**A-level Biology – Year 11 transition work**

**Genetics and cell division**

**Quick questions**

1. Double helix; (1)
2. Four; (1)
3. Adenine, cytosine, guanine and thymine; (1)
4. Hydrogen bonds form between the bases on each strand; (1)
5. Pairs of bases join together / A pairs with T and C pairs with G; (1)
6. A section of DNA; that codes for a particular protein; (2)
7. The order of bases in a gene; (1)
8. Messenger; (1)
9. Three; (1)
10. Changes to the base sequence in DNA; (1)
11. Increase the frequency of mutations; (1)
12. In the nucleus; (1)
13. 23; (1)
14. **Two** from:

- growth of tissues/organs (NOT of cells);

- repair of tissues/organs (NOT of cells);

- sexual reproduction; (2)

15. Four; (1)

**Total 17 marks**

**Examination questions**

**Q1.**

(a)     (i)      Deoxyribose;

*pentose / 5C sugar = neutral*

**1**

(ii)     Phosphate / Phosphoric acid;

*phosphorus / P = neutral*

**1**

(b)     Hydrogen (bonds);

**1**

(c)     381 / 384 / 387;

**1**

(d)     (Gln) Met Met Arg Arg Arg Asn;

**1**

(e)     Change in (sequence of) amino acids / primary structure;

Change in hydrogen / ionic / disulfide bonds leads to change in tertiary structure / active site (of enzyme);

Substrate cannot bind / no enzyme-substrate complexes form;

***Q*** *Reject = different amino acids are formed*

**3**

**[8]**

**Q2.**

(a)     Translation.

**1**

(b)     Transfer RNA / tRNA.

**1**

(c)     TAC;

UAC.

**2**

(d)     Have different R group.

*Accept in diagram*

**1**

(e)     1.      Substitution would result in CCA / CCC / CCU;

2.      (All) code for same amino acid / proline;

3.      Deletion would cause frame shift / change in all following codons / change next codon from UAC to ACC.

**3**

**[8]Q3.**

(a)     (i)      Anaphase

**1**

(ii)     1.      Sister / identical chromatids / identical chromosomes;

*Reject: Homologous chromosomes separate.*

*Allow any reference to chromatids / chromosomes being identical e.g. same DNA*

2.      To (opposite) poles / ends / sides;

**2**

(b)     (i)      1.      8.4 / cells with twice DNA content = replicated DNA / late interphase / prophase / metaphase / anaphase;

*Any reference to interphase must suggest towards end of interphase.*

*'Chromosomes replicate' is not enough for DNA replicates.*

2.      4.2 = DNA not replicated / (early) interphase / telophase / cell just divided / finished mitosis;

**2**

(ii)     2.1;

**1**

**[6]**

**Total 22 marks**