NAME (PRINT):_____ **SIGNATURE:**_____

MICROBIOLOGY 201

EXAMPLE EXAM-I (MIDTERM)

43 x 1 point question blocks (79 responses) on 17 pages (including this cover)

Time allowed: 1.5 hours

READ THIS!

FAILURE TO FOLLOW INSTRUCTIONS CAN DELAY THE GRADING OF YOUR EXAM

A. MULTIPLE CHOICE QUESTIONS

On the computer answer sheet, in **PENCIL**, fill in the bubbles for your name (Last name **FIRST, First name LAST**) 8 digit student number. Other student information is **NOT** required.

Turn the computer answer sheet 90^{o}. **IN INK**, sign the computer answer sheet in the spaces provided.

Record all **multiple-choice responses IN PENCIL** on the computer answer sheet — **NOT** on the question paper.

All single **multiple-choice responses** have **ONE BEST** answer. Point values vary with the response.

Students **MUST** record their multiple choice responses onto their computer sheet during the time allowed for the exam. **NO** writing will be permitted after the time allowed for the exam has expired. **NO** appeals will be considered.

B. RETURN OF THE QUESTION PAPER

The question paper **MUST** be returned with the answer sheets. Answer sheets without a question paper will **NOT** be graded. In this regard, students are **STRONGLY CAUTIONED** to guard against theft of their question paper by other students. **NO** appeal relating to loss of a question paper by theft will be considered.

C. FACULTY OF SCIENCE RULES GOVERNING FORMAL EXAMINATIONS

(1) Each candidate must be prepared to produce, upon request ,a Library/AMS card for identification.

(2) Candidates are not permitted to ask questions of the invigilators, except in cases of supposed errors or ambiguities in examination questions.

(3) No candidate shall be permitted to enter the examination room after the expiration of one-half hour from the scheduled starting time, or to leave during the first half hour of the examination.

(4) Candidates suspected of any of the following, or similar, dishonest practices shall be immediately dismissed from the examination and shall be liable to disciplinary action:

- Having at the place of writing any books, papers or memoranda, calculators, computers, cell phones, audio or video players or other memory aid devices, other than those authorized by the examiners.
- Speaking or communicating with other candidates
- Purposely exposing written papers to the view of other candidates. The plea of accident or forgetfulness shall not be received.

(5) Candidates must not destroy or mutilate any examination material; must hand in all examination papers; and must not take any examination material from the examination room without permission of the invigilator.

D. EXAM DISRUPTION POLICY FOR EXAM-I

In the event of an exam disruption and students must leave the exam room, the following policies apply:

(1) Procedure for exiting the exam room:

- Pick up your question booklet and answer sheet. Slip your answer sheet inside the question booklet.
- Exit the room in an orderly manner through the doors indicated by the invigilators.
- As you exit the room, give your question booklet and answer sheet to an invigilator. Any student failing to produce a question booklet and answer sheet will be asked to wait until all students have exited. Students are **RESPONSIBLE** for return of their question booklet and answer sheet. Any student failing to do so will receive a grade of "0" for the exam. Students are **STRONGLY CAUTIONED** to guard against theft of their question booklet and answer sheet by other students. **NO** appeal relating to loss of a question booklet and answer sheet by theft will be considered.

(2) Students **MUST** wait outside the exam room until the disruption has been resolved. During this time, students are **PROHIBITED** from discussing the exam outside the exam room or consulting course materials. Doing so is considered academic misconduct and will result in a grade of "0" for the exam.

(3) Once the exam disruption has been resolved, the exam will be continued if at all possible.

Questions #1 – 4 **(4 x 0.25 points)**

Bacteria and Archaea exhibit differences at the molecular level. These differences have been found in the structures of their:

1. membrane phospholipids.
2. RNA polymerases.
3. flagella.
4. cell wall polysaccharides.

Mark **(a)** for **Yes** or **(b)** for **No** on the answer sheet.

