



TECHNICAL UNIVERSITY OF MOMBASA
Faculty of APPLIED AND HEALTH SCIENCES

DEPARTMENT OF MEDICAL SCIENCES

UNIVERSITY EXAMINATIONS FOR DEGREE IN
BACHELOR OF MEDICAL LABORATORY SCIENCE
BMLS 12S MID ENTRY

AML 4410: MEDICAL BIOTECHNOLOGY

END OF SEMESTER EXAMINATIONS

SERIES: DECEMBER 2013

TIME: 2 HOURS

INSTRUCTIONS:

1. Answer All questions in section A and B.
2. This paper consists of Seven printed pages

1. Which of the following terminates the chain in a sequencing reaction?

- A. Klenow polymerase
- B. DNA primers
- C. Dideoxynucleotides
- D. DNA polymerase III
- E. deoxynucleotides

2. What is a major issue in Eugenics?

- A. Who pays for the process of genetically engineering humans
- B. Who is responsible for the outcome of all eugenics research?
- C. Who chooses which genes to alter and for what outcome?
- D. Who makes the decision about deliberate eugenics
- E. None of the above.

3. Nanoparticles in the field of biology can be used for
- A. Tumor destruction
 - B. Fluorescent labeling
 - C. Delivery of drugs to the body
 - D. Detection of microorganisms
 - E. All of the above
4. Which of the following describes the primary structure of proteins?
- A. It's a chain of Amino Acids held together by hydrogen bonds
 - B. It's a chain of Amino Acids held together by phosphodiester bonds
 - C. It is the functional structure a protein
 - D. It is made by joining Amino Acid residues through peptide bonds
 - E. All of the above.
5. Which of the following is true of baculoviruses?
- A. Infect insects
 - B. Infect human
 - C. Are hexahedral in structure
 - D. Due to their structures, they cannot be used as expression vectors
6. Which of the following is true of gel electrophoresis of proteins.
- A. It is done on agarose gels
 - B. SDS is used to confer a net positive charge to the protein sample.
 - C. The amount of charge conferred is dependent on the original charge of the protein
 - D. The protein molecules are separated based on their sizes
 - E. All of the above.
7. Which of the following can be created by nanoengineering of DNA
- A. Cross-shaped dna to create 2D matrices
 - B. Frameworks for mechanical nanodevices
 - C. Cubical structures
 - D. Nanoscale scaffolds for circuits & nanowires
 - E. All of the above

8. How many alleles are present in the ABO blood group of population?
- A. 2
 - B. 1
 - C. 6
 - D. 4
 - E. 3
9. Which of the following is true about the DNA molecule?
- A. It is simple in its chemistry
 - B. It has 4 sub units
 - C. Stores information in H-bond forms
 - D. It has 8 types of subunits arrayed in pairs
 - E. It was adopted as the hereditary material in 1940
10. Which of the following traits can be conferred to plants by transgenes?
- A. Resistance to infections
 - B. Resistance to grafting
 - C. Protection from herbivores
 - D. Resistance to insects
 - E. Resistance to water
11. Which property is measured with scanning probe microscope?
- A. magnetism
 - B. temperature
 - C. eclectic resistance
 - D. light absorption
 - E. All of the above
12. Which of the following statement about Immunity is not true?
- A. Vaccines use a live agent that is still capable of producing disease in order to elicit an immune response.
 - B. The Immune system remembers foreign antigens through memory B cells
 - C. Vaccines consist of an antigen from an infections agent that induces an Immune response
 - D. Immunity to fetal disease can often be triggered by infection with a closely related infections agent,as in the case of conopox and small pox
 - E. Antibody producing B cell normally live only a few days but memory cells survive longer.

