BINDURA UNIVERSITY OF SCIENCE EDUCATION

BIOLOGICAL SCIENCES DEPARTMENT

BScBZH/ HBSc Ed/ BScEd

BIOTECHNOLOGY (BZH 213)

EXAMINATION
2 HOURS (100 MARKS)

AUG 2023

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 sub-divisions, the mark value of each sub-division is given in brackets. Illustrate your answer where appropriate with large clearly labelled diagrams. You should not spend more than thirty minutes on each question.

SECTION A (COMPULSORY)

1. Genome annotation is the process of adding biological information and predictions to a Sequenced Genome. Below is a result output after searching for a gene in GenBank.

1: Z92910. Homo sapiens HFE ...[gi:1890179] Related Sequences, OMIM, F

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1 LOCUS      1a HSHFE              1b 12146 bp  1c DNA   1d linear 1e PRI 23-JUL-1999
2 DEFINITION    Homo sapiens HFE gene.
3 ACCESSION     Z92910
4 VERSION       Z92910.1 5GI:1890179
6 KEYWORDS      haemochromatosis; HFE gene.
7 SOURCE        human.
  8 ORGANISM    Homo sapiens
                Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
                Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
9 REFERENCE     1  (bases 1 to 858)
    AUTHORS     Albig,W., Drabent,B., Burmester,N., Bode,C. and Doenecke,D.
    TITLE       The haemochromatosis candidate gene HFE (HLA-H) of man and mouse is
                located in syntenic regions within the histone gene cluster
    JOURNAL     J. Cell. Biochem. 69 (2), 117-126 (1998)
    MEDLINE     98208340
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(a) Briefly explain information illustrated by labels 1a, 1b, 1c, 1d, 1e. (10 marks)
(b) Describe two ways used in defining gene structure. (10 marks)
(c) Comment on applications of bioinformatics in Biotechnology. (5 marks)

SECTION B

2. Discuss the ethical, legal, and social implications of the Human Genome Project (HGP).

3. Write short notes on any **FIVE** of the following
   (a) Benefits of transgenic animals to human beings. (5 marks)
   (b) Dideoxynucleotides. (5 marks)

(c) Use of antibiotic resistance in selection of recombinants. (5 marks)
(d) Ligation of blunt ends. (5 marks)
(e) Characteristics of ideal vectors. (5 marks)
(f) Marker Assisted Selection (MAS). (5 marks)

4. Give a detailed description of the methods of introduction of recombinant DNA into cells of higher organisms.

5. Outline the production of a **NAMED** pharmaceutical product using genetic engineering.

6. Discuss utility of polymerase chain reaction (PCR) in recombinant DNA technology.

END OF EXAMINATION QUESTION PAPER