

Professional Certification in Biological Waste Management - Examination Content, Sample Questions & References

The IFBA's Professional Certification (PC) in Biological Waste Management identifies individuals with demonstrated competencies in the fundamental principles & practices of managing biological waste generated from laboratories and healthcare settings. Candidates applying for this certification must first successfully complete the PC in Biorisk Management before they are eligible for examination.

The PC in Biological Waste Management is suited to a wide range of professionals working with and around biological materials in functions such as biorisk management & biosafety officers, laboratory scientists, technicians, researchers, facility operations & maintenance personnel, biocontainment design engineers & architects, educators, consultants and policy makers. Individuals holding this certification possess the knowledge and skills in sufficient degree to safely and securely manage (e.g. segregate, package, label, collect, store, treat, transport and dispose of biological wastes. The Body of Knowledge (BOK) below identifies 5 domains (topic areas) and 37 knowledge/task statements that define the competency for certification in Biological Waste Management. The content of the examination is based on this BOK and each question on the examination is linked to one of the statements below.

Domain A – Types and Risks of Biological Waste

1. Define biological waste management terminology;
2. Describe the fundamental principles of disinfection, decontamination, incineration, and sterilization;
3. Identify different types of biological waste including biological laboratory waste (solid and liquid), sharps, anatomical waste, blood and body fluids, and animal waste (e.g. tissues, body fluids, carcasses, bedding);
4. Identify different types of mixed biological waste including mixed biological/chemical waste and mixed biological/radioactive waste;
5. Understand the relative resistance of different classes of microorganisms to heat and chemical decontamination (e.g. prions, protozoan cysts, bacterial spores, mycobacteria, viruses, fungi, vegetative bacteria);
6. Describe how to evaluate hazards and assess risks from waste handling to waste handlers, the general public and the environment from all types of biological wastes;
7. Understand how to evaluate different risks associated with biological wastes generated from diverse settings including clinical laboratories, research laboratories, Biosafety Level 2, 3 and 4 laboratories, production laboratories, and animal facilities.

Domain B- Biological Waste Management

8. Describe the basic elements of a comprehensive biological waste management system including segregation, packaging, labelling, collection, storage, transport, treatment, and disposal;
9. Describe the proper procedures for documentation, record keeping, review and improvement of a biological waste management system;
10. Describe the advantages and disadvantages of on-site vs off-site when selecting waste management options for treatment and disposal;
11. Identify the individuals responsible for the management of biological waste within an organization;
12. Understand how to evaluate the risk related to activities and processes that generate biological waste;
13. Describe procedures for the segregation, packaging, labelling, collection, storage, transport, treatment, and disposal of different types of biological waste generated from diverse settings including clinical laboratories, research laboratories, Biosafety Level 2, 3 and 4 laboratories, and animal facilities;
14. Describe strategies for reducing the quantities of biological waste that is generated (e.g. minimize the packaging brought into laboratories);
15. Understand the applicability of local/national regulations and regulatory framework that govern the management, treatment and disposal of biological waste;
16. Describe how to develop and implement training programs for personnel in the proper handling and risks associated with biological waste;
17. Describe the safety measures (e.g. personal hygiene, personal protective equipment) and security measures (e.g. physical security, restricted access) needed to manage untreated biological wastes;
18. Understand how to establish emergency response procedures for responding to accidents and incidents involving biological wastes and how to establish contingency plans for dealing with the disruption or inoperability of waste treatment and disposal methods.

Domain C – Treatment and Disposal of Biological Waste

19. Describe the basic principles, advantages and limitations of treatment and disposal options for biological waste including steam autoclaving, irradiation, incineration, chemical disinfection and decontamination, gaseous decontamination, effluent treatment systems and disposal to landfill;
20. Understand how to evaluate and select appropriate treatment and disposal procedures applicable to different types of biological waste generated from diverse settings including clinical laboratories, research laboratories, Biosafety Level 2, 3 and 4 laboratories, and animal facilities;

21. Describe the principles, advantages and limitations of different types of autoclaves and autoclave cycles;
22. Describe the procedures for properly packaging, loading, running, and unloading the autoclave to ensure adequate steam penetration;
23. Describe the principles, advantages and limitations of different types of incinerators for the treatment of biological wastes;
24. Describe the procedures for properly packaging, loading, operating and cleaning incinerators;
25. Understand the applicability of local/national regulations and regulatory framework that govern incinerators related to off-site transportation, operation, emissions and ash disposal;
26. Describe the principles, advantages and limitations of different types of effluent treatment systems including heat-based systems, chemical-based systems, batch and continuous flow systems;
27. Understand the unique treatment methods required for the decontamination of prion contaminated materials; and
28. Understand how to evaluate and select proper treatment and disposal options for animal carcasses and anatomical waste including alkaline hydrolysis, rendering and composting.

