**Biology Test #1**

**1.** What is the probablility of picking a black marble on the first try from a bottle of 100 black and 100 white marbles?  
 **a.** 1/100  
 **b.** 1/200  
 **c.** 1/2  
 **d.** 1/4  
 **e.** none of the above

**2.** What is the method for understanding nature from the Fundamentalist point of view? (That is, how does this point of view resolve conflicting perceptions of reality?)  
 **a.** from the object  
 **b.** from a written or oral text  
 **c.** from experimentation  
 **d.** from a person  
 **e.** from thinking

**3.** When do you use probability?  
 **a.** when you know all of the population  
 **b.** when you have a sample

**4.** What is the method for understanding nature from the Totemism point of view? (That is, how does this point of view resolve conflicting perceptions of reality?)  
 **a.** from the object  
 **b.** from a written or oral text  
 **c.** from experimentation  
 **d.** from a person  
 **e.** from thinking

**5.** What is the method for understanding nature from the Shamanism point of view?  
 **a.** from the object  
 **b.** from a written or oral text  
 **c.** from experimentation  
 **d.** from a person  
 **e.** from thinking

**6.** What is the probability of picking a black marble three times in a row (replacing the marble after each pick)? Refer to question #1.

**a.** 1/2  
 **b.** 1/3  
 **c.** 1/4  
 **d.** 1/6  
 **e.** 1/8

**7.** Which animism point of view in understanding nature is closest to the Science view? This view is “on stage”.)  
 **a.** totemism  
 **b.** inductive reasoning  
 **c.** scholasticism  
 **d.** fundamentalism  
 **e.** shamanism

**8.** What view is represented by a belief that the Constitution is a body of sacred rights and protections that should be the basis of any civilized society?  
 **a.** science  
 **b.** scholasticism  
 **c.** fundamentalism  
 **d.** totemism  
 **e.** shamanism

**9.** Most of the decisions in the modern world (business, government, and social institutions) are made with an emphasis on the method of science.  
 **a.** true  
 **b.** false

**10.** When do you use statistics?  
 **a.** when you know all of the population  
 **b.** when you have a sample

**11.** A scientific theory can be an idea that is not yet supported by any tested hypothesis.  
 **a.** true  
 **b.** false

**12.** The ideas of animism produce value for us only when they are experimentally tested as science does.  
 **a.** true  
 **b.** false

**13.** The ideas of science produce value for us only when they are experimentally tested.  
 **a.** true  
 **b.** false

**14.** Which kind of error is science most vulnerable to?  
 a. Type I  
 b. Type II

**15.** What is the null hypothesis?  
 **a.** Sample A does not equal Sample B  
 **b.** Sample A is greater than Sample B  
 **c.** Sample A is less than Sample B   
 **d.** Sample A equals Sample B  
 **e.** all of the above

**16.** The first person to see and name cells was looking at what kind of tissue?  
 **a.** skin  
 **b.** pond water  
 **c.** bone  
 **d.** cork  
 **e.** leaf cells

**17.** Which type of cell is the oldest?  
 **a.** prokaryotic  
 **b.** eukaryotic  
 **c.** both are about the same age

**18.** Which type of cell has a variety of internal organelles?  
 **a.** prokaryotic  
 **b.** eukaryotic  
 **c.** both are about the same internally

**19.** The organelle that converts food into cell energy, and is called the “powerhouse of the cell” because of this, is named the . . .  
 **a.** chloroplast  
 **b.** mitochondria  
 **c.** vacuole  
 **d.** nucleus  
 **e.** ribosome

**20.** Which is longer?  
 **a.** cilia  
 **b.** flagella  
 **c.** both are about equal in length

**21.** The large chamber in a plant cell that is filled with cell sap is called the . . .  
 **a.** mitochondria  
 **b.** chloroplast  
 **c.** nucleus  
 **d.** golgi body  
 **e.** vacuole

**22.** The movement of molecules from an area where they are in concentration to where those molecules are in concentration is called diffusion.  
 **a.** high, high  
 **b.** high, low  
 **c.** low, high  
 **d.** low, low

**23.** Plant cells produce a hard box outside of the cell membrane. It is called the cell wall and is made of . . .  
 **a.** protein  
 **b.** cellulose  
 **c.** fat  
 **d.** DNA  
 **e.** none of the above

**24.** Ribosomes are involved with the manufacture of . . .  
 **a.** DNA  
 **b.** sugar  
 **c.** fat  
 **d.** protein  
 **e.** none of the above

**25.** The organelle in plants that converts sunlight energy into food energy is called the . . .  
 **a.** ribosomes  
 **b.** mitochondria  
 **c.** nucleus  
 **d.** endoplasmic reticulum  
 **e.** none of the above

**26.** Which cell has a large relative surface area compared to its size?  
 **a.** small cell  
 **b.** large cell  
 **c.** small and large cell are about equal

**27.** Would we expect to find a 200-lb cell?   
 **a.** yes  
 **b.** no  
 **c.** we have no information that would help us to answer this question

**28.** A saturated fat has more (an element) than an unsaturated fat.  
 **a.** nitrogen  
 **b.** oxygen  
 **c.** carbon  
 **d.** hydrogen

**e.** iron

**29.** Consider the molecule C2NO2H5. How many different *elements* are there in that molecule?  
 **a.** 1  
 **b.** 2  
 **c.** 9  
 **d.** 10  
 **e.** none of the above

**30.** Consider the same molecule above. How many *atoms* are in that molecule?  
 **a.** 1  
 **b.** 2  
 **c.** 9  
 **d.** 10  
 **e.** none of the above

**31.** Proteins are made up of chains of smaller molecules called . . .  
 **a.** sugars  
 **b.** fatty acids  
 **c.** nucleotides  
 **d.** starch  
 **e.** none of the above

**32.** DNA is a . . .  
 **a.** nucleic acid  
 **b.** fatty acid  
 **c.** polypeptide  
 **d.** polysaccharide  
 **e.** none of the above

**33.** RNA is most similar to . . .  
 **a.** starch  
 **b.** protein  
 **c.** sugar  
 **d.** DNA  
 **e.** fat

**34.** What specific aspect of atom structure is most closely associated with the chemical bonding properties of an atom?  
 **a.** electron  
 **b.** proton  
 **c.** neutron  
 **d.** nucleus  
 **e.** graviton

**35.** The atomic mass of an atom is equal to the number of  
 a. protons only  
 b. protons and electrons  
 c. neutrons and protons  
 d. neutrons only  
 e. electrons only

**36.** In what way do enzymes change the speed of reactions?  
 **a.** reduce the energy of activation required to start the reaction  
 **b.** increase the amount of energy of activation required to start the reaction  
 **c.** they don’t change the speed

**37.** How versatile is the carbon atom in combining with other elements?  
 **a.** about the same as other elements  
 **b.** noticeably less than most other elements  
 **c.** much more than with almost all other elements

**38.** What is the probability of an absolutely certain event?  
 **a.** 0  
 **b.** 1

**39.** When molecules are moved from where they are in low concentration to where they are in higher concentration, this process is called  
 **a.** electrolysis  
 **b.** osmosis  
 **c.** plasmolysis  
 **d** diffusion  
 **e.** active transport

**40.** In order for an atom to become an ion, the atom must gain or lose  
 **a.** weight  
 **b.** hydrogen bonds  
 **c.** protons  
 **d.** neutrons  
 **e** electrons

**41.** The isotopes of an element differ primarily on their  
 **a.** chemical properties  
 **b.** number of electrons  
 **c.** atomic mass  
 **d.** enzyme properties  
 **e.** electronic charge

**42.** If there is a compound event that requires two independent events to happen together, then the probability of that compound event is calculated by  
 **a.** multiplying the probabilities of the two required events  
 **b.** adding the probabilities of the two required events  
 **c.** neither a or b

**43.** If there are two or more independent ways for an event to happen, then the probability of that event is calculated by  
 **a.** multiplying the probabilities of the two different ways  
 **b.** adding the probabilities of the two different ways  
 **c.** neither a or b

**44.** Which of the following are carbohydrates?  
 **a.** cellulose  
 **b.** starch  
 **c.** sugar  
 **d.** all of the above  
 **e.** none of the above

**45.** Which organelle is possible evidence of the endosymbiosis hypothesis?  
 **a.** mitochondria  
 **b.** lysosome  
 **c.** ribosome  
 **d.** cell membrane  
 **e.** cilia

**46.** Which Groups can normally form positive ions?  
 **a.** I  
 **b.** IV  
 **c.** V  
 **d.** VI  
 **e.** VIII

**47.** The null hypothesis is actually true, but the experimenter mistakenly concludes it is false. Which type of error does this represent?  
 **a.** Type I  
 **b.** Type II  
 **c.** both Type I and Type II

**48.** What is the atomic number for Calcium (Ca)?  
 **a.** 19  
 **b.** 20  
 **c.** 40  
 **d.** 60  
 **e**. none of the above

**49.** How many neutrons does Potassium (K) have?  
 **a.** 19  
 **b.** 20  
 **c.** 39  
 **d.** 58  
 **e.** none of the above

**50.** In a chemical reaction between a Group I and a Group VII element, what would be the ratio of the two elements in the molecule formed?  
 **a.** 1 : 1  
 **b.** 1 : 2  
 **c.** 2 : 1  
 **d.** 3 : 1  
 **e.** none of the above

**51.** What is the probability of a daughter being born first and then a son?  
 **a.** 1/2  
 **b.** 1/4  
 **c.** 1/8  
 **d.** 1/6  
 **e.** none of the above

**52.** Now, what is the probability of a family having both a boy and a girl (not specifying which is born first):  
 **a.** 1  
 **b.** 1/2  
 **c.** 1/4  
 **d.** 1/8  
 **e.** none of the above

**53.** Using the same approach as science, decide which is the “safest and most conservative” null hypothesis”  
 **a.** Defendant is assumed to be innocent, and the trial tries to prove him guilty.  
 **b.** Defendant is assumed to be guilty, and the trial tries to prove him innocent.

