

4.

(a) RrTtDd. (Allow *Drosophila* convention to show genotype but *not* RTDrtD.) (1)

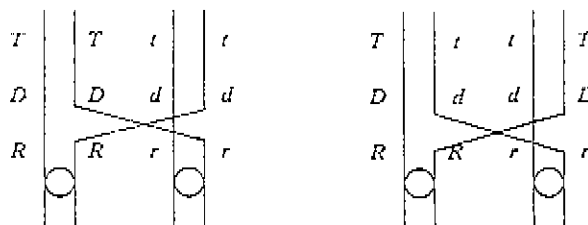
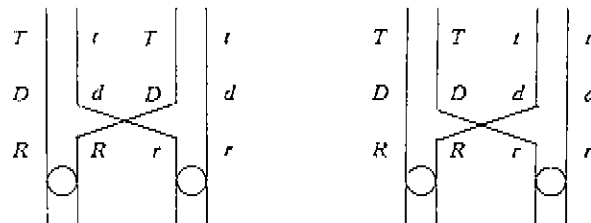
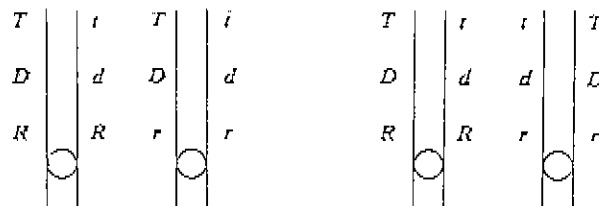
(b) (i) RRTTDD and RrTtDd. (If *three* genotypes are given, award only 1 mark.) (2)

(ii) 1:2:1. (1)

(c) Prophase I. (Not just "Prophase".) (1)

(d) Suitable representation of chiasma between genes D and R on two chromatids on separate chromosomes *or* the results of such a crossover; see diagrams below. (1)

(Do *not* penalise if candidates draw correctly the results of crossing over *and* a representation of where chiasma took place between the relevant two chromatids.)



(e) D/d marked on the chromosome 34 map units from the locus for the gene for stem colour.

T/t marked on the chromosome 38 map units from the locus for the gene for stem colour.

(Allow arrows positioned on the map unit ruler rather than the chromatid. Allow 1 mark for those candidates who know what they are doing but misalign on the diagram the marks for 34 and 38 by one map unit. Similarly, if the gene positions are given correctly but labels are reversed, award 1 mark. If the centromere is used as the reference point, rather than the locus for the stem colour gene, but gene positions are otherwise plotted correctly, award 1 mark.) (2)

(f) 4%. (1)

(9)