Question #5 **(1 point)**

Below sequences A – E have been aligned. Choose the **WORST** alignment of sequence F (20 nucleotides) with these aligned sequences.

Seq A 22 nucleotides: **CC**CC**AGC**UUCG**GCU**GGG**GGAGG**
Seq B 21 nucleotides: **CC**UU**AGC**GAAA**GCU**-AA**GGAGG**
Seq C 21 nucleotides: **CC**UC**AGC**GUGA**GCU**-GA**GGAGG**
Seq D 21 nucleotides: **CC**CA**AGC**UUU-**GCU**AUG**GGAGG**
Seq E 17 nucleotides: **CC--AGC**UUUG**GCU---GGAGG**

Seq F 20 nucleotides: **C**CCAAGCGGAGAGCUUGGAGG

(a) C-CAA-GCGGAGAGCUUGGAGG 6 differences
(b) CC-AAGCGGAGAGCUUG-GAGG 4 differences
(c) CC-AAGCGGAGAGCUUGG-AGG 5 differences
(d) CC-AAGCGGAGAGCUU-GGAGG 3 differences
(e) CCAAGCGGAGAGCU--UGGAGG 3 differences

Question #6 **(1 point)**

You suspect a tRNA gene has been transferred horizontally. Which of the following methods to detect HGT could be used to investigate your suspicions?

(a) GC/AT content analysis.
(b) Codon bias analysis.
(c) Incongruent phylogeny analysis.

Mark **(d)** if the answer is **(a)** and **(b)**.
Mark **(e)** if the answer is **(a)** and **(c)**.

Question #7 **(1 point)**

The table below shows nucleotide differences between the aligned, variable portions of SSU rRNA from 4 different prokaryotic organisms:

Organism	**1**	**2**	**3**	**4**
1		2	8	3
2	2		8	3
3	8	8		7
4	3	3	7	

Assuming these differences are due only to nucleotide substitutions and a branch length of 1 cm is assigned for every single nucleotide difference, the total length of the branches in a distance-based phylogenetic tree of the type used in MICB 201 will be:

(a) 10 cm
(b) 11 cm
(c) 12 cm
(d) 13 cm
(e) 14 cm

Questions #8 – 11 **(4 x 0.25 points)**

Horizontal gene transfer complicates the use of SSU rRNA for:

8. tracing whole genome evolution.
9. tracing organismal evolution.
10. assigning taxonomic units (e.g., genus, species)
11. classifying organisms.

Mark **(a)** for **Yes** or **(b)** for **No** on the answer sheet.

Questions #12 – 15 **(4 x 0.25 points)**

Indicate which of following statements about prokaryotic abundance and diversity are correct by marking **(a)** for **Yes** or **(b)** for **No** on the Answer Sheet.

12. There are more individual prokaryotes on Earth than stars in the universe.
13. If all prokaryotic organisms were laid end to end, the distance covered would be about a trillion astronomical units (a.u.).
14. Most prokaryotes are found in the subsurface regions of the Earth.
15. Since prokaryotes were first discovered over 200 years ago, millions of different prokaryotic species have been cultured in the laboratory.

Question #16 **(1 point)**

It has been estimated there are 10^{30} prokaryotic cells on Earth. What is the corresponding biomass? Assume the density of prokaryotic "tissue" is close to the density of water, i.e., 1 g/cm^3 and the average volume of a prokaryotic cell is 1 μm^3.

(a) 10^{12} g
(b) 10^{18} g
(c) 10^{26} g
(d) 10^{30} g

Questions #17 – 20 **(4 x 0.25 points)**

SSU rRNA gene sequence analysis clusters ***Mycoplasma genitalium*** and ***Bacillus anthracis*** together into the Gram-positive group (phylum) indicating the organisms are more closely-related to each other than each is related to organisms in the other SSU rRNA defined phyla. Surprisingly the two organisms have quite different phenotypic characteristics.