**54.** If you made a Type II error using hypothesis “a”, what would be the result?  
 **a.** Guilty man goes free  
 **b.** Innocent man goes to jail

**55.** If you made a Type II error using hypothesis “b”, what would be the result?  
 **a.** Guilty man goes free  
 **b.** Innocent man goes to jail

**56.** What is the atomic mass for lithium?  
 **a.** 3  
 **b.** 4  
 **c.** 7  
 **d.** 10  
 **e.** none of the above

**57.** What is the atomic number for nitrogen?  
 **a.** 7  
 **b.** 14  
 **c.** 21  
 **d.** 23  
 **e.** none of the above

**58.** What is the number of protons for helium (He)?  
 **a.** 0  
 **b.** 2  
 **c.** 4  
 **d.** 6  
 **e.** none of the above

**59.** What is the number of neutrons for carbon?  
 **a.** 0  
 **b.** 12  
 **c.** 18  
 **d.** 7  
 **e.** none of the above

**60.** What is the number of neutrons for fluorine?  
 **a.** 0  
 **b.** 9  
 **c.** 19  
 **d.** 28  
 **e.** none of the above

**61.** What is the number of electrons for lithium?  
 **a.** 0  
 **b.** 3  
 **c.** 7  
 **d.** 10  
 **e.** none of the above

**62.** What is the number of electrons for sodium (Na)?  
 **a.** 0  
 **b.** 11  
 **c.** 12  
 **d.** 23

**e.** none of the above

**63.** Does sodium (Na) attract of release electrons during a chemical reaction?  
 **a.** attracts  
 **b.** releases  
 **c.** sodium is inert

**64.** Which of the following accepts electrons during a reaction (can form negative ion)?  
 **a.** group I  
 **b.** hydrogen  
 **c.** calcium (Ca)  
 **d.** all of the above  
 **e.** none of the above

**65.** How many oxygen atoms will react with 2 hydrogen and 1 sulfur to form sulfuric acid?  
 **a.** 1  
 **b.** 2  
 **c.** 3  
 **d.** 4  
 **e.** 6

**66.** How many chlorine atoms will react with 1 magnesium to form magnesium chloride?  
 **a.** 1  
 **b.** 2  
 **c.** 2 : 1  
 **d.** 4  
 **e.** none of the above

**Biology Test #2**

**1.** When science correctly describes a process in Nature differently than intuition does, that process is called  
**a.** rational  
**b.** animism  
**c.** intuitive  
**d.** non-deducible  
**e.** counter-intuitive

**2.** Which choice did most students make?  
 **a.** Button A and C  
 **b.** Button A and D  
 **c.** Button B and C  
 **d.** Button B and D

**3.** Which choices are the overall winning strategies in life?  
 **a.** Button A and C  
 **b.** Button A and D  
 **c.** Button B and C  
 **d.** Button B and D

**4.** In our discussion about human decision-making, we found that you play it \_\_\_\_\_\_ when facing a no-

lose situation.  
 **a.** safe  
 **b.** risky

**5.** We also found that you play it \_\_\_\_\_\_ when both choices are losing situations.  
 **a.** safe  
 **b.** risky

**6.** Which choices were risky?  
 **a.** Button A and B  
 **b.** Button A and C  
 **c.** Button A and D  
 **d.** Button B and C

**e.** Button B and D

**7.** Relying upon or derived from observation or experiment is called  
 **a.** rational  
 **b.** intuitive  
 **c.** animism  
 **d.** empirical  
 **e.** non-deducible

**8.** The rotation of the Earth is an example of one of the\_\_\_\_\_\_ processes in nature.  
 **a.** intuitive  
 **b.** counter-intuitive

**9.** An intuitive answer to explaining night and day on this planet is that the sun revolves around the earth.  
 **a.** yes  
 **b.** no

**10.** A counter-intuitive answer to explaining night and day on this planet is that the sun revolves around the

earth.  
 **a.** yes  
 **b.** no

**11.** Which statements represent the results when researchers studied decisions made by groups during

problem solving?

**a.** The test groups were unaware that they had violated their own criteria.  
 **b.** The test groups randomly chose between yes and no when they violated their own criteria.

**c.** All groups developed solutions that included violations of their original decision-

making criteria.

**d.** all of the above  
 **e.** none of the above

**12.** When people are confronted with the empirical truth that their intuitive solution to a problem is

incorrect, their feelings change regarding their original proposal, and they fairly easily give up on that

first solution.  
 **a.** yes  
 **b.** no

**13.** The general feeling of “knowing that you are right” causes most problems in \_\_\_?  
 **a.** intuitive processes in nature  
 **b.** counter-intuitive processes in nature  
 **c**. neither intuitive nor counter-intuitive processes

**14.** Which cell organelle is specialized for doing photosynthesis?  
 **a.** mitochondria  
 **b.** chloroplast  
 **c.** both mitochondria and chloroplast  
 **d.** cell wall  
 **e.** ribosome

**15.** What is the general equation for respiration?  
 **a.** sugar + O2 —> CO2 + H2O  
 **b.** sugar + CO2 —> O2 + H2O  
 **c.** H2O + CO2 —> O2  
 **d.** sugar + CO2 + O2 + H2O —> ATP  
 **e.** sugar + CO2 + O2 —> lactic acid

**16.** Which do respiration?  
 **a.** animals only  
 **b.** plants only  
 **c.** both plants and animals  
 **d.** prokaryotes only  
 **e.** eukaryotes only

**17.** Aerobic respiration occurs inside of which cell organelle?  
 **a.** endoplasmic reticulum  
 **b.** nucleus  
 **c.** chloroplast  
 **d.** mitochondria  
 **e.** grana

**18.** What is the general equation for photosynthesis?  
 **a.** CO2 + H2O —> O2 + sugar  
 **b.** CO2 + O2 —> H2O + sugar  
 **c.** sugar + CO2 —> O2 + H2O  
 **d.** O2 + H2O —> CO2 + sugar  
 **e.** sugar + O2 —> CO2 + H2O

**19.** Why don’t plants use energy waves shorter than visible light (ultra-violet)?  
 **a.** not enough energy  
 **b.** too much energy  
 **c.** they do use mostly shorter than visible light  
 **d.** the rain absorbs these waves  
 **e.** there are no energy waves shorter than visible light

**20.** Plants are green. This clue suggests that they are actually using green light.  
 **a.** yes  
 **b.** no

**21.** An unknown “thing” is giving off heat. Which statement do we know to be true about this system?  
 **a.** light is involved  
 **b.** energy is decreasing  
 **c.** energy is increasing  
 **d.** energy is changing form  
 **e.** energy is not involved

**22.** If an animal takes in more food energy than it releases during a day, then we know that the animal will

gain weight.  
 **a.** yes  
 **b.** no

***Someone has discovered that there is a 50% transfer of energy from food energy into ATP energy, and a 25% transfer of the ATP energy into muscle work. Assume that you have just unloaded a truckload of bricks and that work represents a certain amount of energy. Answer the following three questions:***

**23.** We know that there was more energy in ATP than actual work done.  
 **a.** yes  
 **b.** no

**24.** We know for sure that heat was given off during the process.  
 **a.** yes  
 **b.** no

**25.** We know that the amount of ATP energy is equal to or greater than the food energy.  
 **a.** yes  
 **b.** no

***Assuming that 50,000 units of sun energy shines on an area of plants, answer the next five questions.***

**26.** How many units of plant growth would we expect?  
 **a.** 500,000  
 **b.** 50,000  
 **c.** 5,000  
 **d.** 500  
 **e.** 50

**27.** How many plant-eating animals (herbivores) would we expect?  
 **a.** 50  
 **b.** 500  
 **c.** 5,000  
 **d.** 50,000  
 **e.** the same as the carnivores

**28.** How many first-level carnivores would we expect?  
 **a.** same as herbivores  
 **b.** same as the heat given off  
 **c.** 10% of the herbivores  
 **d.** 90% of the herbivores  
 **e.** none of the above

**29.** How many second-level carnivores would we expect?  
 **a.** 5,000  
 **b.** 500  
 **c.** 50  
 **d.** 5  
 **e.** 0.5

**30.** How much heat would be given off between the plants and the herbivores?  
 **a.** 0% of plants  
 **b.** 10% of plants  
 **c.** 50% of plants  
 **d.** 90% of plants  
 **e.** 100% of plants

***Assume for the next two questions that it takes 200 kg of* cow meat *energy to keep you alive for a year. Assume also that plant material has approximately 40% of the food value as an equal weight of cow meat.***

**31.** How much plant was fed to the cow in order to make your year’s requirement of meat?  
 **a.** 20 kg  
 **b.** 320 kg  
 **c.** 500 kg  
 **d.** 2,000 kg  
 **e.** 8,000 kg

**32.** If you ate only plants instead of meat, how much plant material would you have to eat to keep alive for a

year?  
 **a.** 80 kg  
 **b.** 200 kg  
 **c.** 320 kg  
 **d.** 500 kg  
 **e.** 2,000 kg

**33.** Visible light is a part of the electromagnetic spectrum.  
 **a.** small  
 **b.** large

**34.** The first law of thermodynamics states that the amount of energy in a closed system \_\_\_.

1. usually increases
2. always increases
3. usually decreases
4. always decreases
5. does not change

**35.** The second law of thermodynamics states that whenever energy is transformed from one form into

another form of energy \_\_\_.