13. What material is coated on DNA when transforming plant cells with a particle gun.
- A. hold
 - B. aluminum
 - C. calcium
 - D. silver
 - E. helium
14. Which of the following is an incidental side effect of technology?
- A. Decrease in infant mortality rate leads to overcrowding and more use of infinite resource
 - B. Overcrowding due to decrease in infant mortality rate lends to decrease in quality of life by promoting emergency of infectious diseases.
 - C. Cars are faster than horses to reach hospitals but can cause deaths to many people every year.
 - D. Increased life expectancy burden the healthcare system
 - E. All of the above
15. Which of the following is not true about sequencing peptides with mass spectrometry?
- A. In order to determine the sequence, a pure sample of protein is obtained through 2D – page or HPLC.
 - B. The entire protein can be sequenced all at once using mass spectroscopy
 - C. Some purified proteins must be digested with proteases to eliminate undesirable characteristics such hydrophobicity and solubility.
 - D. A database of protein ion spectrum is used to compare the peaks of the unknown peptides to determine the sequence
 - E. Two rounds of mass spectroscopy are used to determine the sequence.
16. What is a major ethical concern of DNA obtained during a criminal or civil case?
- A. Entering DNA evidence into trial is common practice and therefore no ethical concerns.
 - B. Privacy issues of DNA records
 - C. If the procedures used to exonerate or implicate a suspect are accurate
 - D. If the DNA obtained in the investigation matches the suspects DNA.
 - E. None of the above
17. Which of the following is not used during western blotting?
- A. Secondary antibody with a conjugated detection system
 - B. Non-fat dry milk
 - C. Nitrocellulose membrane
 - D. Agarose gel electrophoresis
 - E. Primary antibody that recognizes the protein of interest

18. Which of the following techniques uses fluorescence labeled antibodies
- A. Flow cytometry
 - B. Immunocytochemistry
 - C. Fluorescence activated cell sorting
 - D. Immunohistochemistry
 - E. All of the above
19. Which statement best describes the central diagram of life?
- A. It only applies to yellow & green peas from Mendel's expts.
 - B. Genes are made of RNA, expressed as DNA intermediary and decoded to make proteins
 - C. It only applies to animals
 - D. Genes are made of DNA expressed as an RNA intermediary that is decoded to proteins.
 - E. Genes made of DNA are directly decoded to proteins.
20. What would be the most practical use of cloning humans?
- A. To produce new organisms or tissues for transport
 - B. To have a behavioral replica of one's self.
 - C. To use as food
 - D. All of the above
 - E. None of the above
21. Which of the following is not a nucleic acid structure
- A. B-form
 - B. A-form
 - C. X-form
 - D. Z-form
 - E. Helix
22. What is the purpose of constructing gene libraries?
- A. To create a 'bank' of all the genes in an organism
 - B. To sequence the whole genome
 - C. To find new genes
 - D. To compare genes to other organisms
 - E. All of the above
23. Which of the following holds the largest piece of DNA for cloning?
- A. Plasmids
 - B. bacteriophage
 - C. YACs
 - D. pacS
 - E. Cos mids

24. Which of the following is used as a live vaccine to smallpox?
- A. Variola major
 - B. Variola minor
 - C. Vaccinia virus
 - D. Monkey pox
 - E. None of the above.
25. HPLC can be used to
- A. Separate proteins
 - B. Identify proteins
 - C. Purify proteins
 - D. Quantify proteins
 - E. All of the above
26. Which type of body fluid can be analyzed for forensic purposes?
- A. blood
 - B. tears
 - C. semen
 - D. urine
 - E. all of the above.
27. The following are types of serine proteases except
- A. chymosin
 - B. chymotrypsin
 - C. trypsin
 - D. elastase
 - E. none of the above
28. Which of the following is not a step in DNA fingerprinting.
- A. A cDNA copy of the mRNA is made
 - B. The DNA is cut with restriction enzymes
 - C. Southern blotting is used to visualize the DNA fragments
 - D. Autoradiography is used to identify the location of the radioactive probe after hybridization
 - E. DNA polymerase adds bases to the growing DNA molecule from the message RNA.
29. Which of the following best describes a degradome?
- A. Complete set of RNAases expressed at one specific time.
 - B. Complete set of proteases expressed at one specific time.
 - C. Complete set of carboxylases expressed at one specific time.
 - D. Complete set of aminosees expressed at one specific time.

E. Complete set of DNAases expressed at one specific time
30. How many different proteins does the human proteome have?

- A. 6000
- B. 32000
- C. 130 000
- D. 500 000
- E. 1000 000

SECTION B

Question 1

Discuss the chromosomal organization of genes and noncoding regions of DNA and how they contribute to the expression of given genes (20marks)

Question 2

- a) Describe in details the FISH method. Give two specific examples of where you would apply this technique. (10marks)
- b) Describe the role and use of transgenic plants. (10marks)