Which of these differences call into question the results of the SSU rRNA gene sequence analysis? Mark **(a)** for **Yes** or **(b)** for **No** on the Answer Sheet.

		Mycoplasma genitalium	***Bacillus anthracis***
17.	Cell diameter?	~0.2μm	~2μm
18.	Synthesize peptidoglycan?	No	Yes
19.	Possess flagella?	No	Yes
20.	Genome size?	~600kb	~4000kb

Question #21 **(1 point)**

Which bacterial group defined by SSU rRNA gene analysis contains bacteria historically recognized as of major medical, industrial and agricultural importance as well as the model organism ***E. coli***?

(a) Cyanobacteria
(b) Gram-positive bacteria
(c) Purple bacteria
(d) Green (Sulfur) bacteria

Question #22 **(1 point)**

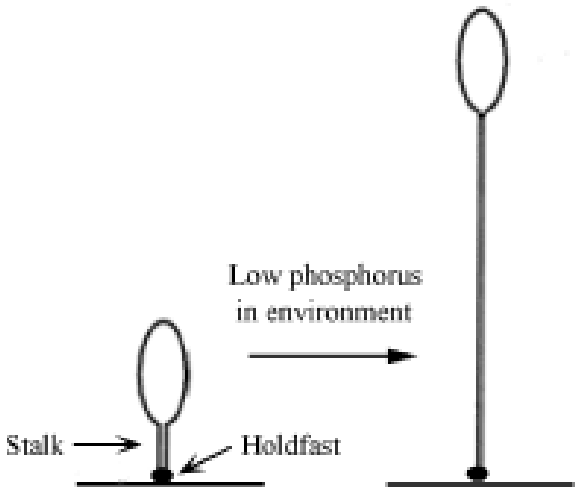
Pure cultures:

(a) are used to determine the characteristics of specific types of prokaryotes.
(b) are important because they simulate the natural environment.
(c) have been used successfully to study millions of different prokaryotic species.
(d) contain all the prokaryotes purified from an environmental sample.

Mark **(e)** if the answer is **TWO** of the above.

Question #23 **(1 point)**

Recall the aquatic dimorphic bacterium ***Caulobacter*** which attaches to surfaces using a polysaccharide "glue" at the end of its stalk. When starved for phosphorus, the bacterium forms very long stalks.



If the cell body has a SA = 7.36 μm^2 and a V =1.15 μm^3 and the stalk has a SA = 13.23 μm^2 and a V =0.46 μm^3 by how many times does the stalk increase the effective SA:V ratio of the cell body?

(a) 2 times
(b) 4 times
(c) 8 times
(d) 16 times
(e) 32 times

Formulas: $?cyl = \pi r^2 h$ $?cyl = 2pr^2 + 2\pi rh$

Question #24 **(1 point)**

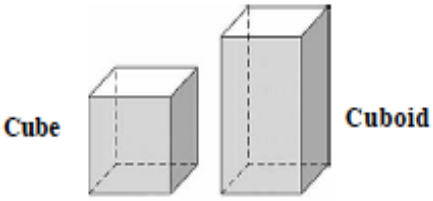
The lipid bilayer of the prokaryotic cytoplasmic membrane is **LEAST** permeable to:

(a) diatomic oxygen
(b) protons
(c) molecular nitrogen
(d) water

Questions #25 – 28 **(4 x 0.25 points)**

In 1980, a scientist named Tony Walsby discovered a thin, square prokaryotic microorganism in the Dead Sea. Initially, the microbe was called "Walsby's square bacterium" but it has been subsequently named ***Haloarcula.***

Haloarcula



Indicate which of the following are expected to be characteristics of ***Haloarcula*** cells by marking **(a)** for **YES** and **(b)** for **NO** on the answer sheet.