**a.** Heat energy is usually produced

**b.** Heat energy is always produced

**c.** Heat energy is never produced

**36.** What does the word *aerobic* mean in aerobic respiration?  
 **a.** CO2 present  
 **b.** CO2 gone  
 **c.** O2 present  
 **d.** O2 gone  
 **e.** sugar gone

**37.** What chemical collects in muscles when anaerobic respiration happens in humans?  
 **a.** nucleotides  
 **b.** O2  
 **c.** CO2  
 **d.** amino acid  
 **e.** lactic acid

**38.** Urea is one of the substances that gives urine its characteristic smell. Urea in the urine means that you

have been metabolizing …  
 **a.** complex carbohydrates  
 **b.** simple carbohydrates  
 **c.** saturated fats  
 **d.** unsaturated fats  
 **e.** protein

**39.** Which nutrient provides the most ATP energy per molecule metabolized?  
 **a.** carbohydrate  
 **b.** nucleic acid  
 **c.** protein  
 **d.** fat  
 **e.** fiber

**40.** The energy captured in ATP during the breakdown of food molecules comes from the \_\_\_\_\_\_\_\_ of the

food molecule.  
 **a.** protons  
 **b.** neutrons  
 **c.** phosphate  
 **d.** heat  
 **e.** electrons

**41.** Which cells evolved first?  
 **a.** eukaryotic  
 **b.** prokaryotic  
 **c.** both evolved at the same time

**42.** Which cells have mitochondria?  
 **a.** eukaryotic  
 **b.** prokaryotic

**43.** How many molecules of ATP are generated during the *anaerobic* metabolism of one sugar molecule?  
 **a.** 0  
 **b.** 2  
 **c.** 36  
 **d.** 64  
 **e.** many hundreds

**44.** How many molecules of ATP are generated during the *aerobic* metabolism of one sugar molecule?  
 **a.** 0  
 **b.** 2  
 **c.** 36  
 **d.** 64  
 **e.** many hundreds

**45.** Which has more electron energy?  
 **a.** CO2  
 **b.** C6H12O6  
 **c.** both of the above are equal

**46.** Which has the most energy?  
 **a.** ATP  
 **b.** ADP  
 **c.** ATP and ADP have the same amount of energy

**47.** During the history of this planet, which has been happening faster?  
 **a.** respiration  
 **b.** photosynthesis  
 **c.** both have been happening at the same rate

**48.** Which of the following provides the most convincing evidence for the previous question?  
 **a.** mitochondria  
 **b.** chloroplasts  
 **c.** heat  
 **d.** carbon dioxide  
 **e.** coal

**49.** The weight of air in a sealed jar containing a live mouse will…  
 **a.** get lighter  
 **b.** get heavier  
 **c.** not change

**50.** The weight of air in a sealed jar containing a live plant (exposed to sunlight) will…  
 **a.** get heavier  
 **b.** get lighter  
 **c.** not change

**51.** What is in the grana?  
 **a.** DNA  
 **b.** ATP  
 **c.** cellulose  
 **d.** lysosomes  
 **e.** chlorophyll

**52.** Which wavelengths of the electromagnetic spectrum have the most energy?  
 **a.** short waves  
 **b.** long waves  
 **c.** all waves have the same amount of energy

**53.** Which primary color *do you not see* when looking at a plant?  
 **a.** green  
 **b.** yellow  
 **c.** red

**54.** Which color is on the long side (short wave) of the rainbow?  
 **a.** green  
 **b.** yellow  
 **c.** red  
 **d.** blue

**e.** violet

**55.** When radioactive isotopes of oxygen atoms are put into sugar molecules and the animal is monitored during respiration, only the CO2 given off is radioactive. Where does the O2 go that you breathe into your body?  
 **a.** becomes new chlorophyll  
 **b.** turned into light energy  
 **c.** becomes part of water  
 **d.** becomes non-matter  
 **e.** becomes part of CO2

**56.** Respiration is the opposite of  
 **a.** nucleogenesis  
 **b.** protein synthesis  
 **c.** lipolysis  
 **d.** inhalation  
 **e.** photosynthesis

**57.** Which must have evolved first?  
 **a.** animals that required oxygen  
 **b.** photosynthesis

**58.** Where does some of the weight of the mouse go during respiration?  
 **a.** it doesn’t change  
 **b.** it actually increases  
 **c.** becomes ATP  
 **d.** becomes O2  
 **e.** becomes water

**59.** A plant in your house begins to lose weight.  
 **a.** photosynthesis is greater than respiration  
 **b.** photosynthesis is less than respiration  
 **c.** photosynthesis equals respiration

**60.** ATP carries what kind of energy?  
 **a.** heat energy  
 **b.** light  
 **c.** oxygen  
 **d.** electron  
 **e.** CO2

**61.** In our discussions of photosynthesis and respiration, which substance was referred to as heavy air?  
 **a.** sugar  
 **b.** water

