Question **1**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

25. Carotenoids are often found in foods that are considered to have antioxidant properties in human nutrition. What related function do they have in plants?



a.

They protect against oxidative damage (chlorophyll) from excessive light energy.



b.

They reflect orange light and enhance red light absorption by chlorophyll.



c.

They serve as accessory pigments to increase light absorption.



d.

They shield the sensitive chromosomes of the plant from harmful ultraviolet radiation.

Feedback

The correct answer is: They protect against oxidative damage (chlorophyll) from excessive light energy.

Question **2**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

12. If photosynthesizing green algae are provided with CO₂ synthesized with heavy oxygen (¹⁸O), later analysis will show that all but one of the following compounds produced by the algae contain the ¹⁸O label. That one is



a.

3-phosphoglycerate.



b.

ribulose bisphosphate (RuBP).



c.

glyceraldehyde 3-phosphate (G3P).



d.

O₂. (from H2O)

Feedback

The correct answer is: O₂. (from H2O)

Question **3**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

4. The presence of cholesterol in the plasma membranes of some animals



a.

makes the membrane less flexible, allowing it to sustain greater pressure from within the cell.



b.

enables the animal to add hydrogen atoms to unsaturated phospholipids.



c.

enables the animal to remove hydrogen atoms from saturated phospholipids.



d.

enables the membrane to stay fluid more easily when cell temperature drops.

Feedback

The correct answer is: enables the membrane to stay fluid more easily when cell temperature drops.

Question **4**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

21. Assume a thylakoid (granum) is somehow punctured so that the interior of the thylakoid is no longer separated from the stroma. This damage will have the most direct effect on which of the following processes?



a.

the synthesis of ATP



b.

the splitting of water



c.

the reduction of NADP⁺



d.

the flow of electrons from photosystem II to photosystem I



e.

the absorption of light energy by chlorophyll

Feedback

The correct answer is: the synthesis of ATP

Question **5**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

33. Fermentation is a complete degradation of sugars that occurs without O2.



a.

False



b.

True

Feedback

The correct answer is: False

Question **6**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

6. Which of the following is one of the ways that the membranes of winter wheat are able to remain fluid when it is extremely cold?



a.

by increasing the percentage of cholesterol molecules in the membrane



b.

by increasing the percentage of unsaturated phospholipids in the membrane



c.

by decreasing the number of hydrophobic proteins in the membrane



d.

by cotransport of glucose and hydrogen

Feedback

The correct answer is: by increasing the percentage of unsaturated phospholipids in the membrane

Question **7**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

7. In order for a protein to be an integral membrane protein it would have to be



a.

completely covered with phospholipids.



b.

hydrophilic.



c.

amphipathic, with at least one hydrophobic region.



d.

hydrophobic.

Feedback

The correct answer is: amphipathic, with at least one hydrophobic region.

Question **8**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

47. The electron transport chain is in the cristae of the mitochondrion.



a.

True



b.

False

Feedback

The correct answer is: True

Question **9**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

54. Antiport systems are usually ATPases



a.

True



b.

False

Feedback

The correct answer is: True

Question **10**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

41. Why is glycolysis described as having an investment phase and a payoff phase?



a.

It uses stored ATP and then forms a net increase in ATP.



b.

It both splits molecules and assembles molecules.



c.

It attaches and detaches phosphate groups.



d.

It uses glucose and generates pyruvate.

Feedback

The correct answer is: It uses stored ATP and then forms a net increase in ATP.

Question **11**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

8. Which of the following is a reasonable explanation for why unsaturated fatty acids help keep any membrane more fluid at lower temperatures?



a.

Unsaturated fatty acids have a higher cholesterol content and therefore more cholesterol in membranes.



b.

Unsaturated fatty acids are more polar than saturated fatty acids.



c.

The double bonds form kinks in the fatty acid tails, preventing adjacent lipids from packing tightly.

Feedback

The correct answer is: The double bonds form kinks in the fatty acid tails, preventing adjacent lipids from packing tightly.

Question **12**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

19. What are the products of linear photophosphorylation (noncyclic photopho… ?



a.

heat and fluorescence



b.

ATP and NADPH



c.

ATP and P700



d.

ADP and NADP

Feedback

The correct answer is: ATP and NADPH

Question **13**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

24. What is the relationship between wavelength of light and the quantity of energy per photon?



a.

They are inversely related.



b.

They are logarithmically related.



c.

They have a direct, linear relationship.



d.

They are separate phenomena.

Feedback

The correct answer is: They are inversely related.

