BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE AND ENGINEERING
BIOLOGICAL SCIENCES DEPARTMENT
BScBZH
CYTOGENETICS (BZG400/ BZH407)

EXAMINATION
2 HOURS (100 MARKS)

NOV 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 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. Describe the function of the following ingredients of human lymphocytes growth media used for karyotyping:
   (a) RPMI 1640. (5 marks)
   (b) L-Glutamine. (5 marks)
   (c) Foetal bovine serum. (5 marks)
   (d) Phytohemagglutinin. (5 marks)
   (e) Gentamycin. (5 marks)

SECTION B

2(a) Distinguish between Cri-du-Chat and Down syndromes with respect to genotype and genetic causes. (15 marks)
(b) Explain characteristic phenotypic effects of each syndrome. (10 marks)

3. Write short notes on any **FIVE** of the following:
   (a) Chromosome instability. (5 marks)
   (b) Nucleolus organiser regions (NOR). (5 marks)
   (c) Microdeletion syndrome. (5 marks)
   (d) X chromosome inactivation. (5 marks)
   (e) Non- disjunction. (5 marks)
   (f) Experimental procedure to obtain polytene chromosomes in *Drosophila* melanogaster. (5 marks)

4. Write short notes on any **FIVE** of the following:
   (a) International System of Human Cytogenetic Nomenclature. (5 marks)
   (b) Genomic imprinting. (5 marks)
   (c) Dicentric bridges. (5 marks)
   (d) Relationship between parental age and chromosomal abnormalities. (5 marks)
   (e) Importance of cytogenetics in plant breeding. (5 marks)
   (f) Genetic counselling. (5 marks)

5. (a) Describe the mechanisms of crossing over. (10 marks)
   (b) Explain the environmental and genetic factors affecting crossing over. (15marks)

6. Give a detailed account of origins of acentric fragments and the cause of their loss.

END OF PAPER