1. carbon dioxide
2. oxygen
3. none of the above

**62.** The total amount of energy in a system (example: wind energy being converted into electrical energy)

\_\_\_\_\_ . (This is the first law of thermodynamics.)  
 **a.** stays the same  
 **b.** increases  
 **c.** decreases

**63.** What is the % energy conversion efficiency from sunlight energy to plant energy?  
 **a.** 0  
 **b.** 1  
 **c.** 10  
 **d.** 25  
 **e.** 50

**64.** What is the % energy conversion efficiency at all of the other energy transfers between food levels

following the plants?  
 **a.** 0  
 **b.** 1  
 **c.** 10  
 **d.** 25  
 **e.** 50

**65.** During photosynthesis the light energy is first converted into what kind of energy?  
 **a.** water  
 **b.** nuclear  
 **c.** starch  
 **d.** electron  
 **e.** sugar

**66.** During the second part of the photosynthesis reactions what is produced?  
 **a.** water  
 **b.** nuclear  
 **c.** DNA  
 **d.** electron  
 **e.** sugar

**Biology 100 TEST # 3**

**1.** The view that life is the result of, and is subject to, the same laws of the universe as any other

Physical entity is called

**a.** animism  
 **b.** vitalism  
 **c.** conceptualism  
 **d.** fundamentalism  
 **e.** mechanism

**2**. What is the best estimate of how long ago since the universe began to expand?  
 **a.** 15 billion years  
 **b.** 4 billion years  
 **c.** 1 billion years  
 **d.** 500 million years  
 **e.** 100 million years

**3.** Which environment would be better for the evolution of first life from non-living molecules?  
 **a.** a lot of oxygen  
 **b.** no oxygen   
 **c.** no hydrogen  
 **d.** a lot of nitrogen  
 **e.** a lot of helium and argon

**4.** How old are the oldest fossils?  
 **a.** 100 million years  
 **b.** 1 billion years  
 **c.** 2 billion years  
 **d.** 4 billion years  
 **e.** 10 billion years

**5.** What new gas was added to the atmosphere after the evolution of stromatolites (those strange rock-like

formations produced by blue-green bacteria)?

**a.** hydrogen  
 **b.** carbon dioxide  
 **c.** ammonia  
 **d.** methane  
 **e.** oxygen

**6.** Which cell type is the oldest?  
 **a.** prokaryotic  
 **b.** eukaryotic  
 **c.** both are about the same age

**7.** Which cell organelles are circumstantial evidence for the symbiosis theory for the evolution of the first

eukaryotic cells?

**a.** golgi and endoplasmic membranes  
 **b.** cell membranes  
 **c.** ribosomes and lysosomes  
 **d.** mitochondria and chloroplasts  
 **e.** flagella and cilia

**8.** Which two gases are the most common in our atmosphere today?  
 **a.** methane and oxygen  
 **b.** oxygen and nitrogen  
 **c.** hydrogen and oxygen  
 **d.** oxygen and carbon dioxide  
 **e.** carbon dioxide and nitrogen

**9.** In the 1950s, Stanley Miller found that the gases of the early atmosphere could react spontaneously with

each other in the lab to form

**a.** starch  
 **b.** DNA  
 **c.** vitamins  
 **d.** amino acids  
 **e.** cells

**10.** Although a variety of energy sources have been used in experiments like Miller’s, what energy source

was the one actually used in his first experiments (your book discussed this)?

**a.** heat  
 **b.** electricity  
 **c.** ultraviolet light  
 **d.** nuclear energy  
 **e.** ATP energy

**11.** Later, another scientist, Sidney Fox, performed an experiment using the product molecules of Miller’s

experiment. He duplicated the most likely conditions on the early Earth. What kind of molecules

formed during his experiment?  
**a.** starch  
**b.** proteins  
**c.** vitamins  
**d.** living cells  
**e.** viruses

**12.** What was the source of energy for Fox’s experiment?  
 **a.** heat  
 **b.** electricity  
 **c.** UV light  
 **d.** nuclear energy  
 **e.** ATP energy

**13.** The book discusses structures like “coacervate droplets,” “liposomes,” and “microspheres” which we

will call microspheres in this class. Do these structures require a “life force” in order to form? (Life

force means something that is already alive.)  
**a.** yes  
**b.** no

**14.** The weakness of the current use of microspheres as a model of early life is that microspheres cannot

exist for longer than a couple of seconds, they can’t grow, and they can’t reproduce.  
**a.** true  
**b.** false

**15.** Which method would be best for manufacturing a human protein (like insulin or human growth

hormone)?  
**a.** gel electrophoresis  
**b.** radioactive probe  
**c.** Krebs cycle  
**d.** recombinant DNA  
**e.** restriction enzymes

**16.** What kind of cell is commonly used as a “host” organism for receiving a new gene from a donor

organism? (Human growth hormone is made this way.)  
**a.** red blood cells  
**b.** sperm cells  
**c.** onion cells  
**d.** human embryo cells  
**e.** bacteria

**17.** What is the name of the DNA fingerprinting technique that starts with a very small sample of DNA and

replicates thousands of copies of that DNA?  
**a.** gel electrophoresis  
**b.** recombinant DNA  
**c.** radioactive probes  
**d.** PCR  
**e.** restriction enzymes

**18.** Which method would be best for cutting up DNA at very specific places along the DNA?  
 **a.** gel electrophoresis  
 **b.** radioactive probe  
 **c.** Krebs cycle  
 **d.** recombinant DNA  
 **e.** restriction enzymes

**19.** Which method would be the best for separating various pieces of DNA that have been cut up by the

method in the previous question?

