

Reg. No.



**UNIVERSITY OF EMBU**

**2017/2018 ACADEMIC YEAR**

**SECOND SEMESTER EXAMINATIONS**

**THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE,  
BACHELOR OF SCIENCE (MICROBIOLOGY AND BIOTECHNOLOGY)**

**SBT 318: LABORATORY METHODS IN MICROBIOLOGY**

**DATE: APRIL 6, 2018**

**TIME: 8:30 – 10: 30 AM**

**INSTRUCTIONS:** Answer **ALL** Questions from **SECTIONS A** and **B**, and **ONE** Question selected from **Section C**.

**SECTION A: Multiple Choice Questions (1 Mark each)**

Please tick in the box opposite the correct answer.

1. Which of the following statements is false about optical microscopes?
  - They use transparent lenses.
  - They use a beam of charged particles.
  - They are the most familiar to everyone.
  - They use visible light.
2. Which of the following statements is false about classification of media based on nutritional component?
  - Simple media can support most non-fastidious.
  - Blood agar is an example of complex media.
  - Synthetic media has each of its component known.
  - Nutrient agar supports growth of most fastidious bacteria

3. Which of the following statements is correct about spray drying method of microbial preservation?

- It is a low cost protocol.
- It has a simple process.
- It is strain dependent.
- Cryoprotectants are not required.

4. Which of the following statements is incorrect about cell preservation techniques?

- Cell survival ratio play important roles in developing efficient cell preservation protocols.
- Maintenance of the cell viability upon cell immobilization is paramount to various applications.
- Physiological changes play important roles in developing efficient cell preservation protocols.
- Membrane integrity, cell polarization, and metabolic activity of lactobacilli are independent of the p H control or the harvesting time conditions adopted.

5. Which of the following is an undesirable aspect of solid media?

- Ability to liquefy over the temperature range of bacterial growth.
- Resistance to digestion by bacteria.
- Ability to form reversible colloid.
- Transparency.

6. Which of the following statement is true about microencapsulation?

- It ensures high survival rates of preserved microbes.
- It is a long term storage method for microbes.
- It is a preservation method that is independent of temperature.
- It is difficult to resuscitate the microbes.

7. Which of the following statements is true about culture media?
- Basal media is an example of enriched media.
  - Addition of an egg to basal media makes it enriched media.
  - Enriched media favours the growth of a particular bacterium by inhibiting the growth of undesired bacteria and allowing growth of desirable bacteria.
  - Differential media is made by adding blood to basal media.
8. Which of the following is not a component of a PCR master mix?
- DNA Polymerase.
  - dNTP's.
  - Primers.
  - Extracted genomic DNA.
9. Which of the following statements is false?
- Fluorescent dyes can be employed to stain all species.
  - Fluorescent dyes can be employed to stain a particular species of interest in an environmental sample.
  - Fluorescent dyes can be employed to stain a specific component of cells.
  - Fluorescent dyes fluoresce in presence of visible light.
10. Which of the following statements is false?
- Basic biosafety level 1 laboratory is basically used for advanced teaching and research.
  - Basic biosafety level 2 laboratory is used for primary health and diagnostic services.
  - Containment biosafety level 3 laboratory is used for special diagnostic services.
  - Maximum containment biosafety level 4 laboratory is used to handle dangerous pathogens.
11. Which of the following statements is false about transmission electron microscope?
- The light source is replaced by an electron source.
  - The glass lenses are replaced by magnetic lenses.
  - The projection screen is replaced by a fluorescent screen.
  - All specimens can be made thin enough for the transmission electron microscope.

12. Which of the following statements applies only to containment laboratory and not basic laboratory?

- Records of illness and absence should be kept by the laboratory management.
- The two-person rule should apply, whereby no individual ever works alone.
- Women of childbearing age should be made aware of the risk to an unborn child of occupational exposure to certain microorganisms.
- All laboratory workers should undergo a pre-employment health check.

13. Which of the following statements is false about viable counts?

- It is used to measure both living and dead microbes.
- Spread plate method is one way of conducting viable count.
- To obtain the appropriate colony number, the sample to be counted should always be diluted.
- Pour plate is one way of conducting viable counts of microbes.

14. Which of the following is not a lyoprotectant?

- Glycerol.
- Dimethylsulfoxide (DMSO).
- Polysaccharides.
- Monosaccharides.

15. Which of the following is not an advantage of using turbidimetric methods to measure microbial growth?

- It is quick.
- It typically does not require destruction or significant disturbance of sample.
- It gives an accurate number of bacterial counts.
- It is easy to perform.

### **SECTION B: SHORT ANSWER QUESTIONS (5 Marks Each)**

**Your answers should be brief and to the point (Use the examination answer book provided)**

16. Describe briefly how you could enumerate the total number of bacteria in water sample using a named fluorescent dye.

17. Explain how lactic acid bacteria (LAB) can be preserved using freeze drying.

18. Outline factors that should be considered during a microbiological risk assessment.
19. State the limitations of various methods for identification of microorganisms.
20. Why is phylogenetic taxonomy a superior method of microbe identification?
21. How can poor implementation of liquid culture be averted?

**SECTION C: ESSAY QUESTIONS (25 Marks Each)**

**Write an essay on any ONE of the following topics (Use the examination answer book provided)**

22. Describe how one can indirectly determine the number of coliforms in a water sample  
(25 marks)
23. Discuss cryopreservation as a long term cell preservation method  
(25 marks)
24. Discuss functional classification of media  
(25 marks)

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