



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

**SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE (BIOTECHNOLOGY)**

SBC 324: MICROBIAL BIOTECHNOLOGY

DATE: TUESDAY, 3RD APRIL 2012

TIME: 4.30 P.M. – 6.30 P.M.

INSTRUCTIONS

Answer any ALL questions in Section A and B and 2 questions in Section C

SECTION A (20 MARKS)

1. Microorganisms were first observed in a microscope in the 17thC by
 - A. Robert Koech
 - B. Louis Pasteur
 - C. Van Leeuwenhoek
 - D. James Watson

2. Which of the following is not an example of microbial applications in solid-substrate fermentations
 - A. Cheeses
 - B. Water
 - C. Organic acids
 - D. Composting

3. Micro-organisms living in very harsh natural conditions have attracted the attention of biotechnologists who are collecting them from volcanic areas, hot springs and soda lakes e.g. Lake Magadi, etc. This practice is called:--
 - A. Bioprospecting
 - B. Bioexploring
 - C. Biomining
 - D. Bioresourcing

4. Most bacteria and all fungi and protozoans are -----, meaning that they need an *organic* source of carbon.
 - A. prototrophic
 - B. chemotrophic
 - C. heterotrophic
 - D. chemosynthetic

5. The ability of *Agrobacterium tumefaciens* to transfer bacterial genes into the plant genome leads to formation of:
- A. Silkworm disease
 - B. Crown galls
 - C. Bacterial rot
 - D. Stem rot disease
6. Probiogenomics refers to:
- A. Genome-scale analyses of health-promoting bacteria
 - B. Protein analyses of microorganisms
 - C. Genome-scale analyses of health-promoting viruses
 - D. Protein analyses of microorganisms in foods
7. Projecting from the walls of some Gram negative bacteria are numerous fine protein rods called:
- A. Cocci
 - B. Flagellae
 - C. Pili
 - D. Sprillae.
8. Transfer of DNA between bacterial cells is referred to as
- A. Transduction
 - B. Symbiosis
 - C. Conjugation.
 - D. Transformation
9. Purified samples of viruses were first identified chemically as:
- A. Genetic material
 - B. Nucleoproteins
 - C. Nucleic acids
 - D. Virions
10. Which of the following organisms consumed by the deep-sea inhabitants, contributes significantly to the formation of petroleum deposits
- A. Eubacteria
 - B. Rhodophyta
 - C. Cyanobacteria
 - D. Diatoms
11. Genomic islands are derived from
- A. genes laterally transferred by bacteria.
 - B. genes vertically transferred by bacteria
 - C. genes laterally transferred by viruses.
 - D. genes vertically transferred by viruse

12. Yeasts
 - A. are motile like animals
 - B. are unicellular, saprotrophic fungi
 - C. are unicellular prototists
 - D. have hyphae
13. An inflammatory disease of mammary tissues called ----- is due to many microorganisms such as *Staphylococcus aureus*, *Escherichia coli*, *Streptococcus agalactiae*, and *Pseudomonas aeruginosa*.
14. When used as a food source, microbe are referred to as -----.
15. An example of a bacterium that acts as a source of thermophilic enzymes for biotech applications is -----
16. In microbial culture, pure cultures and extensive strain development are essential for product development. Give two examples of products developed in this way. -----and -----
17. An example of a product that contains a significant amount of mould biomass (mycelium) as a source of food is -----
18. The most abundant photosynthetic organism in the ocean is -----
19. Toxic substances produced by fungi on food materials are known as-----
20. Compounds extracted from either mycelium or fruiting bodies of mushrooms with nutritional and pharmaceutical applications are termed -----

SECTION B (30 MARKS): ANSWER ALL QUESTIONS : 5 marks each

1. What are microbial sunscreens? Give two examples.
2. Why are bacterial biological weapons considered a challenge to global security?
3. State the reasons why microalgae are now considered superior sources for biofuel production compared to agricultural crop-derived bioethanol and fossil sources
4. Illustrate the production of calf chymosin from by genetically modified microorganisms
5. List the dangers associated with microbial biofilms.

SECTION C: 3Qs: ANSWER TWO QUESTIONS (10mks each)

1. Summarize ways in which aflatoxins can be eliminated from the food and animal feed chains
2. Discuss the methods used for maintaining microorganisms in a viable condition over a long period time.
3. Outline the criteria employed for selection of microorganisms for use in fermentation