**a.** gel electrophoresis  
**b.** radioactive probe  
**c.** Krebs cycle  
**d.** recombinant DNA  
**e.** restriction enzymes

**20.** How certain can we be when using “DNA Fingerprinting” in a criminal case?

**a.** It is easier to prove someone absolutely innocent than proving them absolutely guilty.

**b.** It is easier to prove someone absolutely guilty than proving them absolutely innocent.

**21.** When a specifically “tagged” molecule has been designed to bind with a specific sequence of

nucleotides in the DNA, this process is called

**a.** gel electrophoresis  
**b.** recombinant DNA  
**c.** RNA attraction  
**d.** restriction enzyme  
**e.** radioactive probe

**22.** What is the general shape of the DNA molecule?

**a.** a ball  
 **b.** a spiral (helix)  
 **c.** a flat sheet  
 **d.** a box  
 **e.** like a nucleoma

**23.** How many different kinds of nucleotides are there in DNA?  
 **a.** 1  
 **b.** 2  
 **c.** 4  
 **d.** 20  
 **e.** almost infinite

**24.** Adenine pairs with . . .  
 **a.** adenine  
 **b.** proline  
 **c.** nulceotine  
 **d.** guanine  
 **e.** thymine

**25.** Cytosine pairs with  
 **a.** adenine  
 **b.** uracil  
 **c.** basine  
 **d.** guanine  
 **e.** thymine

**26.** The gene is copied by   
 **a.** several other genes  
 **b.** tRNA  
 **c.** mRNA  
 **d.** protein  
 **e.** the codon

**27.** How many nucleotides in one codon  
 **a.** 1  
 **b.** 2  
 **c.** 3  
 **d.** 4  
 **e.** 20

**28.** The codon is responsible for lining up a specific   
 **a.** RNA  
 **b.** DNA  
 **c.** fatty acid  
 **d.** amino acid  
 **e.** nucleotide

**29.** How many different kinds of protein are made by one gene?  
 **a.** 1  
 **b.** 4  
 **c.** 20  
 **d.** nearly 100  
 **e.** almost infinite

**30.** How many different amino acids are there in your molecular protein structure?  
 **a.** 1  
 **b.** 4  
 **c.** 20  
 **d.** nearly 100  
 **e.** almost infinite

**31.** If a nucleotide in a codon was changed by mutation, then what would happen?  
 **a.** nothing  
 **b.** RNA would not replicate  
 **c.** one entire protein would have totally different amino acids  
 **d.** one amino acid would be changed  
 **e.** DNA would not replicate

**32.** If the sequence of nucleotides in one chain of DNA is TATGAC, then what would be the sequence on

the opposite chain?  
 **a.** CGCATG  
 **b.** TATGAC  
 **c.** CTCACG  
 **d.** ATACTG  
 **e.** CACCAG

**33.** Where are the proteins assembled?  
 **a.** mitochondria  
 **b.** ribosome  
 **c.** chloroplast  
 **d.** nucleus  
 **e.** nucleolus

**34.** What kind of RNA carries amino acids to the protein assembly site?  
 **a.** endoplasmic  
 **b.** messenger RNA  
 **c.** ribosome RNA  
 **d.** DNA  
 **e.** transfer RNA

**35.** The gene is a portion of the molecule.  
 **a.** tRNA  
 **b.** mRNA  
 **c.** ribosomal RNA  
 **d.** DNA  
 **e.** protein

**36.** A string of amino acids hooked together is called a . . .  
 **a.** protein  
 **b.** nucleotide  
 **c.** lipid  
 **d.** polysaccharide  
 **e.** nucleic acid

**37.** Where are tRNA and mRNA made?  
 **a.** mitochondria  
 **b.** endoplasmic reticulum  
 **c.** centriole  
 **d.** nucleus  
 **e.** ribosome

**38.** Is there only one direction of change during evolution?.  
 **a.** yes  
 **b.** no

**39.** The height of a person and the color of skin are examples of.  
 **a.** single-gene traits  
 **b.** multiple-gene traits  
 **c.** non-genetic traits

**40.** Are all your genes “on” in all of your cells at the same time?  
 **a.** yes  
 **b.** no

**41.** Evolution is defined as the change in the frequency of alleles (variations of a gene) in a population.  
 **a.** yes  
 **b.** no

