

1. Please draw a 'transcription unit' and its corresponding translation regions on a genomic DNA sequence. You need to label the following terms on this diagram: (1) promoter region; (2) poly(A) consensus sequence; (3) RNA transcription region; (4) start codon; (5) stop codon; (6) coding sequences; (7) introns; (8) exons; (9) 5'UTR (10) directions of RNA transcribing; (50 points).
2. What is the difference between the activator and the inducer? (10 points)
3. What is the difference between monoploid (x) and haploid (n)? (10 points)
4. In tetraploid potato, homozygous genotypes are classified as quadruplex (**AAAA**) and nulliplex (**aaaa**), and heterozygous genotypes are classified as triplex (**AAAa**), duplex (**AAaa**), and simplex (**Aaaa**), in which the **A** allele is dominant to the **a** allele. There are two parental potato lines, one resistant to late blight disease and the other susceptible, and the ratio of resistant individuals to susceptible individuals is 5 in the F1 progenies from the cross of these two parental lines. If this resistant phenotype is controlled by a single gene, what genotype does the resistant parent have? You need to give explanation of your answer. (30 points)

2. What is the difference between the activator and the inducer? (10 points)

3. What is the difference between monoploid (x) and haploid (n)? (10 points)

4. In tetraploid potato, homozygous genotypes are classified as quadruplex (**AAAA**) and nulliplex (**aaaa**), and heterozygous genotypes are classified as triplex (**AAAa**), duplex (**AAaa**), and simplex (**Aaaa**), in which the **A** allele is dominant to the **a** allele. There are two parental potato lines, one resistant to late blight disease and the other susceptible, and the ratio of resistant individuals to susceptible individuals is 5 in the F1 progenies from the cross of these two parental lines. If this resistant phenotype is controlled by a single gene, what genotype does the resistant parent have? You need to give explanation of your answer. (30 points)