BINDURA UNIVERSITY OF SCIENCE EDUCATION
DEPARTMENT OF SCIENCE AND MATHEMATICS EDUCATION
BZH213 BIOTECHNOLOGY

EXAMINATION
2 HOURS (100 MARKS)

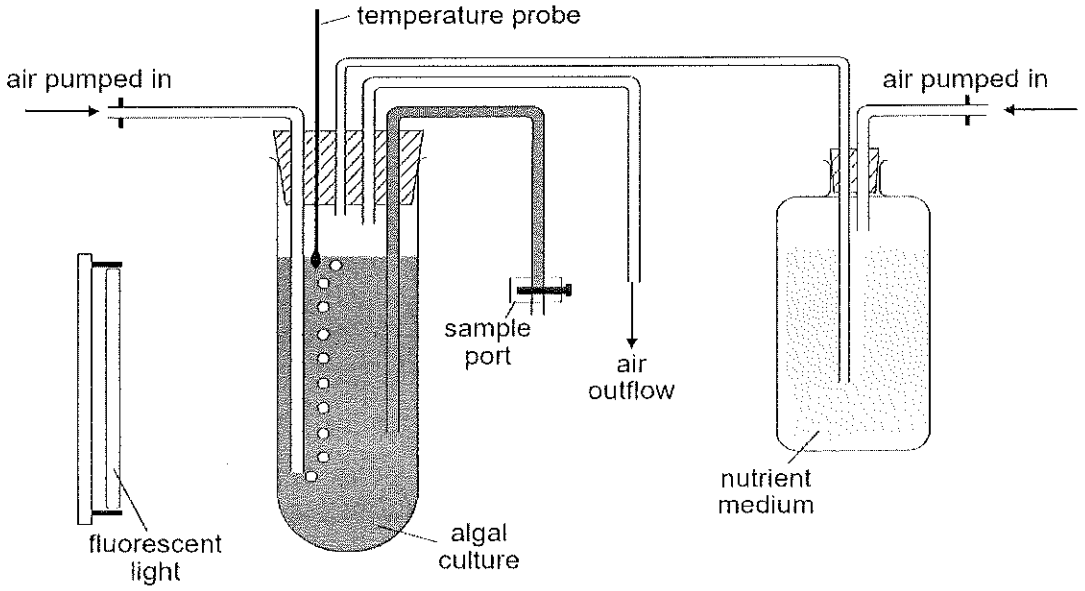
AUG 2024

INSTRUCTIONS TO CANDIDATES

Answer **FOUR** questions. You **MUST** answer **QUESTION 1** (Section **A**) and any **THREE** questions from Section **B**. Each question carries **25 MARKS**. Where a question contains subdivisions, the mark value of each subdivision is given in brackets. Illustrate your answers where appropriate with large, clearly labelled diagrams. You should not spend more than thirty minutes on each question.

SECTION A (COMPULSORY)

1. The figure below shows a 'pilot plant' assembled by a student in a school laboratory.



(a) The student has undertaken a project to culture an alga called *Chlorella* to feed brine shrimps for use as fish food. If it works, the student hopes to produce a **continuous culture** of algae. Explain the apparatus shown in the figure above to allow a continuous culture of *Chlorella*. (15 marks)

(b) Describe the major problems of developing this project to enable the large scale production of *Chlorella* (10 marks)

SECTION B

2. Discuss in vitro production of secondary metabolites.

3. (a) Give an account of the process of electrophoresis. (20 marks)

(b) Explain the role of the electric field in the electrophoresis process. (5 marks)

4. Describe the contribution of biotechnology to the advancement of biology and impacting human wellbeing.

5. (a) Discuss the roles of DNA analysis and genetic fingerprinting in forensic investigations. (15 marks)

(b). Explain the impact of DNA analysis and genetic fingerprinting. (5 marks)

6. (a) Outline the genetic engineering for xenotransplantation of animals. (15 marks)

(b) Outline the use of genetic markers in plasmids to identify bacteria that have taken up a recombinant plasmid. (10 marks)

END OF EXAMINATION QUESTION PAPER