25. The cytoplasmic membrane lipids of ***Haloarcula*** cells are expected to be similar in molecular shape to cubes or cuboids rather than cylinders.
26. ***Haloarcula*** cells are expected to retain their shape when placed in a hypertonic environment.
27. The cytoplasmic membranes of ***Haloarcula*** cells are expected to possess lipid bilayers which are less fluid than bacteria with a rod shape.
28. ***Haloarcula*** cells are expected to have a Gram-positive wall structure.

Question #29 **(1 point)**

Which of the following mechanisms of DNA compaction is used by **ALL** Bacteria and **ALL** Archaea so far studied?

(a) histone-like proteins
(b) polyamines
(c) DNA supercoiling
(d) histone proteins

Question #30 **(1 point)**

A sample of a bacterial cell structure is subjected to partial chemical analysis and found to contain amino acids and sugars. The sample could be derived from:

(a) flagella.
(b) outer membrane.
(c) capsular material.
(d) peptidoglycan.

Mark **(e)** if the answer is **TWO** of the above.

Questions #31 – 34 **(4 x 0.25 points)**

When abruptly transferred from a hypertonic environment to a hypotonic environment, in general, Gram +ve bacteria are less likely to undergo osmotic lysis than Gram -ve bacteria.

Which of the following statements help to explain why this is so? Mark **(a)** for **Yes** or **(b)** for **No** on the Answer Sheet.

31. Gram +ve cell walls have more layers of peptidoglycan (PG) than Gram –ve cell walls.
32. Gram +ve PG has a higher degree (density) of cross-linking than Gram –ve PG.
33. The covalent bonds in Gram +ve PG are stronger than the covalent bonds in Gram –ve PG.
34. Gram +ve bacteria lack an outer membrane.

Question #35 **(1 point)**

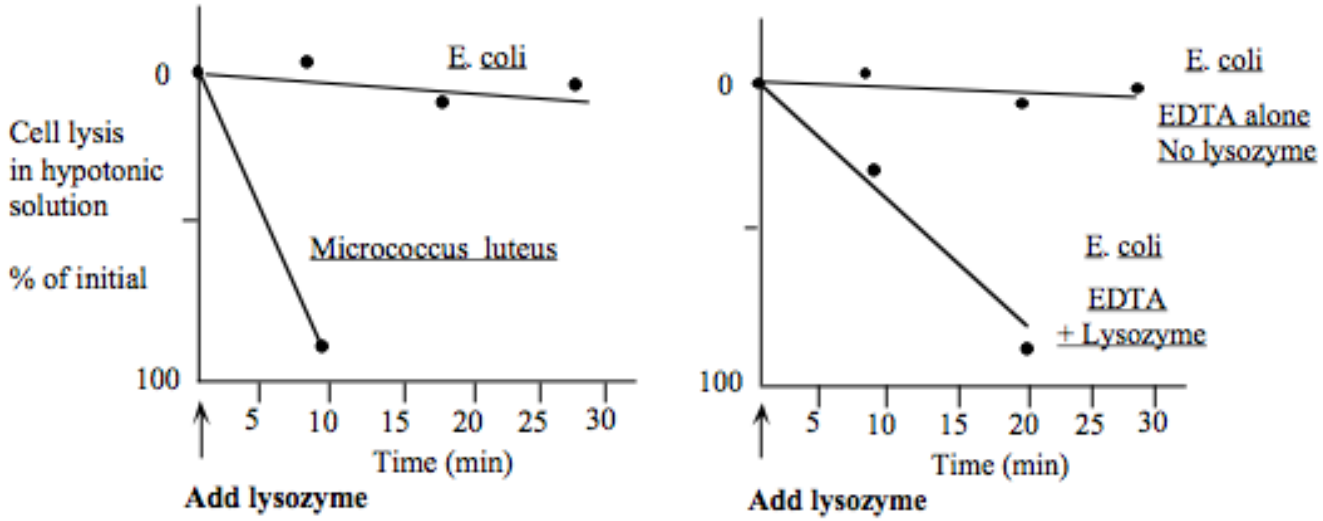
E. coli has been in the news recently (Google: XL Foods meat recall). As MICB 201 students know, organisms classified as E. coli can exhibit important differences in their phenotypes. ***E. coli* K12** and ***E. coli* O157: H7** are both ***E. coli***; however, one is docile while the other is deadly. Some of the differences between these two organisms show-up in their strain designations. Which of the following identifiers are **INCORRECTLY** matched to the cellular structure they refer to?

