safety protocols effectively?

12. (a) Discuss the key components of a safety audit in detail.

Or

(b) What are the different types of safety audits commonly conducted in various industries

13. (a) What is the role of the safety committee in promoting a culture of safety and facilitating accident prevention initiatives within organizations?

Or

(b) Discuss the protocols for reporting accidents to statutory authorities.

14. (a) How does the “Safe T” score contribute to assessing safety performance?

Or

(b) What distinguishes permanent total disabilities from permanent partial disabilities.

15. (a) How is the importance of training reflected in workplace safety?

Or

(b) Discuss the role of government agencies play in safety training.

Part C

(5 × 8 = 40)

Answer **all** questions.

16. (a) Describe the core concepts of safety management, encompassing risk assessment and preventive measures across organizations?

Or

- (b) How have past workplace accidents influenced the evolution of safety policies, and what lessons can be drawn from them to prevent future incidents?

17. (a) Enumerate the significance of using an audit checklist and report review during safety inspections.

Or

- (b) How does the review of accident and safety records help in formulating effective preventive measures to improve workplace safety?

18. (a) Discuss the key principles of accident prevention with suitable example.

Or

- (b) Describe the process of accident investigation and analysis in detail.

19. (a) How does ANSI Z16.1 recommend practices for compiling and measuring work injury experience, and what are the key parameters involved in this process?

Or

- (b) What is the significance of incident rates in monitoring safety performance, and how do they contribute to the formulation of proactive safety measures and policies?.
20. (a) Discuss the key elements of effective safety training methods, including seminars, and competitions.

Or

- (b) Discuss the various methods of promoting safety, including motivation and communication strategies
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C-1298

Sub. Code

70116A

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

First Semester

Industrial Safety and Hygiene

ENVIRONMENTAL SAFETY

(2023 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 1 = 10)

Answer **all** the questions.

1. What does the acronym "EPA" stand for in the context of environmental safety?
 - (a) Environmental Pollution Assessment
 - (b) Environmental Protection Agency
 - (c) Environmental Policy Act
 - (d) Environmental Preservation Authority

2. What natural event can lead to a temporary reduction in air pollution, such as lower levels of nitrogen oxides (NO_x)?
 - (a) Volcanic eruption
 - (b) Forest fires
 - (c) Heatwaves
 - (d) Tornadoes

3. What is the main cause of thermal pollution in water bodies, which can harm aquatic ecosystems?
 - (a) Oil spills
 - (b) Geothermal energy production
 - (c) Industrial discharges of heated water
 - (d) Sewage overflow

4. Which of the following pollutants is commonly associated with “dead zones” in aquatic ecosystems?
 - (a) Oil and grease
 - (b) Microplastics
 - (c) Nutrients like nitrogen and phosphorus
 - (d) Heavy metals

5. How is hazardous waste typically classified based on its characteristics?
 - (a) By color
 - (b) By weight
 - (c) By the date of disposal
 - (d) By its potential to ignite, corrode, react, or be toxic

6. Which hazardous waste treatment method involves the use of high temperatures to break down hazardous substances into less harmful components?
 - (a) Recycling
 - (b) Land disposal
 - (c) Incineration
 - (d) Chemical stabilization

7. What is the primary goal of environmental measurement and control?
- (a) To increase pollution levels
 - (b) To monitor and mitigate environmental impact
 - (c) To encourage unregulated emissions
 - (d) To minimize data collection and analysis
8. What does the acronym “GIS” stand for in the context of environmental measurement and control?
- (a) Global Industrial Standards
 - (b) Groundwater Infiltration System
 - (c) Geographic Information System
 - (d) Greenhouse Inspection Service.
9. Which of the following industries is categorized as a Red Category” industry, indicating high pollution potential in India?
- (a) Food processing
 - (b) Information technology (IT)
 - (c) Textiles
 - (d) Renewable energy
10. Which technology is commonly used for the treatment of hazardous waste in India, particularly for incineration and thermal destruction?
- (a) Wind energy
 - (b) Solar power
 - (c) Waste-to-energy plants
 - (d) Hydropower

Part B

(5 × 5 = 25)

Answer **all** the questions.

