**THE OPEN UNIVERSITY OF SRI LANKA**
**FACULTY OF HEALTH SCIENCES**
**DEPARTMENT OF PSYCHOLOGY & COUNSELLING**
**ACADEMIC YEAR 2024/2025– SEMESTER I**

**BSC HONS IN PSYCHOLOGY**
**PLU6307 BEHAVIORAL GENETICS - LEVEL 6**
**CONTINUOUS ASSESSMENT TEST – NBT I**
**DURATION: 1 ½ HOURS**

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DATE: 16.01. 2025 TIME: 11.30 AM-1.00 PM

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**IMPORTANT INSTRUCTIONS/ INFORMATION TO CANDIDATES**

- This question paper consists of **10 pages** with **TWO sections**

  **Section 1: 20 Multiple Choice Questions - (40 Marks)**

  **Section 2: 12 Short Answer Questions - (60 Marks)**

- Write your INDEX number in the space provided.
- **Multiple Choice Questions (Section 1):** Indicate answers in the **ANSWER SHEET** provided by placing a cross **(X)** in **INK** in the relevant cage (answers in pencil will **NOT** be marked)
- **Short Answer Questions (Section 2):** Write the answer within the space provided.
- Do **NOT** remove any page/part of this question paper from the examination hall.
- Do **NOT** keep unauthorized materials, including mobile phones and other electronic equipment, with you during the examination

## SECTION 1: Multiple Choice Questions (20 Questions-40 Marks)

1.1 **What is the primary focus of quantitative genetic studies in human behavioral genetics?**

a. Investigating genetic influences in natural groups like families and twins
b. Identifying the precise location of genes linked to traits
c. Manipulating the genetic composition of populations to study behavior
d. Analyzing RNA expression patterns to determine behavioral traits

1.2 **Which of the following is a major advantage of association studies over linkage analysis?**

a. Requires fewer participants who must be related
b. Identifies specific genes rather than general chromosomal regions
c. Eliminates the need for molecular genetic techniques
d. Relies on identical twins exclusively for data collection

1.3 **What is a significant limitation of twin studies in behavioral genetics research?**

a. They require an artificial environment to be conducted
b. They do not account for shared prenatal environmental factors
c. They rely on genetic markers for data collection
d. They are unable to distinguish between monozygotic and dizygotic twins

1.4 **What is the primary purpose of selective breeding in animal models within behavioral genetics research?**

a. To increase the genetic diversity in a population
b. To identify the environmental influences on behavior
c. To artificially produce offspring with desirable behavioral traits
d. To eliminate genetic mutations in a species

1.5 **Which animal model is commonly used in behavioral genetics due to its rapid reproductive rate and genetic similarity to humans?**

a. Primates
b. Fruit flies
c. Mice
d. Birds

1.6 **What is a significant limitation of using animal models to study human behavioral genetics?**

a. They require large-scale breeding
b. Ethical guidelines are stricter for animals than humans
c. They fail to replicate environmental interactions seen in humans
d. Genetic expressions may differ between animals and humans

1.7 **What is a frameshift mutation?**

a. A mutation that substitutes one nitrogenous base for another
b. A mutation that changes the total number of chromosomes in an organism
c. A mutation caused by the addition or deletion of nucleotides, altering the reading frame
d. A mutation that leads to a silent change with no phenotypic effects

1.8 **What is the primary difference between mutations and polymorphisms?**

a. Mutations occur more frequently than polymorphisms
b. Polymorphisms are DNA variants with a population frequency of at least 1%
c. Mutations are inherited, whereas polymorphisms are not
d. Polymorphisms only occur in somatic cells, while mutations occur in reproductive cells

1.9 **Which type of chromosomal mutation involves the loss of a chromosome region?**

a. Duplication
b. Inversion
c. Deletion
d. Translocation

1.10 **What was the main reason Mendel chose garden pea plants for his experiments on inheritance?**

a. They have easily observable traits and short generation times
b. Their flowers are unisexual, allowing controlled fertilization
c. They require little maintenance and grow in any condition
d. They were newly introduced to agriculture during Mendel's time