	Identifier	**Structure**
(a)	K	capsule
(b)	O	LPS
(c)	H	flagellum

Mark **(d)** if the answer is two of the above.

Question #36 **(1 point)**

Generally, Gram -ve bacteria are much more resistant to the effects of lysozyme than Gram +ve bacteria. For example consider the following data reproduced from the literature showing the effect of exposing the unicellular bacteria ***E. coli*** and ***Micrococcus luteus*** (Gram +ve) to lysozyme. In each case 10^6 bacterial cells were incubated in 1 mL of phosphate buffer + 50 µg lysozyme @ 37°C . However when 10 mM EDTA (final
concentration) is included in the phosphate buffer, ***E. coli*** is lysed by lysozyme.



What is the likely chemical nature of EDTA?

(a) EDTA is a kind of detergent.
(b) EDTA is a chemical that binds divalent cations.
(c) EDTA is a chemical that like lysozyme, disrupts peptidoglycan.

Question #37 **(1 point)**

Because of stronger lateral interactions between LPS molecules, the outer membrane bilayer of Gram-negative bacteria is less fluid and less permeable to many chemicals than the cytoplasmic membrane phospholipid bilayer. Which regions of LPS are responsible for these stronger interactions?

(a) Lipid A
(b) Core region
(c) O polysaccharide

Mark **(d)** if the answer is **TWO** of the above.

Question #38 **(1 point)**

Porins transport:

(a) some nutrients into the periplasm.
(b) extracellular proteins into the environment.
(c) periplasmic proteins into the periplasm.
(d) nutrients into the cytoplasm.

Mark **(e)** if the answer is **TWO** of the above.

Question #39 **(1 point)**

Many bacteria have capsules. Which one of the following statements about capsule function is **NOT** correct?

Capsules:

(a) help attach bacteria to surfaces.
(b) protect bacteria from plasmolysis.
(c) protect bacteira from virus infection.
(d) protect bacteria from phagocytosis.
(e) help bacteria avoid starvation.

Question #40 **(1 point)**

Some lake-dwelling photosynthetic bacteria make internal sac-like structures called **gas vesicles** so they can float near the surface of a lake.

The gas vesicle sac is made from a single type of molecule which excludes water. Correctly predict the molecule that makes up the gas vesicle sac.

(a) peptidoglycan
(b) phospholipid
(c) protein
(d) LPS
(e) Nucleic acid (DNA or RNA)

Question #41 **(1 point)**

The "tethered flagella experiments" described in class demonstrated:

(a) Transport of H+ down a [H+] gradient drives flagellar rotation.
(b) Tumbling involves a change in direction of flagellar rotation.
(c) The bacterial flagellum rotates.
(d) The bacterial flagellum is made of protein.

Mark **(e)** if the answer is **ALL** of the above.

Question #42 **(1 point)**

Which of the following structures are **NOT** found in the Archaea?

(a) peptidoglycan
(b) rotary flagella
(c) S-layers
(d) pili

Mark **(e)** if the answer is **TWO** of the above.

Question #43 **(1 point)**

Like all organisms, the total physical DNA specifying the characteristics of a prokaryotic organism is referred to as its:

(a) genome.
(b) genotype.
(c) genes.
(d) chromosome(s)

Question #44 **(1 point)**

Prokaryotic chromosomes:

(a) constitute the majority of the genome in most organisms.
(b) on the average have as many nucleotides making-up genes as between genes.
(c) possess one strand that serves as a template for the transcription of all genes.
(d are circular molecules in most organisms.

Mark **(e)** if the answer is **TWO** of the above.

