NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION: BACHELOR OF SCIENCE HONOURS	
QUALIFICATION CODE: 08BOSH	**LEVEL:** 8
COURSE CODE: PAB811S	**COURSE NAME:** PLANT AND ANIMAL BIOTECHNOLOGY
SESSION: JULY 2022	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

SUPPLEMENTARY / SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	DR JEYA KENNEDY
MODERATOR:	DR JUAN VORSTER

INSTRUCTIONS
1. Write clearly and neatly 2. Number the answers clearly 3. All written work MUST be done in blue or black ink 4. No books, notes and other additional aids are allowed 5. Mark all answers clearly with their respective question numbers 6. Draw diagrams wherever necessary

PERMISSIBLE MATERIALS

None

THIS QUESTION PAPER CONSISTS OF 6 PAGES

(Including this front page)

QUESTION 1:
Multiple choices **[8]**

1.1 Somatic hybridization is achieved through; (1)
a) micropropagation
b) recombination DNA technology
c) protoplast fusion
d) electrofusion

1.2 What is a cell line? (1)
a) Multilayer culture
b) Transformed cells
c) Multiple growth of cells
d) Sub culturing of primary culture

1.3 Monoclonal antibodies are referred as _____. (1)
a) Magic bullets
b) Magic gun
c) Magic shots
d) Magic bomb

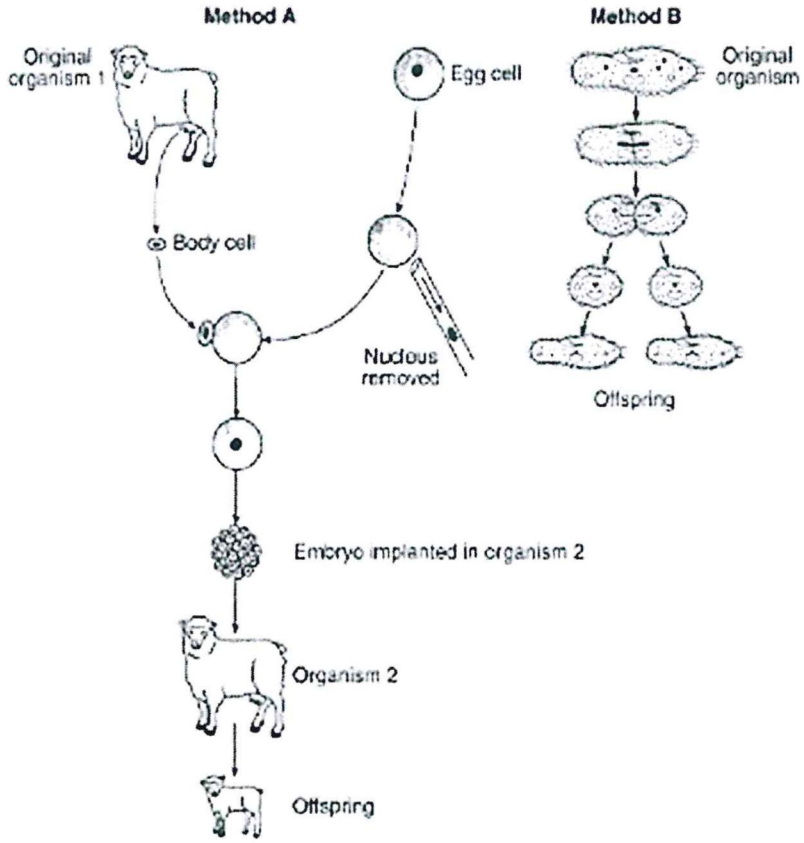
1.4 Salmon produce a 20 times higher efficiency _____ compared to the human version. (1)
a) Ziconotide
b) Calcitonin
c) Hydroxyapatite
d) Manoalide

1.5 Why are fish in fish farm susceptible to diseases and stress? (1)
a) Little genetic diversity and disease resistance
b) Fish are more susceptible to stress and disease caused by bacterial and viral pathogens
c) Large supply of fish can be wiped out quickly if disease is not controlled
d) All the above is correct

1.6 The production of secondary metabolites requires the use of; (1)
(a) protoplast
(b) cell suspension
(c) meristem
(d) auxiliary buds

1.7 Synthetic seed is produced by encapsulating somatic embryo with; (1)
(a) sodium chloride
(b) sodium alginate
(c) sodium nitrate
(d) sodium acetate

1.8 Two methods of reproduction are represented in the diagram below.



How does the DNA in the offspring produced by these methods compare to the DNA in the original organism?

a) The offspring contain half the original number of chromosomes in each method.
b) The DNA in the offspring is genetically identical to that of the original organism in both methods.
c) The offspring produced by method A contain twice the original number of genes, while those produced by method B contain half the original number of genes.
d) The number of DNA bases is less than that of the original organism in method A, but more than the original number in method B.

