

Biology 111**In-class Exam #2****Feb 28, 2011**

For each question or statement select the best answer or completion. Mark your selections on a scantron form using a pencil.

1. Cells are small but in general the cells of _____ are bigger than those of other organisms.
a) bacteria b) animals c) plants d) zebras e) horseshoe crabs
2. Cells are generally quite small probably because larger cells have problems with adequate membrane transport of nutrients and wastes. This seems to be because ...
a) large cells are slow.
b) potential energy converts to kinetic energy.
c) kinetic energy converts to potential energy.
d) as an object increases in size the ratio of its surface area to its volume decreases.
e) there is a tendency for large cells to collapse
3. The cell theory states that...
a) all cells come from pre-existing cells b) all living things are composed of cells
c) some living things are unicellular while others are composed of many cells
d) all of the above e) none of the above
4. The idea that living things were the product of spontaneous generation was rejected by the experiments of...
a) Charles Darwin b) Ernest Hemingway c) Neil Shubin d) Linus Pauling e) Louis Pasteur
5. All cells have at least three components including genetic material (in the form of DNA), cytoplasm, and
a) a cell membrane b) organelles c) granulooids d) fibrinoids e) cashews
6. According to the fluid mosaic model, cell membranes are composed primarily of _____ which, formed together in a bilayer two molecules thick, provide a hydrophobic boundary at the edge of cells.
a) oils and fats b) DNA molecules c) proteins d) phospholipids e) carbohydrates
7. According to the fluid mosaic model, cell membranes also contain _____ which functions primarily to permit transport of specific entities across the membrane.
a) oils and fats b) DNA molecules c) proteins d) phospholipids e) carbohydrates
8. In eukarote cells, the nucleus containing the DNA is surrounded by...
a) an hermetic seal b) a ribosome c) a membrane d) the nuclear envelope e) heavy water
9. Chromatin refers to ...
a) the contents of the nucleus b) rapidly dividing cells c) the products of the golgi
d) the contact point between nerve cells e) the morning exudate of plant cells
10. Within the nucleus, a region called the nucleolus is the site of
a) sound amplification b) detoxification c) DNA digestion
d) protein synthesis e) ribosome synthesis
11. Synthesis of proteins to be secreted or released from the cell occurs in the...
a) plastids b) mitochondria c) smooth endoplasmic reticulum
d) rough endoplasmic reticulum e) golgi

12. Membrane lipids are synthesized in the...
 a) plastids b) mitochondria c) smooth endoplasmic reticulum
 d) rough endoplasmic reticulum e) golgi
13. The functions of the golgi include:
 a) sort molecules b) chemically modify molecules c) package molecules for final destination
 d) a, b, and c e) a and c only
14. Excretion or release of large molecules (e.g. insulin) by cells is by means of a process called...
 a) myxomatosis b) halitosis c) cirrhosis d) exocytosis e) endocytosis
15. Type 1 diabetes is a form of autoimmune disease and occurs when the immune system mistakenly destroys islet cells in the ...
 a) brain b) stomach c) liver d) spleen e) pancreas
16. Insulin, released by islet cells, signals to other cells of the body to...
 a) take up glucose b) expel toxins c) initiate photosynthesis
 d) increase fluidity e) synthesize protein
17. Type 2 diabetes occurs when the various non-islet cells of the body become...
 a) unattached b) sinuous c) insensitive to insulin
 d) too heavy e) tremulous
18. Ribosomes function (in conjunction with mRNA and tRNA) in the synthesis of...
 a) proteins b) lipids c) carbohydrates d) DNA e) none of these
19. The mitochondria of cells function as the primary site of _____ synthesis in eukaryote cells.
 a) DNA b) RNA c) ATP d) GDP e) all of these
20. The so-called “aerobic metabolism” that occurs within mitochondria is so named because it has an absolute requirement for...
 a) ATP b) air c) oxygen d) CO₂ e) vigorous exercise
21. The plastid class of organelles includes...
 a) chromoplasts b) chloroplasts c) amyloplasts d) proplastids e) all of these
22. The endosymbiosis theory accounts for the existence of what two types of organelles within eukaryote cells?
 a) mitochondria and nuclei b) plastids and golgi c) nuclei and golgi
 d) golgi and mitochondria e) mitochondria and plastids
23. The space inside the chloroplast surrounding the thylakoids is called _____
 a) the nucleus b) the stroma c) the matrix d) the cytoplasm e) endoplasmic reticulum
24. A mitochondrion has how many membranes?
 a) none b) one c) two d) four e) at least six
25. The principle evidence supporting the endosymbiosis hypothesis includes that the _____ of these organelles is circular and prokaryote-like in other ways.
 a) DNA b) RNA c) ATP d) GDP e) all of these

