

KATHMANDU UNIVERSITY
End Semester Examination
July/August, 2024

Level : B.Sc.
Year : III
Time : 2 hrs. 30mins.

13 AUG 2024

Course : ESEE 304
Semester : I
F. M. : 40

SECTION "B"

[2 Q. × 10 = 20 marks]

Attempt *ALL* questions.

1. In recent years, the agricultural sector has faced significant challenges related to the unregulated use of pesticides. Farmers often resort to using various pesticides to protect their crops from pests and diseases, but the lack of proper regulation and safety training has led to serious health and environmental concerns. The effects of pesticide exposure are not limited to the farmers and workers handling these chemicals; they extend to consumers who unknowingly ingest pesticide-laden fruits and vegetables. In a rural farming community, the widespread use of pesticides has become a norm due to increased pest resistance and pressure to maximize crop yields. Farmers in this community lack formal training on the safe use of pesticides and often do not have access to proper personal protective equipment (PPE). As a result, incidents of acute pesticide poisoning are not uncommon. Additionally, the long-term exposure to these chemicals has led to chronic health issues such as respiratory problems, skin disorders, and even cancer. The problem extends to consumers as well. Studies have shown that the fruits and vegetables produced in this community have high levels of pesticide residues, which pose significant health risks. The local market does not have stringent checks for pesticide levels, and consumers are unaware of the potential dangers of consuming these products.

As an aspiring Environmental Science undergraduate specializing in Environmental and Occupational Safety & health, your task is to design a comprehensive OSH Management System (OSHMS) for the government to address the critical issues faced by Nepalese. This comprehensive OSHMS should be tailored to address the unique risks associated with the construction industry in the Gulf region. You may include the following in your response:

- a. Define the context and scope of the Occupational Safety and Health Management System (OSHMS) you would implement to mitigate this issue. [2]
 - b. List down at least three significant hazards in this scenario and describe the methodology for identifying these hazards. [3]
 - c. Construct a Risk Assessment Matrix for each hazard to ascertain the overall risk level. [4]
 - d. Rank the hazards based on their severity and urgency for mitigation. [1]
2. You have been appointed as the Environmental Health and Safety Officer in Bir Hospital, which is an urban hospital known for its high patient traffic and diverse medical services. Recently, there have been reports of healthcare workers experiencing respiratory issues and skin irritations in a specific ward where patients with infectious diseases are treated. A notable portion of the staff show symptoms of red rashes in their hands, and cheeks. Some healthcare workers feel difficulty in breathing due to nose blockade and continuous itching around their chest. Given the nature of the ward's services, healthcare workers frequently engage in activities that involve close contact with patients, handling potentially hazardous substances, and implementing infection control measures.

P.T.O.

In addition to healthcare workers, residents living in proximity to the hospital's dumping site have reported similar health problems. Concerns have been raised about the potential environmental and biological hazards in this ward. Your task is to conduct a comprehensive risk assessment for the hospital ward, focusing on environmental and biological hazards.

In your response, address the following aspects:

- a. Clearly identify the environmental and biological hazards based on the reported health issues among healthcare workers. Explain how you would gather information about the incidents, considering the nature of healthcare settings. [2]
- b. List out the potential risks associated with the identified hazard, and discuss the sources, events, and factors contributing to the risks in a hospital setting. [3]
- c. Assess the potential consequences of the hazards, considering both immediate health impacts and the risk of spreading infections. [3]
- d. Propose diverse control measures to mitigate the identified risks in a hospital environment. [2]

SECTION "C"

[4 Q. × 5 = 20 marks]

Attempt *ANY FOUR* questions. (Q.N. 8 is compulsory).

3. Write in short about three work-related diseases. Also explain why all work-related diseases are not considered occupational diseases". [3+2]
4. Discuss in detail about the essential fire prevention techniques at the workplace. [5]
5. Describe in detail about all biosafety levels and their characteristics. [5]
6. Discuss the key areas of action outlined in Article 5 of the Occupational Safety and Health Convention, 1981, and explain how they contribute to improving occupational safety and health. [5]
7. List out the importance of physical and cognitive ergonomics. Provide examples to illustrate the application of ergonomic principles in both physical and cognitive aspects of work. [3+2]
8. Write short note on *ANY TWO*: [2Q. × 2.5 = 5]
 - a. Machine Safety and Electrical Safety
 - b. Benefit-cost Ratio
 - c. Multiple Causation Theory

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SECTION "A"

[20 Q. × 0.5 = 10 marks]

Choose and encircle in the most appropriate option from each set of choices

1. If a project has a BCR greater than 1.0, the project is expected to deliver a _____ net present value to a firm and its investors.
 Negative Exponential Positive Complex
2. Select the correct order implied in OSHMS:
 Plan Check Act Do Plan Check Do Act
 Plan Do Check Act Do Check Act Plan
3. The probability that someone could experience harm or have a negative impact on their health as a result of being exposed to a hazard:
 Risk Assessment Risk
 Incident Tracking Danger
4. Who developed the Domino theory in OSH?
 D. Heinlein H.W. Henrich
 John M. Keynes W. Petersen
5. _____ typically refers to a formal agreement or treaty negotiated and adopted by multiple countries or sovereign states to address global issues, establish standards of behavior, or regulate specific areas of international relations, such as trade, human rights, or environmental protection.
 Convention Standards
 Recommendation Enforcement
6. Which level of biosafety is required to handle pathogens such as Ebola Virus and Marburg Viruses?
 BSL-1 BSL-2 BSL-3 BSL-4
7. What is the ultimate goal of prioritizing medical safety in the workplace?
 Legal compliance Financial stability
 Well-being of employees Profit maximization
8. What does OSHA's General Duty Clause require from employers in the construction industry?
 Provide specific fall protection measures
 Maintain hazard-free workplaces
 Strict adherence to machine guarding
 Ensure proper electrical safety

9. Which OSHA standard mandates protective systems like sloping, shoring, or shielding?
 Fall Protection Hazard Communication
 Excavations and Trenching Scaffolding
10. Which of the following is an "Air Reactive" chemical hazard?
 Benzene Silane
 Formaldehyde Carbon tetrachloride

Fill in the blank.

11. The formula for calculating present value (PV) is _____.
12. _____ is also known as macro-ergonomics.
13. _____ refers to heart weakening caused by reduced blood flow to your heart. Typically, this reduced blood flow is the result of coronary artery disease, a condition that occurs when your coronary arteries narrow.
14. In simpler terms, the _____ quantifies the impact of removing a risk factor on reducing the incidence of the disease or health outcome.
15. Effective OHSMS are based on key principles, and one of these is _____, which involves sharing the vision, creating policies, and promoting worker involvement.

Define the following in one sentence.

16. ILO defines ergonomics as:
17. Work-related Psychosomatic illnesses:
18. Engineering Controls:
19. Risk Assessment:
20. Occupational Safety and Health: