

### Question 3, Sample A – 3 Points

Starting with mRNA leaving the nucleus, list and describe four major steps involved in protein synthesis.

After mRNA is transcribed in the nucleus, it leaves and goes into the ribosomes. Then the mRNA is paired with its anticodon carried by tRNA connected to an amino acid. As the mRNA gets translated the tRNA breaks off and its amino acid connects with the next tRNA molecule. This continues until there is a long chain of amino acids that forms a polypeptide, or protein.

Notes:

4 Key Elements:

1. "...goes to the ribosome..."
2. "...mRNA is paired with anticodon..."
3. "...mRNA is translated..."
4. "...amino acid connects...forms a polypeptide..."

**Question 3, Sample B – 3 Points**

**Starting with mRNA leaving the nucleus, list and describe four major steps involved in protein synthesis.**

The mRNA moves from the nucleus to ribosomes. Then, tRNA will match anticodons with mRNA codons. The tRNA molecules have amino acids attached to them, so the amino acids are bonded in the same order as the codons instructed. When the mRNA is done translating, the protein is formed.

*Notes:*

*4 Key Elements:*

1. "...mRNA...from nucleus to ribosomes..."
2. "...tRNA will match anticodons with mRNA codons..."
3. "...tRNA...amino acids attached to them..."
4. "...amino acids are bonded in the same order as the codons instructed..."

Question 2, Sample C – 2 Points

Starting with mRNA leaving the nucleus, list and describe four major steps involved in protein synthesis.

mRNA leaves the nucleus, where it joins with tRNA. tRNA reads mRNA, & creates a protein based on the codon that was read. The proteins are continually created until tRNA hits a stop codon. The proteins created are now a protein chain.

Notes:

3 Key Elements:

1. "...tRNA reads mRNA...creates a protein based on the codon that was read..."
2. "...hits a stop codon..."
3. "...proteins created are now in a chain..."

**Question 2, Sample D – 1 Point**

**Starting with mRNA leaving the nucleus, list and describe four major steps involved in protein synthesis.**

- 1) mRNA leaves the nucleus
- 2) mRNA is transcribed
- 3) tRNA brings codons to match with anticodons
- 4) Amino acids are assembled, making proteins

*Notes:*

*2 Key Elements:*

1. "...tRNA brings codons to match with anticodons..."
2. "...amino acids are assembled making proteins..."

**Question 2, Sample E – 0 Points**

**Starting with mRNA leaving the nucleus, list and describe four major steps involved in protein synthesis.**

- 1) The mRNA connects to the DNA.
- 2) Protein polymerase codes their base pairs.
- 3) Base pairs combine to DNA and mRNA.
- 4) There are 4 copies of DNA.

*Notes:*

*No Key Elements Given*

**Question 2, Sample F – 0 Points**

**Starting with mRNA leaving the nucleus, list and describe four major steps involved in protein synthesis.**

1. mRNA leaves the nucleus
2. mRNA creates amino acids
3. amino acids transcribe tRNA
4. tRNA is used to create proteins

*Notes:*

*No Key Elements Given*