Questions #45 – 48 **(4 x 0.25 points)**

Which of the following statements about transcription and translation in Bacteria are correct? Mark **(a)** for **Yes** or **(b)** for **No** on the Answer Sheet.

45. Transcription depends on the presence of a functional ribosome binding site.
46. As a part of translation initiation, the two strands of the mRNA are separated.
47. The rho independent stem-loop hairpin structure in mRNA participates in the termination of translation.
48. Transcription takes place in the nucleus while translation takes place in the cytoplasm.

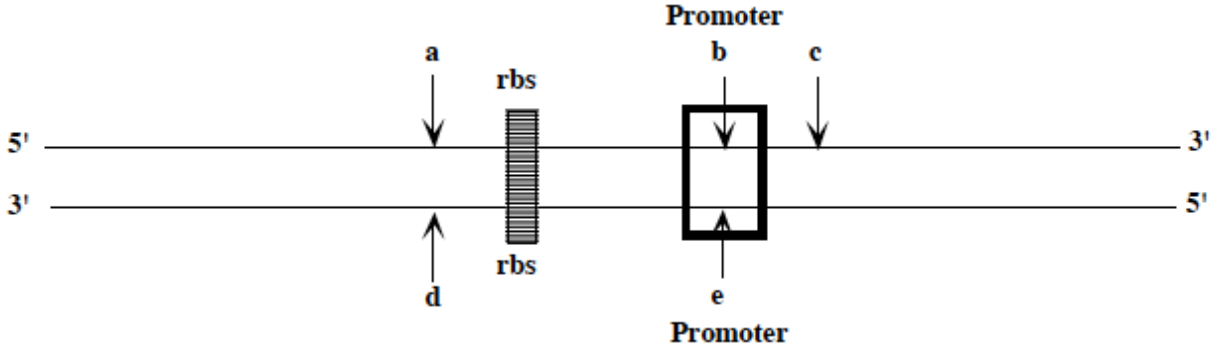
Questions #49 – 52 **(4 x 0.25 points)**

Which of the following statements about transcription and DNA replication in Bacteria are correct? Mark **(a)** for **Yes** or **(b)** for **No** on the Answer Sheet.

49. DNA replication and transcription both take place in the same membrane-bound cellular compartment.
50. Synthesis of new nucleic acid requires a 3' to 5' template in both cases.
51. DNA replication uses two template strands while transcription uses only one.
52. Transcription initiates at a unique location in a gene while DNA replication is initiated at several points on a chromosome or plasmid.

Questions #53 – 55 **(4 x 0.25 points)**

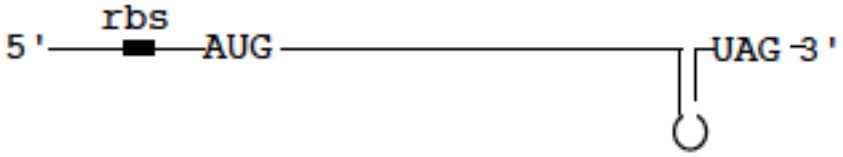
The following diagram represents a segment of double-stranded DNA specifying transcription and translation initiation information for a single gene. **"rbs"** indicates the nucleotide sequence in DNA that is either the same as, or complementary to, the nucleotide sequence of the ribosome binding site in mRNA. Transcription and translation termination information is **NOT** shown.



53. Identify the position of the first nucleotide used as a template for the synthesis of mRNA as either **a, b, c, d, e**.
54. Identify the position of the nucleotide sequence complementary to the initiation codon in mRNA as either **a, b, c, d, e**.
55. A gene transcribed divergently from the one shown above would use which strand as a template? Answer **(a)** for the top strand or **(d)** for the bottom strand.

Questions #56 – 59 **(4 x 0.25 points)**

Consider the following **HYPOTHETICAL** bacterial mRNA molecule:



Which one of the following statements help to explain why is this a poor design for an mRNA? Mark **(a)** for **Yes** or **(b)** for **No** on the Answer Sheet. Assume AUG and UAG are separated by a number of nucleotides evenly divisible by 3.

