



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**(MMUST)**

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS**

**2017/2018 ACADEMIC YEAR**

**FOURTH YEAR FIRST SEMESTER EXAMINATIONS**

**FOR THE DEGREE**

**OF**

**BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCES**

**COURSE CODE: BML 216**

**COURSE TITLE: BIOSAFETY AND BIOSECURITY**

**EXAM: SUPPLEMENTARY EXAM**

**DATE:**

**TIME:**

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INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, A, B and C, carrying respectively: Multiple Choice Questions (MCQ), short answered Questions (SAQs) and Long Answer (LAQs).

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating.

This paper consists of 5 printed pages. Please Turn Over.

**Section A: Answer ALL Questions in this Section [20 Marks]**

1. The correct sequence for cleaning a biological spill is:
  - A. Disinfect, cover, clean, disinfect
  - B. Disinfect, disinfect, clean, cover
  - C. Clean, disinfect, cover, disinfect
  - D. Cover, disinfect, clean, disinfect
2. rDNA should be a part of the \_\_\_\_\_ for your lab, taking into account source, vector, polypeptide product, etc.
  - A. Comprehensive risk assessment
  - B. Emergency exit plan
  - C. Employee incentive program
  - D. None of the above
3. True or False: it is recommended that liquid waste be decontaminated with 10% bleach solution and then autoclaved.
  - A. True
  - B. False
4. Which of the following statements is true regarding hoods/cabinets?
  - A. Laminar flow hoods, chemical fume hoods and biological safety cabinets (BSC) can be used interchangeably
  - B. A laminar flow hood maintains inward airflow and may be used for work with infectious materials
  - C. Chemical fume hoods are HEPA filtered
  - D. Biological safety cabinets use HEPA filters and directional airflow to protect both the worker and materials being used
5. Which of the following procedures can create aerosols?
  - A. Re-suspending centrifuged cells with a pipette
  - B. Streaking an agar plate
  - C. Making dilutions with a syringe and needle
  - D. All of the above
  - E. None of the above
6. Which of the following is NOT an example of a safety sharp?
  - A. Syringe with protective shield
  - B. Syringe with retractable needle
  - C. Blunt-tip blood drawing needle
  - D. Glass vacutainers

7. A process that reduces microbes to a level deemed safe by public health standards is called
  - A. Antisepsis
  - B. Disinfection
  - C. Sanitation
  - D. Sterilization
8. The time required for a control agent to kill 90% of the microorganisms or spores in a sample under specified conditions is called
  - A. The contact time
  - B. The D value
  - C. The Z value
  - D. None of the above
9. Which of the following statements about Personal Protective Equipment (PPE) are correct?
  - A. PPE should be worn and stored only inside the laboratory
  - B. PPE should be chosen based upon the work being completed
  - C. Employees utilizing PPE should be properly trained
  - D. All of the above.
10. A clean bench protects the samples only, not the laboratory worker
  - A. True
  - B. False
11. When working in a Biosafety cabinet what area of the cabinet should samples be placed in for the best protection?
  - A. Back
  - B. Middle
  - C. Front
  - D. Sides
12. Biohazard waste containers should be open \_\_\_\_\_.
  - A. At all times
  - B. Only when actively adding waste to them
  - C. When they are placed outside for storage
  - D. None of the above
13. What color on the NFPA diamond represents health?
  - A. Red
  - B. White
  - C. Blue
  - D. Yellow
14. What agency provides guidance on laboratory design for increasing Biosafety levels?
  - A. IATA – Dangerous Goods Regulations
  - B. DOT – 49CFR
  - C. CDC/NIH – BMBL
  - D. WHO

15. Risk of exposure can vary with the amount of infectious material used, therefore, CDC/NIH BMBL –
- A. Recommends different procedures be used based on amounts/manipulation being performed
  - B. Recommends that you always use the highest Biosafety level
  - C. Recommends you contact the WHO for further information
  - D. None of the above
16. Biosafety cabinets are among the most effective and most commonly used \_\_\_\_\_ containment devices when working with infectious agents
- A. Primary
  - B. Secondary
  - C. Tertiary
  - D. Quaternary
17. Which of the following involves preventing the accidental transmission of disease in the laboratory?
- A. Biohazard
  - B. Biosafety
  - C. Biorisk
  - D. Biosecurity
18. Ensuring that biological materials are locked up and only available to authorized personnel is one aspect of Biosecurity.
- A. True
  - B. False
19. The risk assessment process is used to
- A. Determine what measures should be put in place that are proportionate with the risks involved with the work
  - B. Define how much funding is needed to implement a biorisk management program
  - C. outline the roles the responsibilities of individuals within the facility for managing biological risks
  - D. Measure the effectiveness of personal protective equipment and other safety equipment
20. One of the roles of a biorisk management officer is to
- A. Ensure sufficient resources are provided to safely work with biological agents
  - B. Discipline employees who refuse to wear protective equipment and follow safety practices
  - C. Conduct background checks on employees to ensure they are suitable for working with biological agents
  - D. Provide guidance on the development of biorisk management procedures

**Section B: Answer ALL Questions in this Section [40 Marks]**

21. Describe any five elements of Good Laboratory Practices (GLP) [5 Marks]
22. Outline the potential and perceived Biosafety concerns associated with GMOs?[6 Marks]
23. State the key elements considered in assessing the risk of exposure of biomedical laboratory workers to injury, infection and illness? [6 Marks]
24. Distinguish between Precautionary principle and Biosafety guidelines [6 Marks]
25. Outline the range of laboratory equipments designed to reduce biohazards in a research laboratory [6Marks]
26. Define the following terminologies/concepts [6 Marks]
- i. Biosafety
  - ii. Biohazard
  - iii. Biosecurity
27. Describe the causes of aerosols in a biomedical laboratory [5 Marks]

**Section C: Answer ANY Two Questions from this Section [40 Marks]**

28. You are considering accepting a job working in a cancer research lab. The work that you will be doing is to insert a gene for a known human toxin into lentivirus to have a way to see if the lentivirus can deliver the toxin to malignant cells. Carry out a risk assessment to determine the suitability of the job. [20 Marks]
29. Describe in detail how to establish emergency response procedures in a biosafety lab [20 Marks]
30. Discuss the principles of biosafety. [20 Marks]