



*(University of Choice)*

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

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS  
2018/2019 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER EXAMINATIONS**

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

**COURSE CODE: BMB 322**

**COURSE TITLE: MOLECULAR ONCOLOGY**

**DATE: 31<sup>ST</sup> MAY 2019**

**TIME: 8.00 -10.00 AM**

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**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

BMB 322 Molecular Oncology

This Paper Consists of 5 Printed Pages. Please Turn Over.

## SECTION A: MULTIPLE CHOICE QUESTIONS (20 MKS)

### Instructions to the candidate

- The section has twenty (20) multiple choice questions (MCQs)
- Each question has a stem and four (4) completion options, of which only one is correct
- Write your answers on the provided university examination booklet.

1 Which one of the following is not a step in the cell cycle progression?

- A. Mitosis
- B. G0
- C. G1
- D. G2

2. Regarding the causative agents of DNA damage, which one is not:

- A. RNA polymerase II repair failure
- B. UV radiations
- C. Asbestos
- D. All of the above

3. All of the following changes in a cell will lead to cancer establishment, except?

- A. Sustained angiogenesis
- B. Tissue invasion and metastasis
- C. Sustained apoptosis
- D. Evasion of apoptosis

4. Regarding protooncogenes, which is false?

- A. Include non-mutated genes that cannot cause tumours suppression
- B. Include non-mutated genes which are non-protein coding
- C. Include mutated genes which can cause tumours
- D. Include mutated tumour suppressor genes

5. Which of the following genes is an example of proto-oncogene?

- A. Ras
- B. P53
- C. Rb
- D. All of them

6. One of the following is not a tumor suppressor gene:

- A. APC
- B. PTEN
- C. P53
- D. Ras

7. All of the following constitute point mutations in the genome, except:

- A. Frame shift mutation
- B. Translocation mutation
- C. Missense mutation
- D. Nonsense mutation

8. A cancer of 'B-lymphocytes' is referred to as:

- A. Burkitt's lymphoma
- B. Lymphoma
- C. Carcinoma
- D. Sarcoma

9. Which of the following truly depicts cancer:

- A. Results from controlled cell growth
- B. Result from uncontrolled cellular proliferation

- C. Result from controlled cellular proliferation
  - D. Results from the high ability of cellular apoptosis.
10. Which is true about tumors:
- A. All tumors are cancerous
  - B. Malignant tumors cannot metastasise
  - C. Benign tumors are metastatic
  - D. Malignant tumors are metastatic
11. Which is false about tumor markers:
- A. It's a cancer specific cell marker
  - B. Can be used in diagnosing specific tumors
  - C. Some tumour markers are generalised
  - D. Tumor makers are found in specimens such as blood, serum, tissue biopsy and urine
12. Alpha fetoprotein (AFP) can be used as marker for diagnosing?
- A. hepatocellular carcinoma
  - B. Burkitt lymphoma
  - C. Colorectal carcinoma
  - D. Prostate cancer
13. Which of the following is not true about prostate specific antigen (PSA):
- A. Used as the principle marker for diagnosing and screening of prostate cancer
  - B. Causes liquefaction of the semen and cervical mucus following ejaculation
  - C. It's a serine protease
  - D. Usually present in small quantities in healthy prostates.
14. Cancer antigen 15-3 (CA 15-3) is a tumor marker for the following cancers except:
- A. Breast cancer
  - B. Ovarian Cancer

C. Lung cancer

D. None of the above

15 Care taker genes:

- A. Maintain the integrity of the genome by repairing DNA damage
- B. Inhibit the proliferation or promote the death of cells with damaged DNA
- C. None of them
- D. All of them

16. Which of the following general statements is not true about cancer:

- A. Cancer is a genetic disease.
- B. All mutations that cause cancers must occur in Somatic cells.
- C. Mutations can also occur in germ cells.
- D. Mutations causing cancer result into altered proteins.

17. Which of the following signify genomic causes of cancer:

- A. Gain of DNA
- B. Loss of DNA
- C. Epigenetic changes
- D. All of the above

18. Which of the following proteins are not antiapoptotic

- A. Ras
- B. Bcl2
- C. P53
- D. None of the above

19. All of the following processes signify tumor metastasis, except:

- A. Protease secretion

- B. Digestion of extracellular matrix
- C. Migration of tumor through connective tissue.
- D. Production of tumor antigens.

20. Which of the following is not true about apoptosis and mitosis:

- A. Apoptosis is the same as necrosis; Mitosis increases number of germ cells.
- B. Apoptosis reduces cells; mitosis creates them
- C. Apoptosis is programmed in normal cells; mitosis is tightly regulated.
- D. Apoptosis can be mediated by caspases; Mitosis requires spindle fibres for cellular split of cytoplasm.

## **SECTION B: SHORT ANSWER QUESTIONS (40 MKS)**

### **Instructions**

- This section has a total of **FIVE** short answer questions (SAQs), totalling a maximum of forty (40) marks.
- Answer all questions.
- Write your answers on the provided university examination booklet.

1. Outline the main events of tumour metastasis.
2. Describe angiogenesis process during tumour metastasis.
3. Outline any four mechanisms that can cause formation of oncogenes from proto-oncogenes.
4. State and explain four proteins encoded by tumour suppresser genes.
5. Outline four non hereditary factors that can cause alterations in cells, leading to cancer.

## SECTION C: LONG ANSWER QUESTIONS (40 MKS)

### Instructions

- This section has **TWO** long answer questions (LAQs), totalling a maximum of forty (40) marks.
  - Answer all questions.
  - Write your answers on the provided university examination booklet.
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1. a) Discuss the following genes in respect of their association with cancers:
    - i) Adenomatous polyposis coli( APC) gene (7 marks)
    - ii) WT- 1 gene. (7 marks)
    - iii) P53 gene (6 marks)
  2. a) Outline any four imaging techniques that can be employed tumour identification (8 marks)  
  
b.) Describe the procedure to follow when using agarose gel electrophoresis to screen and diagnose tumours (12 marks)