Unit 4 - Week 2: Pedigree Analysis and Molecular Biology Tools

Week 2- Assignment

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-02-12, 23:59 IST.

1) Red-green color blindness is X-linked in humans. If a male is red-green color blind, and both parents have normal color vision, which of the male's grandparents is most likely to be the carrier? *1 point*

- Paternal grandparents
- Maternal grandparents
- Can be from either maternal or paternal grandparents
- Cannot be concluded from the data provided

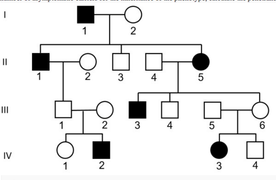
No, the answer is incorrect.
Score: 0
Accepted Answers:
Maternal grandparents

2) Non-allelic recombination can result in: *1 point*

- Genome evolution
- Gene duplication
- Disease
- All of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
All of these

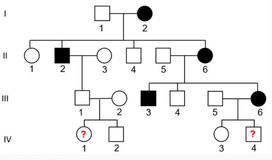
3) Shown here is a pedigree displaying an autosomal dominant phenotype with incomplete penetrance. By finding a minimum number of asymptomatic carriers for the inheritance of the phenotype, calculate the penetrance of this phenotype in this pedigree: *1 point*



- 75%
- 50%
- 25%
- 0%

No, the answer is incorrect.
Score: 0
Accepted Answers:
75%

4) The pedigree shown here is for a late-onset X-linked disorder. Review the pedigree and find the probability of individuals IV-1 and IV-4 (marked with "?") developing the disease. Assume here the probability of one of the X chromosome being inactive in a female is 50% (random inactivation). *1 point*



- IV-1: 50% and IV-4: 50%
- IV-1: 25% and IV-4: 75%
- IV-1: 0% and IV-4: 50%
- IV-1: 0% and IV-4: 100%

No, the answer is incorrect.
Score: 0
Accepted Answers:
IV-1: 0% and IV-4: 50%

5) A person with a hearing disability marries a woman with a hearing disability. Assume that the phenotype is autosomal dominant, that the defective gene is not the same in these two individuals, that the two genes are not located on the same chromosome, and that the mutant allele of the two genes complement each other. Given these, what is the probability that a child born to this couple would have a normal hearing ability? *1 point*

- 0%
- 25%
- 50%
- 100%

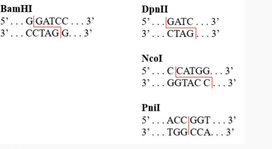
No, the answer is incorrect.
Score: 0
Accepted Answers:
50%

6) Which one of the following options is correct regarding the properties of a cDNA library? *1 point*

- Offers insight into the tissue-specific presence of genes
- Offers insight into the transcription factors regulating gene expression
- Offers insight into the exonic regions of the gene
- Offers insight into the size of the genome

No, the answer is incorrect.
Score: 0
Accepted Answers:
Offers insight into the exonic regions of the gene

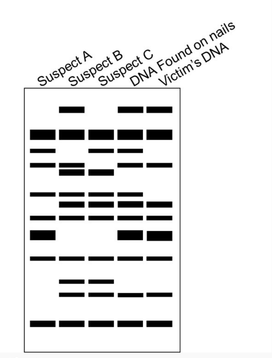
7) The image given here identifies four restriction enzymes, their recognition sequence, and their restriction sites. You have a DNA fragment resulting from a digestion with the enzyme BamHI and you wish to clone the fragment into a vector. Which one of the options given below is correct with regard to the choice of the enzyme for the proposed cloning? *1 point*



- DpnII
- NcoI
- PnlI
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers:
DpnII

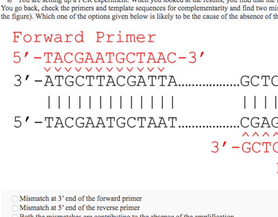
8) A person was found dead, with bodily injuries, in the parking lot of a night club. The police suspect a fight between the victim and another person leading to the loss of life of the victim. The police collected the blood spots present on the victim's nails and sent it for forensic examination by DNA fingerprinting. They identified three suspects and collected their blood samples also for checking whether any of the suspects' DNA profile matches the profile of the DNA sample found in the victim's nails. Based on the data given below identify the person who is likely to have committed the crime. *1 point*



- Suspect A
- Suspect B
- Suspect C
- None of them

No, the answer is incorrect.
Score: 0
Accepted Answers:
Suspect A

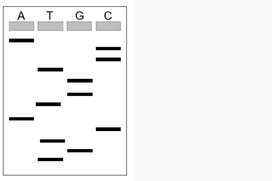
9) You are setting up a PCR experiment. When you looked at the results, you find that the PCR reaction fails to amplify any DNA. You go back, check the primers and template sequences for complementarity and find two mismatches in the primer-template pairs (as given in the figure). Which one of the options given below is likely to be the cause of the absence of the amplification? *1 point*



- Mismatch at 3' end of the forward primer
- Mismatch at 5' end of the reverse primer
- Both the mismatches are contributing to the absence of the amplification
- Insufficient information to troubleshoot the problem

No, the answer is incorrect.
Score: 0
Accepted Answers:
Mismatch at 3' end of the forward primer

10) The following schematic represents the DNA sequencing gel resulting from the Sanger method. What would be the exact sequence of the template DNA being sequenced? *1 point*



- 5'-ACC TGG TTC TGT-3'
- 5'-TGT CTT GGT CCA-3'
- 5'-TGG ACC ATG ACA-3'
- 5'-ACA GTA CCA GGT-3'

No, the answer is incorrect.
Score: 0
Accepted Answers:
5'-TGG ACC ATG ACA-3'