56. It lacks a functional signal for termination of transcription.
57. It lacks a functional signal for termination of translation.
58. It lacks all 3 possible termination codons.
59. It lacks a promoter.

Question #60 **(1 point)**

Which one of the following statements about plasmids is correct?

(a) Plasmids carry genes for the DNA replication proteins required for replication in the host organism.
(b) Plasmids typically possess fewer genes than the host chromosome and are therefore typically smaller than the host chromosome.
(c) Plasmids usually carry extra copies of the same genes carried by the host chromosome.
(d) Plasmids exhibit little diversity, as a group these selfish genetic elements are quite similar in terms of size, copy number, host range and the kinds genes they carry.

Question #61 **(1 point)**

A newly isolated bacterium is found to have a single circular chromosome with a molecular size of 2500 kb. Estimate the maximum number of average protein encoding genes in its genome. Assume that 10% of the genome does not code for anything (i.e., 10% of the chromosomal DNA constitutes the spaces between the genes), 1% of the chromosome codes for stable RNA molecules and the size of an average protein encoding gene is 1000 bp.

(a) 1113
(b) 1250
(c) 2225
(d) 2500

Question #62 **(1 point)**

The genome of an ***E. coli*** strain is found to consist of a single chromosome. When subjected to nucleotide sequencing the chromosome is found to consist of 4, 638, 422 bp. Which of the following is **LEAST** certain with respect to this bacterium?

(a) The number of average genes that the bacterium possesses.
(b) The number of average proteins encoded by the chromosome.
(c) The function of each of the proteins that the bacterium synthesizes.
(d) The genotype of the bacterium.

Question #63 **(1 point)**

In genomic analysis, computer software is used to search for potential codling regions. Consider the following dsDNA nucleotide sequence. The nucleotide sequence shown is only part of a gene but it includes all of the information present in the coding region of the mRNA. Do not make the dangerous assumption that the top strand is the non-template strand and the bottom strand is the template strand.

```
5'-ATGTAAAATCAAAGAAAACCAACATCACATGCCGCCATGTAA-3'
3'-TACATTTTAGTTTCTTTTGGTTGTAGTGTACGGCGGTACATT-5'
```

Find the longest **POTENTIAL** coding region.

Using the codon table included with this exam the 3rd amino acid specified by this potential coding region is:

(a) Gly
(b) Ala
(c) Arg
(d) Asp
(e) Ser

Question #64 **(1 point)**

In **Question #63**, you were asked to identify a **POTENTIAL** coding region. Which **ONE** of the following pieces of information would be the **MOST USEFUL** in deciding whether a **POTENTIAL** coding region is a **REAL** coding region?

(a) The presence or absence of a sequence encoding a ribosome binding site close to the beginning of the coding region.
(b) The presence or absence of a promoter sequence close to the beginning of the coding region.
(c) The presence or absence of a sequence encoding a transcription terminator close to the end of the coding region.
(d) The presence or absence of a palindromic sequence close to the beginning of the coding region.

Question #65 **(1 point)**

In the process of transposition, the transposase protein recognizes and binds to specific DNA nucleotide sequences. Which of the following sequences does the transposon **NOT** bind to?

(a) inverted repeat sequences.
(b) target site sequences.
(c) the promoter sequence for the transposase gene.
(d) the single-stranded sequences created as a consequence of transposon insertion.

Mark **(e)** if the answer is **TWO** of the above.

Questions #66 – 69 **(4 x 0.25 points)**

When using a transposon to mutate genes in the lab following electric shock billions of organisms are spread on agar solidified nutrient medium containing an antibiotic yet only hundreds of colonies containing antibiotic- resistance organisms form. Below are some possible explanations. Indicate whether each is reasonable by marking **(a)** for **Yes** or**(b)** for **No** on the Answer Sheet.