1.11 **Which law of inheritance explains that alleles of a gene segregate independently during gamete formation?**

a. Law of dominance
b. Law of segregation
c. Law of independent assortment
d. Law of uniformity

1.12 **What phenotypic ratio did Mendel observe in the F2 generation of a monohybrid cross?**

a. 1:1:1:1
b. 9:3:3:1
c. 3:1
d. 1:2:1

1.13 **What are the components of a nucleotide, the building block of DNA?**

a. Sugar, protein, and a nitrogenous base
b. Sugar, amino acid, and a nitrogenous base
c. Phosphate, ribose sugar, and a fatty acid
d. Phosphate, deoxyribose sugar, and a nitrogenous base

1.14 **What feature of DNA allows it to store unique genetic information?**

a. Its double-stranded structure
b. Its nucleotide base-pairing rules
c. The sequence of its nitrogenous bases
d. Its sugar-phosphate backbone

1.15 **How many chromosomes are present in a normal human somatic cell**

a. 23
b. 46
c. 44
d. 22

1.16 **What did Hippocrates propose in his theory of heredity?**

a. Traits are inherited through the bloodline alone
b. Both parents contribute physical seeds for reproduction
c. Behaviour is solely determined by environmental factors
d. The mind is a blank slate at birth

1.17 **What was the major limitation in Charles Darwin's theory of natural selection concerning heredity?**

a. It lacked an explanation for the source and transmission of variability
b. It did not account for the role of environmental factors in heredity
c. It ignored the possibility of acquired traits being inherited within a species
d. It failed to address the concept of survival of the fittest in the natural world

1.18 **Who is considered the founder of the behavioural genetics field and why?**

a. Charles Darwin, for proposing natural selection
b. Sir Francis Galton, for his studies on heredity in mental characteristics
c. Gregor Mendel, for developing the laws of inheritance
d. John Locke, for the theory of Tabula Rasa

1.19 **What distinguishes behavioural genetics from other fields such as biology or psychology?**

a. It focuses on the similarities in behaviour across all species through scientific observations
b. It investigates shared human characteristics across generations through the study of genetics
c. It emphasizes individual differences in behaviour caused by genetic and environmental interactions
d. It solely studies the hereditary transmission of physical traits

1.20 **Which genetic technique has been crucial in understanding the influence of genes on psychological disorders like autism and ADHD?**

a. Pedigree analysis
b. Family studies
c. Twin studies
d. Molecular cloning

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## ANSWER SHEET FOR SECTION-1

| Q. No. | (a) | (b) | (c) | (d) |
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## SECTION 2: SHORT ANSWER QUESTIONS (60 MARKS)

**All Questions are compulsory**

**2.1 Describe the purpose of adoption studies in behavioral genetics and explain how they differentiate between genetic and environmental influences. (5 marks)**

**2.2 What is the role of molecular genetic studies in understanding human behavioral traits, and how do they differ from quantitative genetic studies? (5 marks)**

**2.3 What are the advantages of using inbred strain studies in behavioral genetics, and how do they contribute to understanding environmental influences on behavior? (5 marks)**

**2.4 Describe the ethical principles outlined by the American Psychological Association (APA) for the use of animals in behavioral genetics research. (5 marks)**

**2.5 Describe the difference between a transition mutation and a transversion mutation. Provide examples of each. (5 marks)**

**2.6 Explain how an insertion mutation can lead to a frameshift mutation. What is the potential impact on protein synthesis? (5 marks)**

**2.7 Explain Mendel's first law of inheritance and describe its significance in genetics. (5 marks)**

**2.8 Describe the experimental design and results of Mendel's dihybrid cross involving seed shape and seed color. (5 marks)**

**2.9 Explain the differences between mitosis and meiosis in terms of their purpose and outcomes. (5 marks)**

**2.10 Describe the double-helix structure of DNA and explain its significance in heredity. (5 marks)**

**2.11 Describe the concept of eugenics introduced by Sir Francis Galton and explain its impact on the field of behavioural genetics. (5 marks)**

**2.12 Explain the role of behavioural geneticists in understanding human behaviour. (5 marks)**

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