11. (a) What are the key classifications of air pollutants, and how do their properties contribute to their impact on the environment and human health?

Or

- (b) Discuss the impact of deforestation on the environment and its effects.
12. (a) Discuss the various health hazards associated with the contamination of water sources by different pollutants, emphasizing their implications for public health.

Or

- (b) Discuss the different types of industrial effluents and its disposal methods.
13. (a) How is hazardous waste management regulated in India, and what are the key guidelines and protocols for handling hazardous waste?

Or

- (b) What are the potential hazards related to bio-processes in hazardous waste management and how can these risks be effectively mitigated through proper protocols and safety measures?
14. (a) How are dust monitors, particle size analysers used in environmental monitoring and pollution control?

Or

- (b) Discuss the importance of environmental laws in promoting sustainable practices and pollution reduction.

15. (a) How is pollution controlled in the cement industry, and what are the key strategies employed to minimize environmental impact during the production process?

Or

- (b) Discuss the specific pollution control measures adopted by tanneries to mitigate the environmental impact of leather production and processing.

Part C

(5 × 8 = 40)

Answer **all** questions.

16. (a) Explain the role of automobile exhausts and chemical factory stack emissions in adding to air pollution levels, and discuss the specific pollutants emitted by these sources.

Or

- (b) What are the potential risks associated with the depletion of the ozone layer, and how does this phenomenon contribute to the hazards of air pollution and climate change?

17. (a) Explain the significance of sampling and analysis in water quality assessment.

Or

- (b) How can effective management of water pollution contribute to the sustainable use of water resources and the protection of aquatic ecosystems and biodiversity?

18. (a) Discuss the processes involved in the identification, characterization, and classification of hazardous waste, emphasizing their importance in effective waste management practices.

Or

- (b) How are solid wastes collected and disposed of, and what are the specific health hazards associated with the mishandling of hazardous waste during collection and disposal processes?
19. (a) Describe the functions of lux meters and pH meters in assessing environmental conditions and controlling pollution levels.

Or

- (b) Discuss the roles and responsibilities of Pollution Control Board in enforcing environmental standards.
20. (a) How do dyeing and pigment industries implement pollution control measures to minimize environmental harm and promote sustainable practices in their production processes?

Or

- (b) Discuss the role of technological advancements and innovation play in facilitating pollution control and sustainable practices in various process industries.
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C-1299

Sub. Code

70116B

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

First Semester

Industrial Safety and Hygiene

WORK STUDY AND ERGONOMICS

(2023 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 1 = 10)

Answer **all** the questions.

1. Which work study technique is used to analyze the sequence and movement of workers in performing a task?
(a) Time study (b) Method study
(c) Motion study (d) Work measurement
2. What is the term for a momentary lapse in attention that can lead to an accident?
(a) Concentration
(b) Fatigue
(c) Complacency
(d) Momentary distraction
3. Which ergonomic principle involves designing tools and equipment to fit the user's physical characteristics?
(a) Anthropometry
(b) Biomechanics
(c) Cognitive ergonomics
(d) Macroergonomics

4. What is the purpose of conducting an ergonomic assessment in the workplace?
 - (a) To evaluate employee attire
 - (b) To identify and mitigate ergonomic risks
 - (c) To measure employee satisfaction
 - (d) To assess marketing strategies

5. What does the term “fit testing” refer to in the context of PPE?
 - (a) Testing the durability of the PPE
 - (b) Testing the cleanliness of the PPE
 - (c) Ensuring that the PPE fits properly and provides adequate protection
 - (d) Testing the quality of the PPE material

6. Which of the following is an ergonomic consideration in designing safety eyewear?
 - (a) Making them as tight as possible to prevent any movement
 - (b) Ensuring a secure fit without consideration for vision clarity
 - (c) Providing anti-fog coatings and adjustable frames for comfort and visibility
 - (d) Using clear lenses for all lighting conditions

