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051106T4APB

APPLIED BIOLOGY LEVEL 6

APB/OS/AB/CR/02/6/A

CARRY OUT MICROBIOLOGICAL TECHNIQUES

July/August 2024

TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)

WRITTEN ASSESSMENT

TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. This paper consists of two sections: A and **B**
2. Answer **ALL** the question as guided in each section
3. Marks for each question are as indicated in the brackets
4. You are provided with a separate answer booklet to answer the questions
5. Do not write in this question paper

This paper consists of FOUR (4) printed pages. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A (40 MARKS)

(Answer ***ALL*** the Questions in This Section)

1. The microbiology laboratory is used for culturing specimen in a sterile environment.
   a) In the context of microbiology laboratory, define the term sterilization (1 Mark)
   b) Outline THREE methods of sterilization used in microbiology laboratory (3 Marks)
2. Laboratory workers must wear protective clothing to keep off infections. Use this information to answer the questions below;
   a) Describe the term laboratory as used in microbiology (1 Mark)
   b) Mention any THREE laboratory acquired infections as per laboratory procedures. (3 Marks)
3. When selecting the type of culture media for microbiology laboratory, several factors need to be considered. Outline any FOUR factors that must be considered (4 Marks)
4. To estimate the concentration of a bacteria in a sample, microbiologists can use the most probable number method. Give four procedures used. (4 Marks)
5. Viruses are microscopic organisms that can infect hosts, like humans, plants or animals. Describe the structure of a virus (4 Marks)
6. Fermentation is the breakdown of carbs like starch and sugar by bacteria and yeast. Explain the role of fermentation in food production carried out as per microbiological procedures. (4 Marks)
7. Microbiologists can use several laboratory methods to identify bacterial contamination in water sources. Give FOUR of these methods. (4 Marks)
8. Public drinking water systems use different water treatment methods to provide safe drinking water. Explain the importance of the process of disinfection in sewage treatment plant and the role of chlorine in killing pathogenic bacteria. (4 Marks)
9. Maintaining and preserving fungal cultures is essential for microbiology studies. List FOUR common methods for preservation of fungal cultures in microbiological laboratories. (4Marks)
10. Growth of microorganisms is influenced by several factors;
    a) Explain the difference between macroscopic and microscopic characteristics used in classification of fungi. (2Marks)

b) Temperature is an important environmental factor for the growth of microorganism. Explain two roles of temperature in fungi cultivation in Laboratory Settings.

(2 Marks)

SECTION B (60 MARKS)

*(Answer any **THREE** questions from this section)*

11. A bacteria culture test can help identify different bacteria.
    a) Describe the procedure of gram staining in identification of bacteria (10 Marks)
    b) Describe the procedure of inoculating Culture media by streak plate method (10 Marks)
12. Once the sample is collected it should be transported hygienically under strict conditions of time and temperature, to preserve its microbiological status.
    a) Explain five importance of using control samples in microbial analysis of food and water. (10 Marks)
    b) Discuss the significance of temperature control in optimizing microbial activity during biogas production (10 Marks)
13. Describe the use of the following sterility indicators in sterility testing as used in microbiology techniques;
    a. Autoclave tape (10 Marks)
    b. Biological Indicator (10Marks)
14. An accurate virus diagnosis requires laboratory testing of clinical specimens for the presence of virus, viral antigens, or specific antibodies. Discuss the challenges and limitations associated with isolation and identification of animal viral diseases using microbiological techniques. (20 Marks)

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