



UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

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

SBT 415: MOLECULAR BIOLOGY II

DATE: APRIL 11, 2018

TIME: 11:00 – 1:00 PM

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 term describes the attachment of a primer onto a template strand
 - a) Elongation
 - b) Annealing
 - c) Termination
 - d) Denaturation
2. Which of the following is NOT a component of PCR?
 - a) RNA polymerase
 - b) Nucleotides
 - c) Primers
 - d) Thermocycler
3. DNA recombination _____
 - a) Allows for the transportation of genes from one organism into the other
 - b) Is similar to the process of replication
 - c) Minimizes genetic variation
 - d) All of the above

4. Which of the following is NOT a gene expression assay?
- a) Sonoporation
 - b) Transplantation
 - c) Electroporation
 - d) Micro injection
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5. Which of the following is NOT true about the genetic code?
- a) It's written using the names of amino acids
 - b) Its degenerate
 - c) Its non-overlapping
 - d) Its universal
6. How does genetic information flow?
- a) From DNA-RNA-Proteins
 - b) From proteins-RNA-DNA
 - c) From RNA-DNA- proteins
 - d) From DNA-proteins-RNA
7. What property of monoclonal antibodies makes them very useful in medical biotechnology applications?
- a) Their polymorphism
 - b) Their shapes
 - c) Their specificity
 - d) All of the above
8. Which of the following is true about agrobacterium mediated transformation?
- a) It relies on the use of the Ti-plasmid
 - b) It can be performed in both plants and animals
 - c) It is similar to biolistic transformation
 - d) All of the above
9. Which of the following can be described as a codon?
- a) Three letters of amino acids
 - b) Three letters of the mRNA nucleotides
 - c) Three letters of the DNA nucleotides
 - d) All of the above

10. What is a vector?
- A length of DNA that carries genes one organism into the host
 - It a disease causing pathogen
 - It's an RNA molecule
 - All of the above
11. Which of the following is NOT true about biological vectors in gene cloning
- They carry genes from one organism into another
 - They can replicate
 - They are involved in disease transmission
 - They are usually very small
12. Separation of DNA by gel electrophoresis depends on?
- The charge of the molecules
 - The concentration of the gel
 - The size of the molecules
 - All the above
13. Which of the following is NOT a technique of transferring separated molecules from a gel to a membrane?
- Western blot
 - Eastern blot
 - Northern blot
 - Southern blot
14. Which of the following best describes ligases?
- They are enzymes that join two pieces of DNA molecules
 - They are RNA molecules
 - They are degradable proteins
 - All of the above
15. The three steps involved in a PCR reaction are
- Denaturation-Annealing-Elongation
 - Elongation-Annealing –Denaturation
 - Annealing-Denaturation-Elongation
 - Denaturation-Elongation-Annealing

SECTION B: SHORT ANSWER QUESTIONS (5 Marks Each)

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

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16. Discuss the applications of PCR
 17. Describe techniques used in the labeling of nucleic acids
 18. Discuss the major applications of southern blotting technique
 19. Discuss the theories of DNA replication
 20. Outline the differences between DNA and RNA
 21. Describe the process of gene electroporation

SECTION C: ESSAY QUESTIONS (25 Marks Each)

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

22. Discuss the production of Monoclonal antibodies using hybridoma technology
23. Discuss the applications of biotechnology in the developing economy
24. Discuss the production of human insulin using recombinant DNA technology

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