

**DNA, Genes and Protein Synthesis**

- 1) What are histones and why are they important? (3)
- 2) Explain how the DNA of prokaryotes and eukaryotes is different? (3)
- 3) What is special about the DNA found in mitochondria and chloroplasts? How is this relevant to the endosymbiont theory? (3)
- 4) Why is the genetic code said to be (6) ;
  - a. Universal
  - b. Non-overlapping
  - c. Degenerate
- 5) Define (11);
  - a. Gene locus
  - b. Sense strand
  - c. Codon
  - d. DNA triplet
  - e. Exons
  - f. Introns
  - g. Alleles
  - h. Genes
  - i. Chromosome
  - j. Genome
  - k. Proteome
- 6) What is 'junk DNA' and what proportion of total DNA is this? Why is it relevant? (3)
- 7) Describe the process of transcription? (4)
- 8) What is pre-mRNA and how is it converted to mature mRNA? (3)

- 9) What are the differences between DNA and mRNA? (4)
- 10) Give the mRNA sequence produced from this section of DNA: ATCGGCTAA? (1)
- 11) Draw the structure of tRNA and describe its function? (4)
- 12) Describe the translation process? (5)
- 13) Explain the structure of the ribosome, how it is different in prokaryotes and eukaryotes, and their role in protein synthesis? (4)
- 14) How do the ribosomes in mitochondria and chloroplasts differ to that of cells and what is the relevance of this? (2)
- 15) Explain how the mRNA and tRNA pairing ensures specificity and that the correct amino acids are sequenced into the polypeptide chain? (3)
- 16) Why is protein activation necessary in most cases? (2)
- 17) Suggest how cancers develop based on your knowledge of DNA, genes and protein synthesis? (4)

Total: /65