

BOWEN UNIVERSITY, IWO
COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE
MICROBIOLOGY PROGRAMME
2022/2023 FIRST SEMESTER EXAMINATION
MCB 405: MICROBIAL GENETICS (THEORY OF PRACTICAL)

Answer ALL questions

Time allowed: 1hr

1. If the capsid region of a wild type Human papillomavirus type 16 has the following DNA sequence:
3' TACTTTTCTACACGTATT 5',
- (a) Determine the sequence of its
(i) Complementary strand (ii) mRNA and (iii) Amino acids **(3 marks)**
- (b) If the virus type is subjected to induced mutations in the same region to give the sequences below, describe the type of mutations that must have occurred both at the DNA sequence and the protein-coding sequence
- (i) 3' TACTTTTCCACACGTATT 5' **(2 marks)**
(ii) 3' TACTTTTGCTACACGTATT 5' **(2 marks)**
(iii) 3' TACTTTACTACACGTATT 5' **(2 marks)**
(iv) 3' TACTTATCTACACGTATT 5' **(2 marks)**
(v) 3' TACTTTCTACACGTATT 5' **(2 marks)**
2. List the tools that are required for gene recombination and using a well-labelled diagram, describe how they are used in the process of producing a recombinant bacterial cell
(12 marks)

GENETIC CODE

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		Second nucleotide			
		U	C	A	G
U	UUU Phenylalanine (Phe)	UCU Serine (Ser)	UAU Tyrosine (Tyr)	UGU Cysteine (Cys)	U
	UUC Phe	UCC Ser	UAC Tyr	UGC Cys	C
	UUA Leucine (Leu)	UCA Ser	UAA STOP	UGA STOP	A
	UUG Leu	UCG Ser	UAG STOP	UGG Tryptophan (Trp)	G
C	CUU Leucine (Leu)	CCU Proline (Pro)	CAU Histidine (His)	CGU Arginine (Arg)	U
	CUC Leu	CCC Pro	CAC His	CGC Arg	C
	CUA Leu	CCA Pro	CAA Glutamine (Gln)	CGA Arg	A
	CUG Leu	CCG Pro	CAG Gln	CGG Arg	G
A	AUU Isoleucine (Ile)	ACU Threonine (Thr)	AAU Asparagine (Asn)	AGU Serine (Ser)	U
	AUC Ile	ACC Thr	AAC Asn	AGC Ser	C
	AUA Ile	ACA Thr	AAA Lysine (Lys)	AGA Arginine (Arg)	A
	AUG Methionine (Met) or START	ACG Thr	AAG Lys	AGG Arg	G
G	GUU Valine Val	GCU Alanine (Ala)	GAU Aspartic acid (Asp)	GGU Glycine (Gly)	U
	GUC (Val)	GCC Ala	GAC Asp	GGC Gly	C
	GUA Val	GCA Ala	GAA Glutamic acid (Glu)	GGA Gly	A
	GUG Val	GGG Ala	GAG Glu	GGG Gly	G