BSC (HONS) IN PSYCHOLOGY
PLU 6307 - BEHAVIOURAL GENETICS- LEVEL 6
FINAL EXAMINATION PAPER
DURATION: 03 HOURS

DATE: 2025.04.30 TIME: 1.30 P.M.- 4.30 P.M

SECTION 2: STRUCTURED ESSAY QUESTIONS (60 MARKS)

Choose <u>04 out of the 06 questions</u> given below and answer using the provided answer sheets

2.1 The role of genetics in shaping human personality has become a significant focus of behavioural genetics. Researchers use twin, family, and adoption studies, as well as modern genomic methods, to explore how much of our personality is inherited versus shaped by experience.

a) Define personality and describe any one widely used model of personality. *(5 marks)*
b) Explain how twin studies contribute to understanding the heritability of personality traits. Include references to monozygotic and dizygotic twin research. *(5 marks)*
c) Discuss how genetic findings have been used to understand personality disorders. Provide at least one example. *(5 marks)*

2.2 Cognition refers to the mental processes involved in acquiring and processing information. While cognitive abilities show high heritability, pinpointing specific genes has been challenging due to the complex nature of both the brain and cognition. Research using human and animal models has uncovered important insights into the genetic basis of normal cognition and cognitive disorders.

a) Define cognition and describe how it differs from intelligence. *(5 marks)*

b) Explain how twin and animal studies contribute to our understanding of genetic influences on cognition. *(5 marks)*
c) Discuss the role of the X chromosome in cognitive disorders, using at least two examples. *(5 marks)*

2.3 Intelligence, commonly measured through IQ, is a stable and significant predictor of various life outcomes. While early studies focused on either heredity or environment, modern research emphasizes the complex interplay between genes and environment. Genome-wide studies and behavioural genetics have significantly advanced our understanding, but not without raising ethical questions.

a) Briefly define intelligence and describe how it is commonly measured. *(5 marks)*

b) Explain how genetic and environmental factors interact to influence intelligence, referring to specific gene-environment models. *(5 marks)*
c) Discuss one ethical concern related to genetic research on intelligence and explain why it is important in psychological research. *(5 marks)*

2.4 Mental disorders such as schizophrenia, depression, bipolar disorder, and anxiety show varying degrees of genetic heritability. While twin, family, and molecular studies have uncovered genetic variants involved, the environment also plays a crucial role. The concept of gene-environment interaction helps explain why some individuals develop mental illnesses while others with similar genetic backgrounds do not.

a) **Briefly define gene-environment interaction and explain its relevance to mental disorders.** *(5 marks)*
b) **Describe how genetics contributes to the development of any two specific mental disorders.** *(5 marks)*
c) **Discuss how environmental factors can modify or influence the expression of genetic predispositions in mental health. Provide at least one example.** *(5 marks)*

2.5 Obesity is a growing global health issue with significant physical and mental health consequences. It has both genetic and environmental origins, and its complex nature involves interactions between hormones, lifestyle factors, and multiple genes. Understanding these interactions is crucial for prevention and intervention.

a) Define obesity and explain how it is commonly diagnosed. *(5 marks)*

b) Discuss the genetic basis of obesity, differentiating between monogenic and polygenic forms. *(5 marks)*

c) Explain the concept of gene-nutrient interaction in obesity and give one specific example. *(5 marks)*

2.6 Cancer arises from a combination of genetic mutations and environmental factors. These mutations may occur in genes that control cell growth, either activating oncogenes or inactivating tumour suppressor genes. Genetic testing and counselling now play a growing role in identifying inherited cancer risks and guiding personalised treatment.

a) **Distinguish between acquired (somatic) and germline mutations in cancer, providing an example of each.** *(5 marks)*
b) **Describe the functions of tumour suppressor genes and oncogenes, including one example of each.** *(5 marks)*
c) **Explain the significance of genetic counselling in cancer risk assessment and treatment planning.** *(5 marks)*

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