



(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

THIRD YEAR SECOND TRIMESTER EXAMINATIONS

**FOR THE DIPLOMA
OF
MEDICAL LABORATORY SCIENCE**

COURSE CODE: BMD 322

COURSE TITLE: MEDICAL BIOTECHNOLOGY

DATE: 11TH DECEMBER 2020

TIME: 2.00 - 4.00PM

INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, **A B** and **C**, carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**).

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

SECTION A (20 MARKS)

1. In each of the following which is the correct answer: Genetic engineering:
 - a). Is a natural process
 - b). Only takes place in micro-organisms
 - c). Happens when cells divide
 - d). Involves combining DNA from different species

2. Human growth hormone HGH is produced in the pituitary gland. Where is the gland located?
 - a). Stomach
 - b). Brain
 - c). Intestine
 - d). Lung

3. Which of the following is not associated with genetic engineering?
 - a). Translation
 - b). Transformation
 - c). Cloning
 - d). Expression

4. Genetically modified organisms:
 - a). Are always harmful
 - b). Are always micro-organisms
 - c). May be beneficial
 - d). Arise naturally

- 5). Which of the following cells would be considered differentiated?
 - a) Blastomere
 - b) Spemann organizer
 - c) Myotome of the somite
 - d) Muscle cell
 - e) Stem cell

- 6). Name any two diseases for which bioengineered vaccines have already been developed:
 - a). Insulin, growth hormone
 - b). Proteases, amylases
 - c). all the above
 - d). None of the above

7. What causes the alteration of normal functioning of a gene?
 - a). Mutations
 - b). gene inversion
 - c). Gene deletion
 - d) all the above

- 8).. What is bioremediation?
 - A). Bioremediation is removal of pollutants in the environment with the use of genetically engineered bacteria.
 - B). Bioremediation is removal of pollutants in the environment with the use of genetically modified Viruses
 - C). all the above
 - D). None of the above

- 9). Where are plasmids found?
 - A) In the soil
 - B). In blood
 - C). In bacteria

- D) .animals
- 10)The DNA segment to be cloned is called?
 - a).gene segment
 - b).DNA fragment
 - c). DNA insert
 - d).all the above
 - 11). Who created the first DNA ?
 - a).natan arber smith
 - b).whatson crick and wilkin
 - c).boyer and Cohen
 - d). paul berg
 - 12). The DNA molecule to which the gene of insert is integrated is called ?
 - a).carrier
 - b). transformer
 - C).vector
 - d). a clone
 - 13). Restriction enzymes are called?
 - a).biological scissors
 - b).molecular scalpels
 - c).molecular knives
 - d) molecular markers
 - 14).The gene formed by joining DNA segments from two different sources are called?
 - a).recombinant gene
 - b).joined genes
 - c).both a) and b)
 - d). chimeric genes
 15. Name the bacterium responsible for curdling of milk?
 - a).Lactofermentous
 - b).Lacto virus
 - c). Bacteriophage
 - d).Lactobacillus
 16. Who discovered antibiotics?
 - a).Alexander Peterson
 - b).Watson grick
 - c).Alexander Fleming
 - d). Alexander framing
 17. What do you mean by second generation vaccines?
 - a). Vaccines produced by the use of recombinant DNA technology
 - b). Vaccines produced by the use of recombinant DNA technology
 - c). Vaccines produced by the second generation
 - d).Vaccines produced from
 - 18).the following are advantages of serum free media for hybridomas except?
 - a).decreased viability of culture medium
 - b).reduced risk of infectious agents
 - c). increased control over bioreactor conditions
 - d higher dependence on animals
 - 19).The following are application of medical biotechnology except
 - a).pharmacology
 - b).gene therapy
 - c).stem cells
 - d). Bioremediation
 - 20).which of the following therapeutic protein is not properly matched?
 - a).insulin –diabetes
 - b).somatostatin –growth disorder
 - c).factor ix Christmas disease

d).factor viii—growth disorder

SECTION B: 40 (marks)

- 21 a). What exactly are stem cells? (2 marks)
b). How are they used to treat disease? (2 marks)
c). Explain what is meant by the following terms in relation biotechnology
i). Red biotechnology (2 marks)
ii).green biotechnology (2 marks)
- 22 a).What is the meaning of the term invitro fertilization and embryo transfer (IVF) (2 marks)
b). Describe how the above process takes place in primates (6 marks)
- 23).Insulin is a hormone produced by the pancreas, which reduces the concentration of glucose in the blood. People, who cannot produce insulin, or not enough of it, are called diabetics. Many diabetics need daily injections of insulin. For many years this insulin has been extracted from the pancreas of pigs, sheep and cattle. Human insulin can now be produced using a technique known as genetic engineering.
- (a) What is a hormone? 1 mark
(b) Where in the body is insulin produced? (1 mark)
(c) What is its function? 1 mark
(d) Why are bacteria suitable for use for this purpose?(1mark
(e) What bio molecules are used to extract a gene from a chromosome? (1 mark
(f) Explain why the same restriction enzyme must be used to extract the gene and open the loop of DNA in the bacterium.(1 mark)
(g) What substances should be added to a bioreactor to enable bacteria to grow?
1 mark
(h) Give one advantage of using genetically engineered insulin compared with that extracted from pigs, sheep or cattle. (1 mark)
- 24). Explain what is meant by the following terms:
(i) Genetic engineering (1mark)
(j) Target gene (1 mark)
(k) Recombinant DNA(1 mark)
(l) Gene (1mark)
(m) Restriction enzyme(1mark)
(n) DNA ligase (1 mark)
(o) A plasmid (1 mark)
(p) Micro-organism (1 mark)

SECTION C (20 marks)

- 25 a)What are monoclonal antibodies 4 marks
b).How have cell cultures revolutionized the medical field (16 marks)
- 26).Describe the process of hybridoma technology for the production of monoclonal antibodies (20 marks)
27). Describe the application of therapeutic biotechnology (20 marks)