26. The cytoskeleton is composed of
 a) microtubules b) microfilaments c) intermediate filaments d) a, b, and c e) a and b only
27. Which of the following are responsible for anchorage within cells?
 a) microtubules b) microfilaments c) intermediate filaments d) a, b, and c e) a and b only
28. Which of the following are responsible for movement within cells?
 a) microtubules b) microfilaments c) intermediate filaments d) a, b, and c e) a and b only
29. A pendulum set swinging within a vacuum and suspended by a frictionless hinge would...
 a) be steadily slowed by gravity b) be drawn to the walls of the container
 c) keep swing indefinitely d) would describe a circular arc
 e) both a and b
30. In pendulum set swing in air will steadily slow as consequence of ...
 a) Baumol's law b) Newton's first law c) Newton's second law
 d) the first law of thermodynamics e) the second law of thermodynamics
31. Snow melting on warm spring day (may they come soon!) is an example of a _____ process.
 a) exothermic b) endothermic c) exergonic d) endergonic e) both b and c
32. The second law of thermodynamics states that:
 a) entropy always increases b) entropy always decreases c) the total amount of energy everywhere is constant
 d) the total amount of energy everywhere increases e) the total energy everywhere and entropy always increase
33. Of importance to biological organisms, a molecule of ATP differs from a molecule of ADP in containing more...
 a) kinetic energy b) activation energy c) chemical potential energy
 d) positional potential energy e) either c or d
34. In any chemical reaction an input of so-called _____ is required to reach the transition state.
 a) kinetic energy b) activation energy c) chemical potential energy
 d) positional potential energy e) either c or d
35. Enzymes, like all catalysts, function by decreasing the _____ required by a reaction.
 a) kinetic energy b) activation energy c) chemical potential energy
 d) positional potential energy e) either c or d
36. Individual kinds of enzymes are typically highly specific in that they tend to ...
 a) have a long name b) catalyze just one reaction c) are always in very low concentration
 d) have a high turnover rate e) are generally typical of a single species
37. Reacting molecules in an enzyme catalyzed reaction are called...
 a) products b) fusers c) templates d) reactigons e) substrates
38. So called warm blooded animals, properly called _____, use considerable energy to maintain body temperature.
 a) benthic organisms b) pelagic organisms c) endotherms d) ectotherms e) none of these
39. So called cold blooded animals, properly called _____, use no energy to maintain body temperature.
 a) benthic organisms b) pelagic organisms c) endotherms d) ectotherms e) none of these

