

DNA as the genetic code PPQs - Answers

- 4 (a) tRNA; [1]
- (b) **Any four from**
- (lysine) tRNA leaves the ribosome (so that P-site becomes vacant)
 - ribosome moves along by one codon length
 - so that the Thr-tRNA/ACC is now in the P-site
 - UCG codon is available for translation /AGC tRNA enters/serine is brought in
 - condensation/peptide bond forms between amino acids [4]
- (c) More than one codon can code for a particular amino acid; in diagram two combinations code for Phe (UUC and UUU); [2]
- (d) **Any three from**
- base deletion is frameshift mutation/affects all subsequent codons/affects rest of genetic code
 - therefore all amino acids affected after mutation point
 - base substitution only affects one codon/one amino acid
 - if third base substituted in code that is degenerate, e.g. Phe, no change to amino acid produced [3]
- 3 (a) (i) **Any four from**
- the DNA double helix unzips/hydrogen bonds break
 - through action of enzyme helicase
 - mRNA forms on the template strand/nucleotides assemble on template strand
 - through forming complementary base pairs (with DNA strand)/ examples of RNA to DNA base pairing [**at least two**]
 - catalysed by RNA polymerase [4]
- (ii) **Any two from**
- in RNA uracil replaces thymine
 - mRNA is shorter than DNA
 - mRNA is single stranded
- [**Allow converse for any of the above**] [2]
- (b) (i) One gene one protein less accurate as some proteins have more than one polypeptide/other genes required to code for other polypeptides; one gene one enzyme less accurate as not all proteins/polypeptides are enzymes; [2]
- (ii) A gene (represented by a sequence of bases) codes for the sequence of amino acids/primary structure (of a polypeptide); [1]
- (c) (i) 252/(255/258) [**flexibility to allow for initiation and/or termination codes**]; [1]
- (ii) Gene contains non-coding sections (introns)/part of polypeptide is subsequently removed; [1]