Question **14**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

36. Cellular respiration includes both aerobic and anaerobic respiration but is often used to refer to aerobic respiration.



a.

True



b.

False

Feedback

The correct answer is: True

Question **15**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

13. Which of the following are products of the light reactions of photosynthesis that are utilized in the Calvin cycle?



a.

ATP and NADPH



b.

CO₂ and glucose



c.

ADP, Pi, and NADP⁺



d.

electrons and H⁺



e.

H₂O and O₂

Feedback

The correct answer is: ATP and NADPH

Question **16**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

30. In an experiment studying photosynthesis performed during the day, you provide a plant with radioactive carbon (¹⁴C) dioxide as a metabolic tracer. The ¹⁴C is incorporated first into oxaloacetate. The plant is best characterized as a



a.

heterotroph.



b.

C₃ plant.



c.

C₄ plant.



d.

CAM plant.

Feedback

The correct answer is: C₄ plant.

Question **17**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

52. Carrier proteins bind specific solutes, undergo changes of conformation during transport of solute.



a.

True



b.

False

Feedback

The correct answer is: True

Question **18**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

44. During aerobic respiration, electrons travel downhill in which sequence?



a.

food → citric acid cycle → ATP → NAD⁺



b.

food → NADH → electron transport chain → oxygen



c.

glucose → pyruvate → ATP → oxygen



d.

glucose → ATP → electron transport chain → NADH

Feedback

The correct answer is: food → NADH → electron transport chain → oxygen

Question **19**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

43. During cellular respiration, acetyl CoA accumulates in which location?



a.

mitochondrial intermembrane space



b.

mitochondrial matrix



c.

cytosol



d.

mitochondrial outer membrane



e.

mitochondrial inner membrane

Feedback

The correct answer is: mitochondrial matrix

Question **20**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

16. When oxygen is released as a result of photosynthesis, it is a direct by-product of



a.

the electron transfer system of photosystem I.



b.

splitting water molecules (H+, e, O2).



c.

Chemiosmosis.



d.

reducing NADP⁺.

Feedback

The correct answer is: splitting water molecules (H+, e, O2).

Question **21**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

10. The primary function of polysaccharides attached to the glycoproteins and glycolipids of animal cell membranes is



a.

to maintain membrane fluidity at low temperatures.



b.

to facilitate diffusion of molecules down their concentration gradients.



c.

to maintain the integrity of a fluid mosaic membrane.



d.

to actively transport molecules against their concentration gradients.



e.

to mediate cell-to-cell recognition.

Feedback

The correct answer is: to mediate cell-to-cell recognition.

Question **22**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

5. According to the fluid mosaic model of cell membranes, which of the following is a true statement about membrane phospholipids?



a.

They can move laterally along the plane of the membrane.



b.

They frequently flip-flop from one side of the membrane to the other.



c.

They are free to depart from the membrane and dissolve in the surrounding solution.



d.

They occur in an uninterrupted bilayer, with membrane proteins restricted to the surface of the membrane.

Feedback

The correct answer is: They can move laterally along the plane of the membrane.

Question **23**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

49. In alcohol fermentation, pyruvate is converted to ethanol in two steps, with the first releasing CO2



a.

False



b.

True

Feedback

The correct answer is: True

Question **24**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

2. Which of the following types of molecules are the major structural components of the cell membrane?



a.

phospholipids and cellulose



b.

phospholipids and proteins



c.

proteins and cellulose



d.

nucleic acids and proteins

Feedback

The correct answer is: phospholipids and proteins

Question **25**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

9. Which of the following is true of integral membrane proteins?



a.

They are loosely bound to the surface of the bilayer.



b.

They are usually transmembrane proteins.



c.

They are not mobile within the bilayer.



d.

They lack tertiary structure.

Feedback

The correct answer is: They are usually transmembrane proteins.

Question **26**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

48. About 32% of the energy in a glucose molecule is transferred to ATP during cellular respiration, making about 34 ATP



a.

False



b.

True

Feedback

The correct answer is: False

Question **27**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

14. Where does the Calvin cycle take place?



a.

outer membrane of the chloroplast



b.

stroma of the chloroplast



c.

thylakoid membrane



d.

cytoplasm surrounding the chloroplast

Feedback

The correct answer is: stroma of the chloroplast

Question **28**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

17. In the thylakoid membranes, what is the main role of the antenna pigment molecules?



a.

transfer electrons to ferredoxin and then NADPH.



b.

synthesize ATP from ADP and Pi.



c.

split water and release oxygen to the reaction-center chlorophyll.



d.

harvest photons and transfer light energy to the reaction-center chlorophyll.

