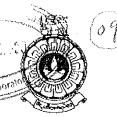
THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES

DEPARTMENT OF MEDICAL LABORATORY SCIENCES
ACADEMIC YEAR 2019/2020 – SEMESTER L'^M of Medical Laboratory



BACHELOR OF MEDICAL LABORATORY SCIENCE HONOURS
MDU6301 – CYTOGENETICS AND MOLECULAR GENETICS
NO BOOK TEST 1

DURATION: 1 1/2 HOUR

TIME:	9.00	AM -	10.30	AM
	7,00	7-1171 -	1 (7	, 2. V I A I

REGISTRATION NO:	•••••••

IMPORTANT INSTRUCTIONS/INFORMATIONS TO CANDIDATES

- This question paper consists of 11 pages with 10 Multiple Choice Questions (Part A) and 04 Structured Essay Questions (Part B) and 01 Essay Question (Part C).
- Write your Registration Number in the space provided.
- Answer **ALL** questions.
- Multiple Choice Questions (Part A): 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)
- Structured Essay Questions (Part B): Write answers within the space provided.
- Essay Question (Part C): Write the answer on the provided papers.
- Do not remove any page/part of this question paper from the examination hall.
- Mobile phones and any other electronic equipment are NOT allowed. Leave them outside.

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Part A: Multiple Choice Questions (10 marks)

- 1) DNA is
 - a) a linear polymer of deoxyribose nucleotides
 - b) a single stranded molecule
 - c) consists of two antiparallel polypeptide chains
 - d) made up of adenine, cytosine, guanine, and uracil
- 2) The person who discovered DNA as the genetic material, using an experiment with *Streptococcus pneumonia* is
 - a) Alfred Hershey and Martha Chase
 - b) Johann Friedrich Miescher
 - c) Frederick Griffith
 - d) W. S. Sutton
- 3) Which one of the following statements is TRUE regarding the mitochondrial genome?
 - a) Mitochondrial DNA is only inherited from father
 - b) Mitochondria have their own DNA, RNA, and ribosomes
 - c) Genes are coding for proteins involved in the photosynthesis
 - d) Genes in mitochondrial genome contain introns and exons
- 4) A recognized type of Mendelian inheritance includes
 - a) incomplete dominance
 - b) codominance
 - c) recessive inheritance
 - d) multiple alleles
- 5) Which one of the following human diseases is caused by aneuploidy?
 - a) Cystic fibrosis
 - b) Sickle cell disease
 - c) Down syndrome
 - d) Tay-Sachs disease
- 6) Which one of the following statements is most correct regarding the human genome?
 - a) Seventy five percent of human genome code for genes
 - b) The human genome is stored on 46 chromosome pairs
 - c) Individual genome is large due to single nucleotide polymorphisms
 - d) All genes specify only one protein molecules

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- 7) A method which can be used for genotyping is
 - a) Polymerase chain reaction
 - b) Enzyme-linked immunosorbent assay
 - c) Sodium dodecyl sulfate -polyacrylamide gel electrophoresis
 - d) Antibiotic susceptibility testing
- 8) If the total amount of adenine and thymine in a double-stranded DNA is 40%, the amount of guanine in this DNA is
 - a) 20%
 - b) 30%
 - c) 40%
 - d) 60%
- 9) A bioinformatics tool which can be used to analyze homologous DNA sequences is
 - a) NCBI BLAST
 - b) Cn3D
 - c) VASTSearch
 - d) CDSearch
- 10) Polygenic inheritance is denoted by
 - a) human ABO blood group system
 - b) hemophilia
 - c) skin color of people
 - d) huntington disease

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O1	
Q1 1.1 Write a short note on RNA structure?	(10 marks)

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	.,,
1.2 Briefly describe the role of mRNA in protein synthesis?	(3 marks)
	• • • • • • • • • • • • • • • • • • • •
	• • • • • • • • • • • • • • • • • • • •
1.3 Sketch and label the structural features of mRNA molecule?	(4 marks)
1.4 List three (03) main types of mutations occur in the DNA strand?	(3 marks)
i)	
ii)	
iii)	
Total 20 marks	

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Q2 2.1 What do you mean by "genome"?		(3 marks
2.2 List two (02) differences between nuclear ge		
i)		••••••••••••••••••
2.3 Sketch the central paradigm of bioinformatic		
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
2.4 Identify the major categories of bioinformation	cs tools?	(4 marks)
2.5 List three (03) difficulties encountered in seq		(3 marks)
i)	•••••	
ii) iii)		

Total 20 marks

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Q3	
3.1 What do you mean by "inheritance"?	(3 marks)
3.2 The hair color of rabbits is inherited according to Mendel laws. The gene for	hair color ir
rabbits has two alleles Q and q. Q is dominant and that codes for brown hair. q is r	ecessive and
that codes for white hair.	
3.2.1 Write down all possible genotypes and phenotypes?	(3 marks)
·	
3.2.2 Give expected genotypes and phenotypes of offspring, if one parent is heter	ozygous and
the other is white haired (Make Punnett's square for possible genotypes).	(6 marks)
	• • • • • • • • • • • • • • • • • • • •
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3.2.3 If the pair of rabbits have 16 babies, estimate the expected number of each g	enotype and
phenotype?	(4 marks)
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.3 Give four (04) examples for non-Mendelian inheritance?	(4 marks)
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)	• • • • • • • • • • • • • • • • • • • •
i)	• • • • • • • • • • • • • • • • • • • •
r)	
otal 20 marks	
4	
1 What are the main steps involve in genotyping by polymerase ch	
	(10 marks
2 List main components of PCR?	(4 marks)
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***************************************	•••••
3 State two (02) post-PCR applications?	(0 1.)
5 blace the (02) post-i Cix applications:	(2 marks)

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4.4 Give four (04) applications of genotyping?	(4 marks)
i)	
ii)	
iii)	
iv)	
Total 20 marks	

Part C Essay Question (10 marks)

1. Briefly describe the polymerase chain reaction (PCR) process and its disadvantages?

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BACHELOR OF MEDICAL LABORATORY SCIENCE HONOURS MDU6301: CYTOGENETICS AND MOLECULAR GENETICS NO BOOK TEST 1

REGISTRATION NO:	

ANSWER SHEET FOR PART A

1.	a	ь	С	d
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5.	a	b	С	đ

6. a b c d

7.	a	b	С	d
				}

8. a b c d

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