4.2 Meiosis – *summary of mark schemes*

4.2.3	Outline the process of meiosis, including pairing of homologous chromosomes and crossing over, followed by two divisions, which results in four haploid cells. Mark Scheme A. two cell divisions / reduction-division / diploid to haploid / meiosis I and meiosis II; B. produce four (haploid) cells; C. for production of sex cells / gametes / spores; D. daughter cells are different from parent cells; E. chromosomes condense / coil / become shorter and fatter during prophase I; F. (homologous) chromosomes pair up in prophase I; G. crossing over / chiasmata formation in prophase I; H. movement of pairs of chromosomes / bivalents to the equator in metaphase I; I. movement of half of the chromosomes to each pole in anaphase I; J. (spindle fibres) pull homologous chromosomes to opposite poles; K. movement of chromatids to opposite poles in anaphase II; L. decondensation / uncoiling in telophase II; M. two haploid cells are formed; N. second division / like mitosis, separates chromatids to opposite poles;
4.2.4	Explain that non-disjunction can lead to changes in chromosome number, illustrated by reference to Down syndrome (trisomy 21). Mark Scheme A. in metaphase homologues in centre of cell / spindles attached; B. homologues are separating; C. one pair doesn't separate / non-disjunction; D. anaphase I / anaphase II; E. in telophase cells divide into two; F. cells have either one more / one less chromosome; G. can occur in second division of meiosis; H. sister chromatids fail to separate; I. two copies of chromosome 21 in gamete; J. fertilization with one gamete / sperm / egg carrying extra chromosome; K. Down's syndrome is trisomy of chromosome 21;