7. Which of the following is a key consideration in process design for chemical plants?
 - (a) Color of the equipment
 - (b) Aesthetics of the plant layout
 - (c) Environmental impact and safety
 - (d) Employee uniforms

8. In equipment design, what does “safety factor” refer to?
- (a) A margin of safety in case of equipment failure
 - (b) A safety manual for equipment operation
 - (c) The color-coding of safety equipment
 - (d) The budget allocated for safety training
9. When designing safety features, what does “fail-safe” design mean?
- (a) Creating features that will intentionally fail under stress to avoid misuse
 - (b) Designing features to be as complicated as possible
 - (c) Designing features to function as intended even in the event of a failure or malfunction
 - (d) Focusing on aesthetics over functionality
10. What is the primary role of a user interface (UI) in a man-machine system?
- (a) To automate all human tasks
 - (b) To provide a way for humans to interact with the machine
 - (c) To eliminate the need for human intervention
 - (d) To reduce the complexity of the machine

Part B

(5 × 5 = 25)

Answer **all** the questions.

11. (a) Discuss the role of work procedures in standardizing operations and ensuring best performance in the workplace.

Or

(b) Discuss the principles of safety and its application in minimizing risks and creating a secure work environment.

12. (a) What is the definition of ergonomics, and how does it contribute to creating efficient and safe work environments?

Or

(b) Explain the key considerations in designing workbenches and seating arrangements to ensure the comfort and well being of workers.

13. (a) Explain the concept of invisible protective barriers and their contribution to workplace safety for workers.

Or

(b) Discuss the significance of training programs and guidelines for the proper use of PPE.

14. (a) Explain the concept of modular design and its contribution to enhancing flexibility and scalability in manufacturing Operations.

Or

(b) Explain the potential hazards associated with Industrial processes and equipment.

15. (a) Discuss the personal risk factors affecting man-machine systems.

Or

(b) Discuss the types of controls and displays used in man-machine systems and their role in enhancing operational efficiency and safety.

Part C

(5 × 8 = 40)

Answer **all** the questions.

16. (a) Explain the significance of task breakdown in identifying areas for improvement and optimizing work processes.

Or

- (b) Discuss the concept of substitution in work study and its role in implementing safe work practices.

17. (a) Discuss the applications of ergonomic principles on the shop floor and their impact on optimizing work processes.

Or

- (b) Discuss the principles of motion economy and their role in minimizing unnecessary movements and maximizing efficiency in the workplace.

18. (a) Explain the ergonomic considerations in the design of PPE and their role in ensuring comfort and usability for workers.

Or

- (b) Explain the role of regulatory bodies and industry standards in enforcing guidelines for the use of PPE.

19. (a) Explain the importance of effective machine layout and machine guarding in maintaining operational safety.

Or

- (b) How does the integration of safety measures into the process and equipment design promote a secure workplace and efficient functioning of industrial operations?

20. (a) Discuss the impact of fatigue and vigilance on system performance and the strategies used to measure these characteristics for enhanced efficiency.

Or

- (b) What are the penalties associated with poor design in man-machine systems, and how can adherence to guidelines for safe design and postures mitigate these penalties?
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C-1300

Sub. Code

70116C

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

First Semester

ISH

DOCK SAFETY

(2023 onwards)

Duration : 3 Hours

Maximum : 75 Marks

Part A

(10 × 1 = 10)

Answer **all** questions.