QUESTION 2:

Fill in the blanks **[9]**

2.1 Credit of successfully establishment the tissue on artificial culture medium goes to German botanist _____. (1)

2.2 Name the pigment that gives shrimp their pink colour_____. (1)

2.3 _____ involves the storing of cells at very low temperature. (1)

2.4 Fingerlings, sometimes called _____, are usually moved into a concrete tank called raceways, which may be indoors or outdoors. (1)

2.5 Cell lines transformed under in vitro culture conditions give rise_____. (1)

2.6 The technology Monoclonal Antibodies was developed by the scientist _____. (1)

2.7 AT III prevents _____ and is found in _____'s milk. (1)

2.8 _____ method uses high voltage electrical impulses for gene transfer. (1)

QUESTION 3:
One-sentence answers **[6]**

3.1 What might happen if you have high levels of cytokinin (kinetin) and low levels of auxin (IAA) when culturing tobacco callus on nutrient agar? (1)

3.2 In cloning the first step is the cell collected from the donor animal is placed in a low- nutrient medium why? (1)

3.3 What is an extraordinary new product that is used in bullet proof vests and in suture silk for stitching wounds? (1)

3.4 Name the scientist who developed Flavor Savr Tomatoes. (1)

3.5 What is the application of the medical product squalamine? (1)

3.6 How many hours the Zebrafish eggs complete embryogenesis? (1)

QUESTION 4:
Short questions **[6]**

4.1 What is the name of the drug is used to encourage hair growth and what was the warning given to human being? (2)

4.2 The first transgenic cow produced human protein - enriched milk. Name the cow and the protein found in milk. (2)

4.3 Which are the most commonly used enzymes for separating cells in a given tissue for culture? (2)

QUESTION 5:
Longer questions **[44]**

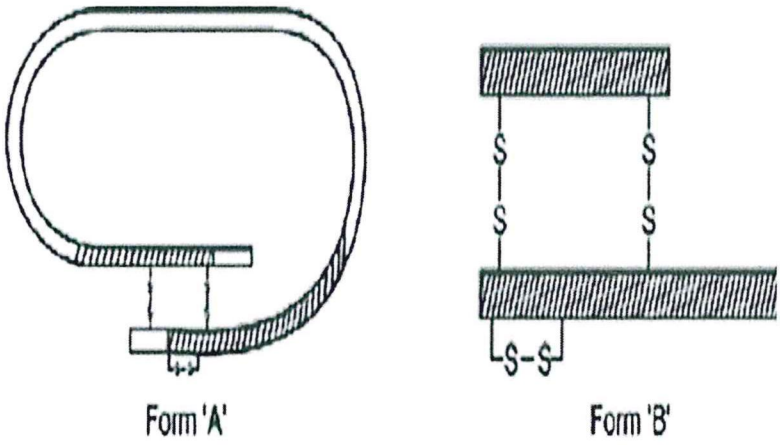
5.1 Explain how many members are required to sit in the Institutional Animal Care and use committee.? (4)

5.2 Bacterium Bacillus thuringiensis produces a toxic protein named 'cry protein' that is lethal to certain insects but not to bacterium. (a) Why does this toxin not kill the bacteria? (b) What type of changes occur in the gut of insects on consuming this protein? (c) How has man exploited this protein for his benefit? (4)

5.3 What are the following criteria/ characteristics are considered for efficient development of primary cultures? (5)

5.4 Describe the 3 morphologies of cells in culture. (6)

5.5 In the given figure, Form (A) and Form (B) represents different forms of a proteinaceous hormone secreted by pancreas in mammals. [8]



(a) What type of bonding is present between chains of this hormone? (1)
(b) What are these form (A) and form (B). How these forms differ from each other? (3)
(c) Explain how this hormone was produced by Eli Lilly, an American company, using rDNA technology. (4)

5.6 Explain the steps of agrobacterium mediated gene transformation method. (7)

5.7 Describe the process used to create monoclonal antibodies from hybridomas. (10)

QUESTIONS 6: **[28]**

Essay questions

6.1 A businessman wishes to venture into the new business of micropropagation and selling of high quality disease-free ornamental plants in Namibia. Advise the businessman on how he should design/layout his laboratory and you are giving him an advice what he will require to succeed at his new business venture. (15)

6.2 Describe the embryonic stem cell transfer technology for the production of transgenic mice and discuss its various applications and limitation. (13)

THE END