



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

**MAIN CAMPUS
UNIVERSITY EXAMINATIONS**

2022/2023 ACADEMIC YEAR

SECOND YEAR SEMESTER MAIN EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN MEDICAL BIOTECHNOLOGY**

COURSE CODE: BMB: 326

**COURSE TITLE: TISSUE ENGINEERING AND
EMBRYOTECNHODOLOGY**

DATE: 20TH APRIL 2023

TIME: 11.00AM – 1.00 PM

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**). **Answer all questions. DO NOT WRITE ON THE QUESTION PAPER.**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over

SECTION A: Multiple Choice Questions (20 Marks)

1. The following statement is true about somatic cells.
 - a. Somatic cells are the cells in the body other than sperm and egg cells
 - b. Somatic cells are the germ cells.
 - c. Somatic cells are haploids
 - d. They are cells in the body including reproductive cells
2. The following are examples of somatic cells.
 - a. Skin cells and sperm cells
 - b. Nerve cells and skin cells
 - c. Blood cells, egg cells
 - d. Sperm cells and egg cells
3. The following are examples of stem cells except?
 - a. Embryonic cells.
 - b. Liver cells
 - c. Bone marrow cells.
 - d. Induced pluripotent cells
4. The following statement is true about embryonic stem cells.
 - a. Are found in the inner cell mass of the human blastocyst which has about 50 cells
 - b. Are found in the inner cell mass of the human blastocyst which has about 1150 cells
 - c. Found in the inner mass of human blastocyst lasting from the 3th to 7th day after fertilization and has about 150 cells.
 - d. Are found in the inner cell mass of the human blastocyst lasting from 4th to 7th day which has about 150 cells.
5. The term Scaffolds is defined as _____?
 - a. Support structures used in tissue engineering designed to facilitate cellular regeneration and implantation into the patient.
 - b. Support structures used in tissue engineering designed to facilitate cellular growth and proliferation upon implantation in vitro.
 - c. Support structures used in tissue engineering designed to facilitate cellular growth and proliferation upon implantation into the patient.
 - d. Support structures used in tissue engineering designed to facilitate cellular proliferation in culture media.
6. The following are examples of natural biomaterials used to make scaffolds except?
 - a. Alginate
 - b. Silk
 - c. Fibers
 - d. Chitosan
7. The term "Xenograft" means?
 - a. A tissue graft/organ transplant from a donor of a different species from the recipient.
 - b. A tissue graft/organ transplant from a donor of same species from the recipient.
 - c. A tissue graft/organ transplant from a donor identical to the recipient.
 - d. Tissue graft/organ transplant from a donor of same species but not identical to recipient.

8. The following statement is true about progenitor cells
- Are descendants of stem cells that further differentiate to create stem cells.
 - Are descendants of stem cells that do not differentiate to create specialized cell types.
 - Are descendants of stem cells that further differentiate to create embryonic stem cells
 - Are descendants of stem cells that further differentiate to create specialized cell types.
9. The term "allograft" is defined as _____?
- Tissue graft from a donor of the same species as the recipient and genetically identical
 - Tissue graft from a donor of same species as the recipient but not genetically identical.
 - Tissue graft from a donor of different species as the recipient and genetically identical
 - Tissue graft from one part of recipients' body to a different site of the same recipient.
10. The following statement is true about cell culture
- The process by which cells are grown under controlled conditions in vivo.
 - The process by which cells are grown under controlled conditions in vitro
 - The process by which cells are grown under uncontrolled conditions in vitro
 - The process by which cells are grown under uncontrolled conditions both in vitro and in vivo
11. The following are essential minerals for cell culture except?
- amino acids,
 - carbohydrates,
 - Ammonium chloride
 - vitamins
12. The term "tissue culture" was first invented by _____?
- Pathologist Montrose Thomas Burrows
 - Zoologist Ross Granville
 - Sydney Ringer
 - Wilhelm Roux
13. Immortalized cell line are _____?
- Cell line with limited lifespan acquired through random mutation/ deliberate modification
 - Cell line with definite lifespan acquired through random mutation/deliberate modification
 - Cell line with definite lifespan acquired through artificial cell culture
 - Cell line able to proliferate indefinitely through random mutation/deliberate modification.
14. The study of whole sets of chromosomes is known as _____?
- Teratology
 - karyology.
 - Embryology
 - Karyogamy
15. Transformation of cultured cells means _____?
- The programmed temporal phenotypic alterations of cells as a result of heritable changes in DNA that leads to gene expression.
 - The spontaneous or induced permanent phenotypic alterations of cells as a result of heritable changes in DNA that lead to gene expression.
 - The spontaneous or induced temporal phenotypic alterations resulting to changes in DNA that lead to gene expression.

- d. The spontaneous or induced permanent phenotypic alterations as a result of heritable changes in DNA that cannot lead to gene expression
16. Natural transformations of cells can be caused by the following viral cancers except?
- a. Human papillomavirus
 - b. T-cell Leukemia virus type I.
 - c. Hepatitis B and C
 - d. HIV virus
17. Which of the following is not a Teratogen?
- a. Thalidomide
 - b. Mercury
 - c. Alcohol
 - d. Citric acid
18. The term teratogen is defined as _____?
- a. Substances that may cause birth defects via a toxic effect on an embryo or fetus
 - b. Substances that cause regenerative cells on an embryo or fetus
 - c. Substances that cause embryogenesis
 - d. Substances that cause regenerative cells on in vitro
19. The following statement is true about the term karyotype.
- a. The general appearance of the complete set of chromosomes in the cells of a species.
 - b. The general appearance of the complete set of stem cells of a species
 - c. The general appearance of the complete set of nuclei in the cells of a species
 - d. The general appearance of the complete set of embryonic cells of a species
20. DNA can be inserted into cells using viruses using the following methods except?
- a. Transduction
 - b. Infection
 - c. Multiplication
 - d. Transformation.

SECTION B: Short Answer Questions (40 Marks)

1. State ten characteristics of somatic cells (10mks)
2. Describe the two tissue engineering approaches (10mks)
- 3 State the guidelines for Cellular Lab Safety (10mks)
4. State the potential sources of bias in tissue sets (10mks)

SECTION C: Long Answer Questions (60 Marks)

1. Discuss the various sources of stem cells. (20mks)
2. Genitourinary tract disorders can be treated by tissue engineering. Discuss (20mks)
3. Discuss the ethical implications of Tissue Engineering for Regenerative Purposes (20mks)