66. A plasmid that cannot replicate in the recipient bacterium is used.
67. Transposition is a rare event.
68. The electric shock process is very inefficient at promoting plasmid uptake.
69. The antibiotic resistance gene is not expressed in the recipient bacteria.

Question #70 **(1 point)**

Consider positive chemotaxis in peritrichously flagellated unicellular bacteria.

(a) In the absence of a nutrient concentration gradient, on the average runs are longer than in the presence of a gradient.
(b) In the presence of a nutrient concentration gradient, tumbles are less frequent than in the absence of a gradient.
(c) The result of a tumble is to point the organism so a run will occur toward the higher concentration of the nutrient.
(d) Spatial changes in nutrient concentration are sensed temporally not spatially.

Mark **(e)** if the answer is **TWO** of the above.

Questions #71 – 74 **(4 x 0.25 points)**

Consider the following statements about operons and the environmental regulation of gene expression. Indicate whether each statement is correct by marking **(a)** for **Yes** or **(b)** for **No** on the answer sheet.

71. If a gene is the middle gene of a 3 gene operon, it cannot be transcribed without transcribing the first gene in the operon.
72. A gene for a regulatory protein is usually the first gene in the operon to whose operator the regulatory protein binds.
73. Before binding to DNA, a regulatory protein must first bind a small molecule (the effector).
74. Each gene of an operon possesses a nucleotide sequence encoding a translation termination codon.

Questions #75 – 78 **(4 x 0.25 points)**

Recall that some genes for siderophore synthesis in ***E. coli*** and ***Pseudomonas aeruginosa*** are contained in an operon. Now imagine expression of these genes is regulated not by negative regulation but by positive regulation.

Given positive regulation of the operon gene expression, indicate whether each of the following statements is correct by marking **(a)** for **Yes** or **(b)** for **No** on the answer sheet.

75. In the presence of iron, the regulatory protein would spend most of its time bound to the promoter.
76. In the absence of iron, the siderophore would spend most of its time bound to the operator.
77. In the presence of iron, a Fe-regulatory protein complex would spend most of its time bound to the operator.
78. In the absence of iron, RNA polymerase would frequently initiate transcription.

Question #79 **(1 point)**

In quorum sensing system important in the ***Alivibrio fischeri***-Hawaiian squid ***(Eupryma scolopes)*** symbiosis, the autoinducer binds to:

(a) an initiator (activator) nucleotide sequence.
(b) a repressor protein.
(c) an activator protein.
(d) an inducer.
(e) light.

Codon	AA	Codon	AA	Codon	AA	Codon	AA
UUU	Phe	UCU	Ser	UAU	Tyr	UGU	Cys
UUC	Phe	UCC	Ser	UAC	Tyr	UGC	Cys
UUA	Leu	UCA	Ser	**UAA**	**Stop**	**UGA**	**Stop**
UUG	Leu	UCG	Ser	**UAG**	**Stop**	UGG	Trp
CUU	Leu	CCU	Pro	CAU	His	CGU	Arg
CUC	Leu	CCC	Pro	CAC	His	CGC	Arg
CUA	Leu	CCA	Pro	CAA	Gln	CGA	Arg
CUG	Leu	CCG	Pro	CAG	Gln	CGG	Arg
AUU	Ile	ACU	Thr	AAU	Asn	AGU	Ser
AUC	Ile	ACC	Thr	AAC	Asn	AGC	Ser
AUA	Ile	ACA	Thr	AAA	Lys	AGA	Arg
AUG	**Met**	ACG	Thr	AAG	Lys	AGG	Arg
GUU	Val	GCU	Ala	GAU	Asp	GGU	Gly
GUC	Val	GCC	Ala	GAC	Asp	GGC	Gly
GUA	Val	GCA	Ala	GAA	Glu	GGA	Gly
GUG	Val	GCG	Ala	GAG	Glu	GGG	Gly