1. What is the primary purpose of safety measures at a dock?
 - (a) To increase productivity
 - (b) To reduce energy consumption
 - (c) To ensure the safety of personnel and equipment
 - (d) To minimize shipping costs

2. Which of the following events is considered a significant turning point in the history of safety legislation, leading to the creation of modern workplace safety laws?
 - (a) The Triangle Shirtwaist Factory fire
 - (b) The sinking of the Titanic
 - (c) The signing of the Magna Carta
 - (d) The invention of the printing press

3. In maritime terms, what does the acronym “SOLAS” stand for?
 - (a) Ship Owner Liability and Safety Act
 - (b) Safety of Life at Sea
 - (c) Standard Operating and Logistics for All Ships
 - (d) Ship Operations and Life Assistance Standards
4. Which emergency signal is used to indicate a vessel that is aground and unable to maneuver?
 - (a) Red flare
 - (b) Orange smoke signal
 - (c) Yellow signal flag
 - (d) Red over red lights
5. In the context of lifting equipment safety, what does the term ‘SWL’ stand for?
 - (a) Safe Weight Limit
 - (b) Standard Working Load
 - (c) Secure Weight Lifter
 - (d) Suspended Weight Limit
6. In a workplace, which personnel are typically authorized to operate lifting appliances and equipment?
 - (a) Anyone with an interest in learning
 - (b) Qualified and trained operators
 - (c) Visitors to the facility
 - (d) Employees with no training
7. What organization sets international safety standards for the transportation of dangerous goods, including chemicals and hazardous materials?
 - (a) United Nations
 - (b) World Health Organization
 - (c) International Monetary Fund
 - (d) Red Cross

8. What is the primary goal of transport equipment safety?
- (a) To increase the speed of transportation
 - (b) To minimize fuel consumption
 - (c) To ensure the safe and efficient movement of people and goods
 - (d) To reduce transportation costs
9. According to the Dock Workers Regulations, which of the following items must be provided to dock workers?
- (a) Unlimited coffee breaks
 - (b) Safety training and personal protective equipment
 - (c) Excessive working hours
 - (d) Entertainment facilities
10. Which organization is typically responsible for overseeing the development and implementation of an Emergency Action Plan in the workplace?
- (a) Local government
 - (b) OSHA (Occupational Safety and Health Administration)
 - (c) Employee unions
 - (d) The Environmental Protection Agency (EPA)

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) What are the key provisions of the Marking of Heavy Packages Act of 1951, and how does it ensure safety in handling cargo in Indian ports?

Or

- (b) What are the primary responsibilities of port authorities in ensuring safety in Indian ports?

12. (a) What safety considerations are essential for handling hatch beams and hatch covers, and how do they ensure smooth operations on cargo ships?

Or

- (b) What safety measures should be observed when dealing with internal combustion engines on board ships to prevent fire and explosion hazards?

13. (a) How do different types of lifting appliances cater to various maritime cargo handling needs?

Or

- (b) How can cutting-edge technologies enhance safety standards in container handling and lifting appliances in the maritime industry?

14. (a) How is the safety ensured in the use of self-loading container vehicles and cranes in port operations?

Or

- (b) What are the restrictions and regulations concerning the carriage of dangerous goods in containers?

15. (a) Prepare an effective emergency action plan for explosions, and collapse incidents in industrial settings.

Or

- (b) What essential information should be included in a comprehensive safety report to ensure compliance with industry safety standards and regulations?

Part C

(5 × 8 = 40)

Answer **all** questions.

16. (a) What are the legal obligations of ship owners and agents concerning the safety of dock workers during operations?

Or

- (b) Why is it crucial to maintain safety standards for lifting appliances and loose gear in dock operations?
17. (a) How are chipping and painting operations managed on board ships, and what safety precautions are necessary to minimize hazards?

Or

- (b) How does proper illumination of decks and in holds contribute to the safety of crew members and cargo handling operations on board ships?
18. (a) How do various rigging methods affect the safety and efficiency of cargo handling in lifting operations?

Or

- (b) What safety guidelines should be included in training programs for operators handling lining appliances to promote a culture of safety awareness in maritime organizations?
19. (a) How are containers tested, examined and inspected to ensure their safety standards?

Or

- (b) Discuss the safety measures involved in the loading and unloading of cargo.

20. (a) What are the standard precautions and procedures for addressing spillages of dangerous goods, and how can environmental and health risks be minimized?

Or

- (b) Discuss the key provisions outlined in the Dock Workers Rules and Regulations of 1990.
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