

THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF PSYCHOLOGY & COUNSELLING
ACADEMIC YEAR 2022/2023 – SEMESTER I



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

DATE: 13th December 2022

TIME: 2.00pm-3.30pm

INDEX NO:

IMPORTANT INSTRUCTIONS/ INFORMATION TO CANDIDATES

- This question paper consists of **09** pages with **TWO** sections
- **Section 1: 20 Multiple Choice Questions - (40 Marks)**
- **Section 2: 12 Short Answer Questions - (60 Marks)**
- Write your INDEX NO 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 Which of the following statements about heredity is false?
- Heredity determines the sex of the child
 - It contributes significantly towards physical constitution
 - It contributes towards the birth of twins
 - Ability to speak a foreign language
- 1.2 “According to Mendel, he mentioned parents contribute a discrete hereditary factor to the offspring which was responsible for the inheritance of specific traits”. What are they called now?
- Chromosomes
 - DNA
 - Genes
 - Genetic material
- 1.3 When a F1 plant (Pp) self-fertilizes, with another F1 (Pp) plant, the ratio of PP formation in F2 generation is indicate as Which one of the following is the correct answer?
- 3:1
 - 1:2:1
 - 9:3:3:1
 - 1:3:3:1
- 1.4 A codon specifies one of which of the following?
- Proteins
 - RNA
 - Amino acids
 - Carbohydrates
- 1.5 Approximately how many protein coding genes are in the human genome?
- 20,000-25,000
 - 100,000
 - 40,000-50,000
 - 10,000

- 1.6 Shanthi and Kamala are monozygotic twins who are separated at birth and adopted by two different middle-class families from Colombo district. Their adoptive parents are all athletic and have high expectations for Shanthi and Kamala's performance in sports. The twins participate in a standardized test of athleticism, and they receive similar scores. Given this information, what assumptions can be made about heredity and the influence of genes on their athletic ability?
- The girls are genetically identical, so the influence of genes on their athletic ability is probably high.
 - The twins are genetically identical and raised in similar environments, so the influence of genes on their athletic ability is unclear.
 - The twins are raised in similar environments, so the influence of genes on their athletic ability is probably low.
 - The girls are raised in environments that are significantly different, so the influence of genes on their athletic ability is probably high.
- 1.7 The father of Genetics isChoose correct answer.
- Gregor Mendel
 - Charles Darwin
 - Sir Francis Galton
 - Plato
- 1.8 The concept of selective breeding to improve human species by using the knowledge of inheritance of traits, particularly behaviour traits is called
- Euphenics
 - Family Planning
 - Cytogenetics
 - Eugenics
- 1.9 Mutations at DNA level does not includeWhich one of the following is the correct answer?
- Substitutions
 - Insertions
 - Deletions
 - Translocation
- 1.10 During point mutations, when purine bases (A to G or G to A) are replaced by purine bases it is called
- Transversion mutation
 - Transition mutation
 - Duplication
 - Repetition

- 1.11 Quantitative trait loci is
- The region of the chromosome where the genes associated with quantitative traits are located
 - The carbohydrate content in a person's body
 - Does not show traits that have continuous variations
 - A form of genetic mutation
- 1.12 What contributes to the limitations in a study when using animal models in behavioral genetics research?
- Inability to provide humane care for animals
 - Unable to develop timely interventions using animals for treatment options
 - Genetic expression, developmental stage of gene expression, gene-environment interaction
 - All the above
- 1.13 Twin studies are proven to be beneficial because scientists can
- Determine the difference between genetic and environmental factors
 - Focus only on traits that run-in families
 - Focus on emotional factors rather than biological
 - Find a number of genes the twins share
- 1.14 In family studies, the proband refers to the.....
- The person being studied
 - Trait being studied
 - Second cousins of the individual studied
 - First-degree relatives of the individual studied
- 1.15 Which of the following is not an advantage of conducting an Association study?
- Requires a smaller number of subjects who do not have to be related
 - Ability to study hundred genes at the same time
 - Help us study further on how specific genes correlated with a trait contribute to the biological processes underlying that trait
 - Can help identify specific genes, not just chromosomal genes
- 1.16 What is the nucleotide sequence of the antiparallel strand be for the DNA molecule with the sequence of ATTGCAG?
- GCCATGA
 - TAACGTC
 - TAA GCA G
 - All the above

- 1.17 The cell division process that is responsible for gamete formation in humans is,
- Transcription
 - Mitosis
 - Meiosis
 - All the above
- 1.18 What does **not** happen when DNA is mutated?
- Erroneous information will be coded by mRNA from mutated DNA
 - Ribosomes will read erroneous information from mRNA resulting in the tRNA bringing in wrong amino acids
 - Wrong or mutated protein is formed
 - tRNA brings in correct amino acids to match the mRNA codon
- 1.19 Darwin was inspired to develop his evolutionary theory by the essay authored by.....
- Sir Francis Galton
 - Robert Malthus
 - Henry Goddard
 - Gregor Mendel
- 1.20 Epigenetics is
- the study of emphasis on the genes as important determinants of behaviour
 - the scientific study of the environment influence on genetic expression
 - the study of similarities and differences that exist in a single species
 - the study of how the genetic difference in individuals lead to behavioural difference

INDEX NO:

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ANSWER SHEET FOR SECTION-1

Q. No.	(a)	(b)	(c)	(d)
1.1				
1.2				
1.3				
1.4				
1.5				
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1.15				
1.16				
1.17				
1.18				
1.19				
1.20				

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SECTION 2: SHORT ANSWER QUESTIONS (60 MARKS)

All Questions are compulsory

2.1 Describe the research methods that are available to determine the importance of genetic and environmental sources that influence physical traits of individuals.

(5marks)

2.2 How did Thomas Malthus inspire Charles Darwin's theory of natural selection? How is this theory different from the term 'artificial selection'? (5marks)

2.3 Describe the differences between DNA level mutations and the Chromosomal mutations? (5marks)

- 2.4 What are the causes of mutations? Support your answer with relevant examples. (5marks)
- 2.5 Briefly explain why mutations can be both beneficial and dangerous to evolution. (5marks)
- 2.6 What is the difference between a monohybrid and dihybrid cross? (5marks)
- 2.7 How was Mendel's contribution to behavioural genetics more significant compared to that of Darwin and Galton? (5marks)
- 2.8 How did the Eugenics movements rise in the early 20th century and why did it fall towards the latter part of the 20th century? (5marks)

2.9 What is the difference between mitosis and meiosis in relation to heredity? (5marks)

2.10 Using a punnet square, write the possible results when you cross a homozygous purple flower plant (PP) with a homozygous white flower plant (*pp*) genotype in the F1 and F2 generation? (5marks)

2.11 How can gender related characteristics of men and women be explained using evolutionary theory? (5marks)

2.12 How has molecular genetics contributed to the nature vs nurture debate in the behavioural genetics field in comparison to twin studies and adoption studies? (5marks)

END OF QUESTION PAPER

