



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

**Faculty of Health, Natural
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School of Natural and Applied
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QUALIFICATION : BACHELOR OF SCIENCE	
QUALIFICATION CODE: 07BOSC	LEVEL: 7
COURSE: BIOTECHNOLOGY	COURSE CODE: BIO702S
DATE: JANUARY 2024	SESSION: 1
DURATION: 3 HOURS	MARKS: 120

SECOND OPPORTUNITY/SUPPLEMENTARY: QUESTION PAPER

EXAMINER: *Prof Percy Chimwamurombe*

MODERATOR: *Dr Ronnie Bock*

INSTRUCTIONS

1. Answer all questions on the separate answer sheet.
2. Please write neatly and legibly.
3. Do not use the left side margin of the exam paper. This must be allowed for the examiner.
4. No books, notes and other additional aids are allowed.
5. Mark all answers clearly with their respective question numbers.

PERMISSIBLE MATERIALS:

1. Non-Programmable Calculator

ATTACHEMENTS

1. NONE

This paper consists of 5 pages including this front pages.

A1. An example of green biotechnology is

- (a) industrial antibiotics
- (b) industrial chemicals
- (c) industrial catalysts
- (d) BT corn and pesticides

A2. Application of biotechnology procedures in agricultural field is classified as

- (a) white biotechnology
- (b) red biotechnology
- (c) blue biotechnology
- (d) green biotechnology

A3. Which of the following is a genetic vector?

- (a) plasmid
- (b) phage
- (c) cosmid
- (d) all of these

A4. The chemical knives of DNA are

- (a) ligases
- (b) polymerase
- (c) endo nuclease
- (d) transcriptase

A5. Genetic engineering is used in

- (a) gene therapy
- (b) vaccine production
- (c) obtaining transgenic plants
- (d) all of these

A6. The first hormone artificially produced by culturing bacteria is

- (a) insulin
- (b) thyroxine
- (c) aldrekin
- (d) testosterone

A7. Which of the following process is related with the application of biotechnology

- (a) fermentation
- (b) germination
- (c) evolution
- (d) photosynthesis

A8. Biotechnology is generally being used for which of the following process

- (a) production of monoclonal antibodies
- (b) rain water harvesting
- (c) production of GM crops
- (d) both a & c

A9. GM crops means

- (a) grand matter crops
- (b) green metallic crops
- (c) genetically modified crops
- (d) growing & moving crops

A10. DNA fragments can be separated by

- (a) centrifugation
- (b) gel electrophoresis
- (c) boiling
- (d) magnetic separation

A11. PCR stands for

- (a) pure chemical reaction
- (b) part create reaction
- (c) polymerase chain reaction
- (d) partial cytoplasm rate

A12. The sequence from where replication starts

- (a) origin of replication
- (b) cloning site
- (c) selectable marker
- (d) recognition site

A13. Which bacteria is responsible to produce Bt toxin

- (a) Basillus thuringiensis
- (b) Bacillus thuringiensis
- (c) Bacillus tuberculosis
- (d) Lacto bacillus

A14. RNA interference is based on the principle of

- (a) RNA interfere
- (b) silencing of a specific mRNA
- (c) prevents translation of
- (d) RNA destruction

A15. Which is first transgenic cow

- (a) Dolly
- (b) Eve
- (c) Rosie
- (d) Goldy

A16. Which is not the way to introduce alien DNA into host cells

- (a) thermal shock
- (b) micro injection
- (c) gene gun
- (d) RNA

A17. Which is the tool of recombinant DNA technology

- (a) restriction endo nuclease
- (b) ribosome
- (c) gel-electrophoresis
- (d) vectors

A18. A multiple cloning site is the same as

- (a) a polylinker site
- (b) an oriC
- (c) a selectable marker
- (d) versatile site

A19. In gel electrophoresis, DNA migrates

- (a) From the negative to the positive electrode
- (b) From the positive to the negative electrode
- (c) Horizontally
- (d) None of the above options

A20. The DNA polymerase which is commonly used in PCR amplifications was isolated from

- (a) *Thermus aquaticus*
- (b) *Agrobacterium tumifaciens*
- (c) *Bacillus licheniformis*
- (d) *Kosakonia* species

SECTION B

[80 MARKS]

1. Describe the three types of restriction endonucleases. (5)
2. Name and describe any three DNA modifying enzymes. (5)
3. Draw and label a typical cloning vector. (5)
4. Describe the process of DNA electrophoresis. (5)
5. Describe a gene gun. (5)
6. Describe fully the Southern blot technique. (5)
7. Name any three cloning hosts and give the advantages and disadvantages of each of them. (5)
8. What are the applications of Biotechnology, give three examples in each case. (5)
9. Describe any five –Omics which you know. (5)
10. You are the only local biotechnologist and are tasked to innovate on the development of a transgenic banana plant with edible vaccines. How you can you do it. (5)
11. In brief explain the process of making a transgenic plant? (10)
12. Briefly describe the steps of DNA isolation from a plant tissue. (10)
13. Describe the process of PCR. (10)

SECTION C

[20 MARKS]

1. Provide possible solutions to three of the biosafety concerns of transgenic plants. (20)

-----END OF EXAMINATION QUESTION PAPER-----