Feedback

The correct answer is: harvest photons and transfer light energy to the reaction-center chlorophyll.

Question **29**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

38. Which of the following statements describes NAD⁺?



a.

NAD⁺ is oxidized by the action of hydrogenases.



b.

NAD⁺ has more chemical energy than NADH.



c.

In the absence of NAD⁺, glycolysis can still function.



d.

NAD⁺ is reduced to NADH during glycolysis, pyruvate oxidation, and the citric acid cycle.

Feedback

The correct answer is: NAD⁺ is reduced to NADH during glycolysis, pyruvate oxidation, and the citric acid cycle.

Question **30**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

28. Reactions that require CO₂ take place in



a.

the light reactions alone.



b.

neither light reactions nor Calvin cycle.



c.

both the light reactions and Calvin cycle.



d.

the Calvin cycle alone.

Feedback

The correct answer is: the Calvin cycle alone.

Question **31**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

26. Where do the enzymatic reactions of the Calvin cycle take place?



a.

matrix of the mitochondria



b.

stroma of the chloroplast



c.

cytosol around the chloroplast



d.

thylakoid membranes

Feedback

The correct answer is: stroma of the chloroplast

Question **32**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

29. Photorespiration occur during the daytime, whereas respiration (24/7) occurs during day and night



a.

False



b.

True

Feedback

The correct answer is: True

Question **33**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

23. Suppose the interior of the thylakoids of isolated chloroplasts were made acidic and then transferred in the dark to a pH 8 solution. What would be likely to happen?



a.

Cyclic photophosphorylation will occur.



b.

The Calvin cycle will be activated.



c.

The isolated chloroplasts will produce NADPH



d.

The isolated chloroplasts will make ATP.

Feedback

The correct answer is: The isolated chloroplasts will make ATP.

Question **34**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

11. Which of these are not embedded in the hydrophobic portion of the lipid bilayer at all?



a.

peripheral proteins



b.

integrins



c.

integral proteins



d.

transmembrane proteins

Feedback

The correct answer is: peripheral proteins

Question **35**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

46. Oxidation of Pyruvate to Acetyl CoA is catalyzed by:



a.

The Pyruvate oxidase complex



b.

The Pyruvate Deoxidase complex



c.

The Pyruvate Dehydrogenase complex



d.

The Pyruvate hydrogenase complex

Feedback

The correct answer is: The Pyruvate Dehydrogenase complex

Question **36**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

51. The most abundant lipids are phospholipids.



a.

False



b.

True

Feedback

The correct answer is: True

Question **37**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

42. The transport of pyruvate into mitochondria depends on the proton-motive force across the inner mitochondrial membrane. How does pyruvate enter the mitochondrion?



a.

active transport



b.

diffusion



c.

facilitated diffusion



d.

through a channel

Feedback

The correct answer is: active transport

Question **38**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

32. Animals that obtain energy by eating plants, are called



a.

Autotrophs



b.

Herbivorous



c.

Heterotrophs



d.

Two answers are correct

Feedback

The correct answer is: Two answers are correct

Question **39**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

53. Channel proteins bind solutes more weakly than carrier proteins form a pore across the membrane allowing specific solute to pass through.



a.

True



b.

False

Feedback

The correct answer is: True

Question **40**

Complete

Mark 0.00 out of 1.00

Flag question

Question text

31. Why multicellular organisms, such as humans, are made up of many small cells instead of one large cell?



a.

Smaller cells have more surface area for oxygen and nutrients to diffuse into the cytoplasm.



b.

One large cell would not be efficient at obtaining nutrients and oxygen from the environment.



c.

All of the above is correct



d.

Increasing the surface area to volume ratio of a cell is critical to increasing the interactions needed for life.

Feedback

The correct answer is: All of the above is correct

Question **41**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

37. The molecule that functions as the reducing agent (electron donor) in a redox or oxidation-reduction reaction



a.

loses electrons and gains potential energy.



b.

loses electrons and loses potential energy.



c.

gains electrons and gains potential energy.



d.

gains electrons and loses potential energy.

Feedback

The correct answer is: loses electrons and loses potential energy.

