

Name: _____

Write your answers only in the space provided under each question. You may use a calculator, notes, books, etc. Work independently

1. **(1.5 points)** The RNA sequence below corresponds to part of the expressed MTHFR gene.

augcaccgacaugggcaucacucgccccaucgucucc

- (a) Write a peptide sequence encoded by this RNA sequence.
- (b) Classify the encoded amino acid residues as hydrophobic, polar, positive at biological pH (pH 7.4), or negative at biological pH.
- (c) Among these amino acid residues, which one has the highest isoelectric point?

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2. **(1.5 points)** We need two primers that are capable of amplifying a 40-base long double stranded DNA fragment using the following 120-mer as a template.

cacatgaaag tttagtttta ttatagacac tttatgcaaa catttcaata ctttttgcta
cttctataat cttttagcaa ggccgctcagt tacagtccaa atgggaaaat ataaacaaaa

(a) Write the primer sequences. Box in the primer sequence and the complementary primer sequence.

(b) If there are 10 copies of template DNA, how many PCR cycles are needed to generate at least 10000 copies of cDNA? Assume that the PCR reaction is 100% efficient.

(c) Based on the number of cycles determined above, determine the number of amplicons that will have the correct length.