**ST MARY’S UNIVERSITY**

**TWICKENHAM, LONDON**

MSc Degree Examination students registered for

Level **SEVEN**

Title**: Nutrigenomics**

Code: **HNU7029**

Semester: **RESIT**

Date: **3rd July 2019**

Time: **09:30-12PM**

TIME ALLOWED: **TWO** HOURS **THIRTY** MINUTES

Please answer all multiple choice questions (2 marks each) and two essay questions (40 marks each).

**Section A:**

Answer all questions in this section. There is one correct answer for each question (2 marks each). **Please answer all questions in your answer booklet.**

**Multiple choice questions (answer ALL)**

1. Which of the following is correct for a nucleosome:
2. Nucleosomes are formed by wrapping DNA around histone proteins
3. Nucleosomes protect DNA and allow it to be packaged in the nucleus
4. Nucleosomes are a structural unit of a chromosome
5. All of the above.
6. p53 is:
7. An oncogene that increases the malignancy of a tumour cell.
8. A transcription factor that regulates cell division.
9. A gene found to be defective in about half of all the tumours.
10. Both b and c are correct.
11. Is the following TRUE or FALSE (circle as appropriate):

A haplotype is a set of closely linked genetic markers present on one chromosome which tend to be inherited together. TRUE or FALSE?

1. Enzymes involved in DNA replication are:
2. Helicase, DNA transcriptase, DNA polymerase, DNA ligase
3. Helicase, DNA polymerase III, DNA ligase, DNA primase
4. Helicase, DNA polymerase III, DNA ligase, RNA gyrase
5. None of the above.
6. Fill in the blanks in the following sentence.

Single nucleotide polymorphisms are\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ base changes in a DNA sequence, present in more than\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the population.

1. The main stages in DNA extraction are:

a. Cell lysis, protein removal, DNA binding, washing of the DNA and DNA elution.

b. Cell lysis, protein removal, DNA binding, washing of the DNA and DNA electrophoresis.

c. Cell lysis, protein removal, primer binding, washing of the DNA and DNA elution.

d. Cell lysis, protein removal, DNA binding, washing of the DNA and RNA elution.

1. Which of the following is NOT a post-transcriptional RNA modification:
2. Capping
3. Splicing
4. Acetylation
5. Polyadenylation
6. Which of the following is correct for transcription factors?
7. Transcription factors are proteins involved in the process of converting, or transcribing, DNA into RNA.
8. They include a wide number of proteins, excluding RNA polymerase, which initiate and regulate the transcription of genes.
9. They bind to RNA sequences called promoters or enhancers.
10. Both a and b are correct.
11. Which term is defined as “the study of heritable changes in gene expression that occur without a change in DNA sequence”?
12. Nutrigenomics
13. Nutrigenetics
14. Epigenetics
15. None of the above.
16. A missense mutation results in the:
17. substitution of one amino acid for another in the protein made by a gene.
18. shortened protein that may function improperly or not at all.
19. substitution of one amino acid in the gene made by a protein.
20. an elongated protein that may function improperly or not at all.

**Section B:**

Answer **TWO** questions from this section (40 marks each).

1. Describe the mechanisms through which NFkB can affect gene expression (10 marks) and critically discuss the potential role of diet in regulating NFkB to promote health or disease (30 marks).
2. Describe the role of ApoE in development and progression of cardiovascular disease (10 marks) and critically discuss the interactions between the ApoE genotype and diet in cardiovascular disease (30 marks).
3. Discuss the key epigenetic mechanisms (20 marks) and the evidence supporting the role of diet in epigenetics and disease development (20 marks).

**END OF EXAMINATION**