Domain D – Chemical Disinfectants and Sterilants

29. Describe the differences between a sanitizer, disinfectant and sterilant;
30. Describe the intrinsic and inherent resistance of different classes of microorganisms to chemical disinfectants;
31. Describe the germicidal properties, advantages and limitations of commonly used classes of chemical disinfectants and sterilants including chlorine-based products, iodine and iodophors, alcohols, phenolic compounds, quaternary ammonium compounds, glutaraldehyde, formaldehyde, hydrogen peroxide and peracids;
32. Describe the factors (e.g. concentration, contact time, organic load, temperature, humidity, diluent, pH, stability) that affect the efficacy of common classes of disinfectants; and,
33. Understand how to evaluate and select the appropriate disinfectant for use against different classes of microorganisms (i.e. prions, protozoan cysts, bacterial spores, mycobacteria, viruses, fungi, vegetative bacteria) in diverse settings including clinical laboratories, research laboratories, Biosafety Level 2, 3 and 4 laboratories, and animal facilities.

Domain E – Validation and Efficacy Monitoring

34. Describe the biological validation and efficacy monitoring methods applicable to different types of biological waste treatment options;

35. Describe the procedures for proper documentation and record keeping of validation and efficacy monitoring;
36. Understand how to evaluate and select the appropriate biological indicator for its intended use (e.g. liquid versus dry loads, self-contained system, enzyme-based rapid method); and,
37. Describe procedures for the proper use of biological indicators to establish effective operating parameters for autoclaves using representative loads and determining their processing times.

The following represents the percentage of questions in each domain that are included in the examination:

Exam Blueprint	
Professional Certification in Biological Waste Management	
Passing Score – 72%	
Domain	Number of Questions
A) Types and Risks of Biological Waste	27
B) Biological Waste Management	35
C) Treatment & Disposal of Biological Waste	21
D) Chemical Disinfection and Sterilants	11
E) Validation & Efficacy Monitoring	6

In order to familiarize candidates with the nature and form of the examination questions, the following are provided as examples. An asterisk marks the correct answer.

1. A/an _____ is a chemical or mixture of chemicals that is used to kill microorganisms on laboratory benchtops, but not necessarily spores.
 - a) antiseptic
 - b) sporocide
 - c) disinfectant*
 - d) sanitizer

2. Segregation of waste from laboratories and healthcare facilities is
 - a) not needed if the facility only generates a small amount of waste materials.
 - b) important to determine the type of treatment and disposal practices that should be applied to each type of waste generated.*
 - c) always carried out at the final site where the waste is disposed of.
 - d) only required if the facility is handling human tissues or body parts that must be separated from other non-pathological wastes.

3. Which of the following should be placed directly into an autoclave bag and processed through the autoclave as infectious laboratory waste?

- a) Paper towels used to dry hands when leaving the laboratory.
- b) Needles contaminated with blood.
- c) A container of sodium hypochlorite used to decontaminate pipettes.
- d) Petrie dishes used to grow cultures of *Salmonella*.*

4. Which of the following best describes the parameters of alkaline hydrolysis used to decontaminate infected animal carcasses?

- a) Dry oxidation process at 850°C
- b) Saturated steam under pressure at 121°C
- c) Strong alkali solution and heat*
- d) Dry heat under pressure

Some suggested preparation for examination might include, but should not be limited to, the following resources:

- 1. Safe Management of Wastes from Health-Care Activities. World Health Organization. 2014
- 2. Laboratory Biosafety Manual. World Health Organization. 2004
- 3. Compendium of Technologies for Treatment/Destruction of Healthcare Waste. United National Environment Programme. 2012
- 4. Canadian Biosafety Standards & Guidelines. Public Health Agency of Canada. 2013

(All of these resources and others are available for download on the IFBA website at www.internationalbiosafety.org)