40. The principle importance of body temperature to biological organisms is due to the high temperature sensitivity of...
- a) digestion b) enzyme function c) DNA structure
d) membrane integrity e) ribosome fuction
41. The term to describe the unfolding of proteins that occurs in high temperatures is...
- a) denaturation b) thermosation c) excretion d) foundation e) perturbation
42. Some predatory fish (e.g. tuna and sharks) maintain high temperature necessary for sudden attacks by...
- a) absorbing heat in surface waters before hunting b) counter current blood flow in their gills
c) storing high concentrations of O₂ in their tissues d) black skin pigmentation
e) living only in tropical waters
43. So called coupled reactions are ones in which...
- a) the energy of an exothermic reaction provides the energy required by an endothermic reaction
b) the energy of an endothermic reaction provides the energy required by an exothermic reaction
c) the energy of an exergonic reaction provides the energy required by an exothermic reaction
d) the energy of an exergonic reaction provides the energy required by an endergonic reaction
e) the energy of an endergonic reaction provides the energy required by an exergonic reaction
44. The energy transferred between coupled reactions is usually provided by the hydrolysis of...
- a) DNA b) RNA c) ATP d) GDP e) all of these
45. In a coupled reaction, low energy molecules are typically made more energy rich through the addition of ...
- a) a steroid b) an amino c) an hydroxyl d) a carboxyl e) a phosphate
46. Metabolic pathways are typically highly regulated. One common form of regulation called _____ occurs when the end product of a series of reactions is capable of loosely binding to the active site of an enzyme functional early in the synthesis of this same molecule.
- a) allosteric regulation b) feed forward regulation c) feed forward inhibition
d) feedback inhibition e) allosteric feedback
47. Another form of enzyme regulation occurs when either an activator or inhibitor molecule binds to an enzyme somewhere other than at the active site resulting in altered enzyme activity. This is called...
- a) allosteric regulation b) feed forward regulation c) feed forward inhibition
d) feedback inhibition e) allosteric feedback
48. Movement of individual molecules in a gas or liquid _____
- a) is non-random b) is random c) is vibrational only d) is rare e) is impossible
49. The net movement of molecules or particles from regions of high concentration to regions of lower concentration in a fluid is called...
- a) random walk b) conflation c) diffusion d) electrophoresis e) distillation
50. Some entities can cross cell membranes relatively easily. These include water, small molecules, and...
- a) non-polar molecules b) polar molecules c) ions d) large molecules e) b, c, and d
51. Some entities cross cell membranes with difficulty. These include...
- a) non-polar molecules b) polar molecules c) ions d) large molecules e) b, c, and d

52. Some membrane transport proteins permit entities to cross the membrane down concentration and/or electrical gradients. This type of transport mechanism is referred to as...
- a) active transport
 - b) passive transport
 - c) exergonic transport
 - d) reflexive transport
 - e) deciduous transport
53. Some membrane transport proteins use metabolic energy to push or “pump” entities (ions) across the membrane against concentration and/or electrical gradients. This type of transport mechanism is referred to as...
- b) active transport
 - b) passive transport
 - c) exergonic transport
 - d) reflexive transport
 - e) deciduous transport
54. The sodium/potassium (Na^+/K^+) pump of animal cells...
- a) moves K^+ into the cell
 - b) moves Na^+ out of the cell
 - c) creates an electrical gradient by moving more Na^+ than K^+
 - d) both a and b
 - e) a, b, and c
55. You place a sugar solution inside a length of dialysis tubing and carefully seal the ends. You then place this artificial cell in a beaker of pure water. Over time...
- a) water will move into the “cell”
 - b) sugar will move out of the “cell”
 - c) water will move out of the cell
 - d) a and b
 - e) b and c
56. Osmosis is important to some aspects of human biology. These include...
- a) kidney function
 - b) movement of water from the stomach to the blood
 - c) perspiration
 - d) b and c
 - e) a, b, and c
57. In plants photosynthesis occurs exclusively in the...
- a) mitochondria
 - b) chloroplasts
 - c) endoplasmic reticulum
 - d) golgi
 - e) nuclei
58. In photosynthesis light energy is used to combine CO_2 and H_2O to form...
- a) DNA and RNA
 - b) protein and lipids
 - c) phospholipids and H_2O
 - d) steroids and nucleic acids
 - e) carbohydrate and O_2
59. Photosynthesis can be divided into two sets of reactions. In the first so-called _____ reactions the energy carrier molecules ATP and NADPH are synthesized.
- a) day
 - b) night
 - c) early
 - d) light independent
 - e) light dependent
60. In the subsequent so-called _____ reactions the energy carrier molecules ATP and NADPH are consumed.
- b) day
 - b) night
 - c) early
 - d) light independent
 - e) light dependent