

**Supplement 2.** Pre-, mid-, and final-test questions. An asterisk (\*) indicates the correct answer.

Instructions to students: Please circle what you think are the correct answers below. One of the options is “I have no idea” - choose that option if it is most appropriate. Also, indicate on the sliding scale how confident you are about your answer (the higher the number the more confident you are).

1) What is the best way to determine the success of PCR?

- A. Chromatography
- B. Spectrophotometry
- C. Electrophoresis \*
- D. Microscopy
- E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1    2    3    4    5 (highest confidence)

2) Ligation is the \_\_\_\_\_.

- A. synthesizing of many copies of DNA
- B. joining together of DNA fragments \*
- C. cutting of DNA at specific locations
- D. the study of protein synthesis
- E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1    2    3    4    5 (highest confidence)

3) Restriction endonucleases are used to \_\_\_\_\_.

- A. cleave double-stranded DNA at specific locations \*
- B. enzymatically digest proteins
- C. combine different DNA fragments together
- D. dissolve the nuclear membrane
- E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1    2    3    4    5 (highest confidence)

- 4) Glyceraldehyde 3-Phosphate Dehydrogenase is involved in \_\_\_\_\_.
- A. the electron transport chain of photosynthesis
  - B. the electron transport chain of respiration
  - C. the Krebs's Cycle (Citric Acid Cycle)
  - D. Glycolysis \*
  - E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

- 5) Which of the following is **NOT** a characteristic of a typical cloning vector?
- A. contains one or more genes that are resistant to antibiotics
  - B. contains an 'origin of replication' for reproduction in the host cell
  - C. capable of accepting inserts that are much larger than the vector itself \*
  - D. contains a series of restriction sites known as the 'multiple cloning region'
  - E. I have no idea

Circle your confidence-level about your answer to this question:

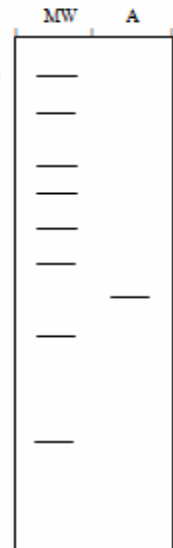
(lowest confidence) 1 2 3 4 5 (highest confidence)

**Use the gel on the right to answer questions #6-7.** There are 8 molecular weight markers (MW); they are 100, 200, 300, 400, 500, 600, 800, 1000 bp. The gel was loaded from the top.

- 6) Determine the size of the band in Lane A.
- A. 150 bp
  - B. 250 bp \*
  - C. 700 bp
  - D. 850 bp
  - E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)



- 7) During electrophoresis, DNA migrates towards the \_\_\_\_\_.
- A. positive electrode \*
  - B. negative electrode
  - C. electrolytic electrode
  - D. neutral electrode
  - E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

- 8) When cloning a gene, which of the following is **NOT** a use of electrophoresis?
- A. to estimate the molecular weight
  - B. to examine purity
  - C. to estimate quantity
  - D. to estimate transformation efficiency \*
  - E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

- 9) Which of the following series of steps is used when cloning a gene?
- A. DNA sequencing → Plasmid isolation → Transformation → Ligation → Plating → DNA isolation
  - B. DNA isolation → Ligation → Transformation → Plating → Plasmid isolation → DNA sequencing \*
  - C. Plasmid isolation → Transformation → Ligation → Plating → DNA isolation → DNA sequencing
  - D. DNA sequencing → DNA isolation → Ligation → Plasmid isolation → Transformation → Plating
  - E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

10) What of the following is **NOT** involved in the process of DNA sequencing by the Sanger Method?

- A. use of DNA primers
- B. use of DNA polymerase
- C. use of dideoxynucleotides
- D. use of restriction enzymes \*
- E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

11) The data from DNA sequencing reactions (using the Sanger Method) are most reliable at the \_\_\_\_\_.

- A) beginning of the sequence only
- B) middle of the sequence only \*
- C) end of the sequence only
- D) beginning and end of the sequence
- E) I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

12) Bioinformatics is **NOT** useful for the \_\_\_\_\_.

- A. identification of homologous sequences
- B. identification of intronic regions
- C. prediction of the amino acid sequences
- D. creation of transgenic organisms \*
- E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

- 13) When examining sequencing output, which of the following is **NOT** considered a characteristic of a “high quality base”?
- A. overlapping signals \*
  - B. intensity of the signal
  - C. unambiguous base identity
  - D. bases are evenly spaced
  - E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

- 14) When submitting a mRNA sequence to NCBI, which BLAST program should be used to predict the identity of its translated product?
- A. BLASTn using the ‘reference genomic sequences (refseq\_genomic)’ database
  - B. BLASTx using the ‘reference genomic sequences (refseq\_genomic)’ database
  - C. BLASTn using the ‘nonredundant protein sequences’
  - D. BLASTx using the ‘nonredundant protein sequences’ \*
  - E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

- 15) Applying the criteria that BLAST searches use, which of the following is the best match for this query:

- AAACTCACTTGATGGCAG
- A. AACTCACTTGAG
  - B. GAACCCACTTGATGACAT
  - C. AACTCACTTGATGGCTG \*
  - D. ACTGACTTAATGGAAG
  - E. I have no idea

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)

- 16) How comfortable do you feel managing DNA data files?

Circle your confidence-level about your answer to this question:

(lowest confidence) 1 2 3 4 5 (highest confidence)