Practice Exam for final

1. All of the following are components of the electron transport chain except \_\_\_\_\_\_.

A) Coenzyme Q

B) Succinate dehydrogenase

C) Coenzyme A

D) Cytochrome c

E) NADH dehydrogenase

1. During the oxidation of NADH there are several steps in which Eo’ is sufficient for ATP synthesis. These occur within

A) Complexes I, II, and III

B) Complexes I, III, and IV

C) Complexes II, III, and IV

D) Complexes III, IV, and V

E) Complexes I, II, and IV

1. The ultimate electron acceptor of the mitochondrial electron transport system is

A) Coenzyme Q

B) NADPH

C) O2

D) H2O

E) Both C and D are correct

1. The final product of oxidative phosphorylation is \_\_\_\_\_\_\_\_.

A) Water

B) ADP

C) NADPH

D) ATP

E) FMNH2

1. The function of complex III is the transfer of electrons from

A) Coenzyme Q to Cyt c

B) NADH to CoQ

C) Succinate to UQ

D) CoQ to NADH

E) UQ to succinate

1. The principal sources of electrons for the electron transport system is (are) which of the following

A) Glycolysis

B) Citric acid cycle

C) Fatty acid oxidation

D) Both A and B are correct

E) All of the above are correct

1. Which of the following statements about the mitochondrial inner membrane is (are) not true?

A) The inner membrane is permeable to CO2, H2O, and small ions.

B) The inner membrane contains about 75% protein.

C) The inner membrane contains many respiratory proteins.

D) The inner membrane is highly invaginated.

E) all of the above are true

1. The DNA “backbone” is composed of

A) An amide bond between deoxyribose and a nitrogenous base

B) A glycosidic bond between deoxyribose and a nitrogenous base

C) A phosphodiester bond between 3! and 5! hydroxyl groups of adjacent deoxyribose residues

D) A phosphodiester bond between 2! and 5! hydroxyl groups of adjacent deoxyribose residues

E) None of the above is correct

1. Protein synthesis is called

A) Translation

B) Transcription

C) Replication

D) A metabolome

E) Proteome

1. Determine the mRNA sequence for the following DNA sequence.

5’-GCCATTTCCCGTTA-3’

A) 5’-CGGTAAAGGGCAAT-3’

B) 5’-CGGUAAAGGGCAAU-3’

C) 5’-TAACGGCAAATGGC-3’

D) 5’-UAACGGCAAAUGGC-3’

E) 5’-UAACGGGAAAUGGC-3’

1. C
2. B
3. C
4. D
5. A
6. E
7. A
8. C
9. A
10. E

Short answer

What are Chargaff’s rules?

What are the three most prominent forms of RNA? What roles do they play in cell function?

Provide the complementary strand and the RNA transcription product for the following DNA template segment: 5’- AGGGGCCGTTATCGTT-3’

Write the net oxidation–reduction reaction based on the following half-reactions. In what direction does this reaction proceed?

εo′ = –0.315 V NAD+ + H+ + 2 *e*– ↔ NADH

εo′ = 0.815 V 1/2 O2 + 2 H+ + 2 *e*– ↔ H2O

Summarize the path of electron transfer among Complexes I, II, III, and IV, cytochrome *c*, and Coenzyme Q.

What is the binding change mechanism of ATP synthase?

The electron transport system consists of a series of oxidations rather than one reaction. Why is this an important feature of energy capture?

Diagram the path of electron flow from NADH to the final electron acceptor during electron transport in mitochondria. For each electron carrier, indicate whether only electrons, or both electrons and protons, are accepted/donated by that carrier. Indicate with an arrow where electrons from succinate oxidation enter the chain of carriers.