Homologous recombination: Points to consider

1. What is homologous recombination? What purpose9s) does it serve for an organism?
2. What is reciprocal transfer of information?
3. What is gene conversion?
4. During gene conversion, what possible configurations can the flanking markers assume?
5. What is the normal pattern of segregation of a marker M, m in a diploid during meiosis?
6. What are the abnormal patterns of segregation observed for a marker M, m during meiosis?
7. What is meant by 4: 4 aberrant segregation?
8. In 4:4 aberrant segregation, what phenotypes do the colonies formed from the four spores of a meiotic event in yeast display?
9. What is the nature of the eight spores of Ascobolus formed during a meiotic event in which a marker segregates in the 4:4 aberrant fashion?
10. What is the colony pattern formed by spores from a yeast meiotic event in which the marker of interest segregates 5:3?
11. What can you say about the Ascobolus spores formed by a meiotic event in which the marker of interest segregates 5:3?
12. When a marker segregates 6:2, what sort of colonies do you expect the four spores from a yeast meiotic event to produce?
13. Will there be sectored colonies when spores from a 6:2 yeast meiotic segregation event are allowed to germinate on a nutrient plate?
14. What is the pattern of spores formed by a 6:2 Ascobolus meiotic segregation event?
15. What is a Holliday junction?
16. What sort of heteroduplex is created in the Holliday junction model, symmetric or asymmetric?
17. When a Holliday junction branch migrates, will it generate symmetric or asymmetric heteroduplex?
18. Under what condition can a Holliday junction branch migrate? Under what condition will branch migration be blocked?
19. What mode of aberrant segregation is most readily explained by the Holiday model?
20. By incorporating mismatch correction, can you suitably modify the Holliday model to accommodate 5:3 and 6:2 segregation patterns?
21. What mode of aberrant segregation is most readily explained by the Meselson-Radding model?
22. What is the nature of the heteroduplex generated in the M-R model?
23. By mismatch correction, can you modify the M-R model to account for 6:2 segregation?
24. How will the M-R model accommodate 4:4 aberrant segregation?
25. What type of aberrant segregation does the double strand break repair (DSBR) model most easily explain?
26. How many Holliday junctions are formed according to the DSBR model?
27. Why is the double strand break repair model the most versatile of the three models for recombination?
28. How can one explain the cross-over or lack of cross-over of flanking markers in terms of the resolution of the Holliday junction intermediate?

29. For a double Holliday junction, how can you account for 50% probability for the cross-over of flanking markers?