Protein Synthesis and Cellular Control

1) Describe the process of transcription? (4)
2) Describe translation? (4)
3) Using a labelled diagram, describe the structure of tRNA? (3)
4) Describe the role of the following in protein synthesis (8);
    a. RNA polymerase
    b. Anticodon-codon complex
    c. Stop codon
    d. tRNA
    e. mRNA
    f. Start codon
    g. Ribosome
    h. Nucleus
5) Which type of bond joins the amino acids together and what is this reaction called? (2)
6) What happens to the polypeptide chain after it has been formed? (2)
7) A toxin works by inhibiting RNA polymerase; what effects is it likely to have and why? (2)
8) There are 64 codons and only 20 amino acids. Explain why? (2)
9) A transcription error results in premature insertion of a stop codon. What effect is this likely to have and why is it significant? (3)
10) Draw a simple labelled diagram to illustrate translation? (4)
11) How is protein synthesis controlled? (3)
12) How is protein activation controlled? (3)
13) What are (3);
    a. Promoters

b. Operators

c. Transcription factors

14) Describe the 3 components of operons and give the functions of each? (6)

15) What are the two different parts of the control elements and why are they each important? (4)

16) How does the lac operon in E.coli work? (6)

17) What is apoptosis and how does it take place? (3)

18) Why is apoptosis important? (2)

19) What are homeotic genes, homeobox sequences and homeodomains and what are their significance? (3)

20) What is a frameshift mutation? (2)

21) Why is it that a frameshift mutation which appears earlier in the base sequence has a greater effect on the protein than one which appears later? (2)

22) Give 3 reasons why a mutation may have neutral effects? (3)

23) What are the different types of mutations? Give a brief description of each. (5)

24) Bacterial enzymes break down particular antibiotics and a mutation has resulted in the genes coding for these enzymes giving them the ability to break down a larger range of antibiotics. How has this helped them survive? (2)

25) Give one example of a harmful mutation and the results from that? (2)

26) If protein synthesis and/or activation are not controlled, cancer can result. Explain why? (3)

Total: **/87**