Question **42**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

15. In autotrophic bacteria, where are the enzymes located that can carry on carbon fixation (reduction of carbon dioxide to carbohydrate)? Stroma; Granum for light reaction



a.

in chloroplast membranes



b.

in chloroplast stroma



c.

in the cytosol



d.

in the infolded plasma membrane

Feedback

The correct answer is: in the cytosol

Question **43**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

27. What is the primary function of the Calvin cycle?



a.

use ATP to release carbon dioxide



b.

synthesize organic compounds (simple sugars (C-C-C) from CO2



c.

use NADPH to release carbon dioxide



d.

split water and release oxygen

Feedback

The correct answer is: synthesize organic compounds (simple sugars (C-C-C) from CO2

Question **44**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

39. Where does glycolysis take place in eukaryotic cells?



a.

mitochondrial matrix



b.

mitochondrial outer membrane



c.

cytosol

Feedback

The correct answer is: cytosol

Question **45**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

3. When biological membranes are frozen and then fractured, they tend to break along the middle of the bilayer. The best explanation for this is that



a.

hydrophilic interactions between the opposite membrane surfaces are destroyed on freezing.



b.

the hydrophobic interactions that hold the membrane together are weakest at this point.



c.

water that is present in the middle of the bilayer freezes and is easily fractured.



d.

the integral membrane proteins are not strong enough to hold the bilayer together.

Feedback

The correct answer is: the hydrophobic interactions that hold the membrane together are weakest at this point.

Question **46**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

50. Humans can make more than half of the 20 amino acids by modifying compounds siphoned away from citric acid cycle.



a.

True



b.

False

Feedback

The correct answer is: True

Question **47**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

40. Starting with one molecule of glucose, the energy-containing products of glycolysis are



a.

2 FADH₂, 2 pyruvate, and 4 ATP.



b.

2 NAD⁺, 2 pyruvate, and 2 ATP.



c.

2 NADH, 2 pyruvate, and 2 ATP.



d.

6 CO₂, 2 ATP, and 2 pyruvate.

Feedback

The correct answer is: 2 NADH, 2 pyruvate, and 2 ATP.

Question **48**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

22. What does the chemiosmotic process in chloroplasts involve?



a.

reduction of water to produce ATP energy.



b.

establishment of a proton gradient across the thylakoid membrane = ATP synthesis.



c.

diffusion of electrons through the thylakoid membrane.



d.

movement of water by osmosis into the thylakoid space from the stroma.



e.

formation of glucose, using carbon dioxide, NADPH, and ATP.

Feedback

The correct answer is: establishment of a proton gradient across the thylakoid membrane = ATP synthesis.

Question **49**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

34. What is the term for metabolic pathways that store energy by building up complex molecules?



a.

fermentation pathways



b.

anabolic pathways



c.

catabolic pathways

Feedback

The correct answer is: anabolic pathways

Question **50**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

20. As a research scientist, you measure the amount of ATP and NADPH consumed by the Calvin cycle in 1 hour. You find 30,000 molecules of ATP consumed, but only 20,000 molecules of NADPH. Where did the extra ATP molecules come from?



a.

photosystem I



b.

cyclic electron flow



c.

photosystem II



d.

linear electron flow

Feedback

The correct answer is: cyclic electron flow

Question **51**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

45. Where are the proteins of the electron transport chain located?



a.

mitochondrial intermembrane space



b.

mitochondrial matrix



c.

cytosol



d.

mitochondrial outer membrane



e.

mitochondrial inner membrane

Feedback

The correct answer is: mitochondrial inner membrane

Question **52**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

1. Singer and Nicolson's fluid mosaic model of the membrane proposed that



a.

membranes are a phospholipid bilayer between two layers of hydrophilic proteins.



b.

membranes are a single layer of phospholipids and proteins.



c.

membranes are a phospholipid bilayer.



d.

membranes consist of protein molecules embedded in a fluid bilayer of phospholipids.

Feedback

The correct answer is: membranes consist of protein molecules embedded in a fluid bilayer of phospholipids.

Question **53**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

35. What is the term for metabolic pathways that release stored energy by breaking down complex molecules?



a.

fermentation pathways



b.

catabolic pathways



c.

anabolic pathways

Feedback

The correct answer is: catabolic pathways

Question **54**

Complete

Mark 1.00 out of 1.00

Flag question

Question text

18. Which of the events listed below occurs in the light reactions of photosynthesis (NADP+ ----- NADPH, ADP ----- ATP)?



a.

ATP is phosphorylated to yield ADP.



b.

Carbon dioxide is incorporated into PGA.



c.

NADP is produced.



d.

Light is absorbed and funneled to reaction-center chlorophyll a.



e.

NADPH is reduced to NADP⁺.

Feedback

The correct answer is: Light is absorbed and funneled to reaction-center chlorophyll a.