UNIVERSITY OF BOLTON

SCHOOL OF SPORTS AND BIOLOGICAL SCIENCES

BSC (HONS) MEDICAL BIOLOGY

SEMESTER ONE EXAMINATION 2018/2019

MOLECULAR GENETICS

MODULE NO: BIO5008

Date: Monday 14 January 2019 Time: 2.00 pm – 5.00 pm

INSTRUCTIONS TO CANDIDATES:

Candidates are advised that the examiners attach importance to legibility of writing and clarity of expression. YOU ARE STRONGLY ADVISED TO PLAN YOUR ANSWERS

There are SIX questions on this paper.

There are TWO sections on this paper.

Answer THREE questions, at least ONE from each section, and ONE other.

All questions carry 50 marks.

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Answer THREE questions, at least ONE from each section. Make use of labelled diagrams where appropriate. All questions carry equal marks.

SECTION ONE

1. a) The restriction enzyme BamH1 cuts DNA between the two Gs when it encounters the base sequence:



In your answer book, mark the recognition sites on the segment of DNA below when the restriction enzyme BamHI is used.

TACGGATCCTAGGGCATAGCTCAGGATCCCGTCAATGGGGATCCC ATGCCTAGGATCCCGTATCGAGTCCTAGGGCAGTTACCCCTAGGG

Calculate the size the resulting fragments will be after digestion and draw a diagram of a typical agarose gel electrophoresis showing migration of the digested and undigested sets of DNA fragments.

[15 marks]

b) Identify the possible causes for failure of cDNA synthesis.

[35marks]

[Total 50 marks]

2. Assess the ethical implications of gene editing techniques like CRISPR.

[50 marks]

3. Summarize the six most common applications of reverse transcription polymerase chain reaction (RT-PCR).

[50 marks]

PLEASE TURN THE PAGE

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SECTION TWO

4. Explain how bacteria can be made to produce human insulin using genetic engineering approaches.

[50 marks]

5. Summarize the various clinical implications of the CRISPR technique. Highlight two specific conditions that CRISPR could prevent in the future.

[50 marks]

6. Explain how restriction enzymes became the workhorses of molecular genetics.

[50 marks]

END OF QUESTIONS