**42.** Sexual reproduction works best when the environment is . . .  
 **a.** unchanging  
 **b.** changing

**43.** During *mitosis* in humans, a cell starts with set(s) of chromosomes and ends up with

set(s) in each cell.  
 **a.** 1, 2  
 **b.** 1, 1  
 **c.** 2, 2  
 **d.** 2, 1  
 **e.** 0, 1

**44.** In summary, we say that two cells fused together during fertilization to make a

cell (you).  
 **a.** haploid, haploid  
 **b.** diploid, diploid  
 **c.** diploid, haploid  
 **d.** haploid, diploid  
 **e.** zygote, gamete

**45.** How many chromosomes does a normal human cell have?  
 **a.** 16  
 **b.** 23  
 **c.** 43  
 **d.** 46  
 **e.** 92

**46.** Describe the appearance of chromosomes at the beginning of mitosis.  
 **a.** as singles  
 **b.** as doubles  
 **c.** as fours (tetrads)  
 **d.** as clusters of 5–10  
 **e.** as clusters of 23

**47.** During *meiosis* a cell starts with set(s) of chromosomes and ends with sets in the

gamete.  
 **a.** 1, 2  
 **b.** 1, 1  
 **c.** 2, 2  
 **d.** 2, 1  
 **e.** 1, 0

**48.** The value of one large egg being made during female meiosis is to . . .  
 **a.** increase the chance of fertilization  
 **b.** decrease the chance of fertilization  
 **c.** increase the chance of offspring surviving  
 **d.** decrease the chance of offspring surviving  
 **e.** increase the chance of daughters rather than sons

**49.** How many *sets* of chromosomes did you get from your mother?  
 **a.** 0  
 **b.** 1  
 **c.** 2  
 **d.** 4  
 **e.** 23

**50.** What happens to chromosomes during metaphase?  
 **a.** chromosomes first appear  
 **b.** DNA replicates  
 **c.** cell divides into two cells  
 **d.** lined up in the middle of the cell  
 **e.** doubled chromosomes are split apart

**51.** Is there any change in the mix of genes during mitosis?  
 **a.** yes  
 **b.** no

**52.** If *meiosis* starts with 40 chromosomes, then it ends with chromosomes in a cell.  
 **a.** 10  
 **b.** 20  
 **c.** 40  
 **d.** 80  
 **e.** variable number

**53.** Homologous pairs are given that name because they are usually stuck together.  
 **a.** true  
 **b.** false

**54.** Your mother gave you . . .  
 **a.** one member of a homologous pair  
 **b.** both members of a homologous pair  
 **c.** neither member of a homologous pair

**55.** Synapsis happens during . . .  
 **a.** mitosis only  
 **b.** meiosis only  
 **c.** both mitosis and meiosis  
 **d.** neither mitosis or meiosis

**56.** How many *sets* of chromosomes in a haploid cell?  
 **a.** 0  
 **b.** 1  
 **c.** 2  
 **d.** 4  
 **e.** 23

**57.** How many homologous pairs of chromosomes in the human?  
 **a.** no pairs  
 **b.** 1  
 **c.** 23  
 **d.** 46  
 **e.** 92

**58.** Do maternal chromosomes go only to the daughters?  
 **a.** yes  
 **b.** no

**59.** Tetrads line up with all the maternal chromosomes on one side of the cell and the paternal chromosomes

on the other side.  
 **a.** true  
 **b.** false

**60.** Which of the following increase genetic variety?  
 **a.** crossing-over  
 **b.** independent assortment  
 **c.** fertilization  
 **d.** all of the above  
 **e.** none of the above

**61.** Crossing-over is exchange between maternal and paternal chromosomes.  
 **a.** yes  
 **b.** no

**62.** Synapsis results in a group of chromatids (chromosomes) stuck together.  
 **a.** 0  
 **b.** 1  
 **c.** 2  
 **d.** 3  
 **e.** 4

**63.** The type of reproduction that requires only one individual, and produces offspring that are identical to

that individual is called.  
 **a.** sexual  
 **b.** meiosis  
 **c.** crossing-over  
 **d.** asexual  
 **e.** homologous

**64.** We would expect that a complex organism with many genes would be  
 **a.** haploid  
 **b.** diploid  
 **c.** either haploid or diploid (no particular value of one over the other)

**65.** The term *chromatin* refers to when the DNA is  
 **a.** in a doubled chromosome shape  
 **b.** in a single chromosome shape  
 **c.** in a thread-like shape  
 **d.** wrapped around the ribosomes  
 **e.** being mutated

**66.** The correct order of phases during cell division is  
 **a.** prophase, anaphase, metaphase, telophase  
 **b.** anaphase, metaphase, telophase, prophase  
 **c.** prophase, anaphase, telophase, metaphase  
 **d.** telophase, anaphase, metaphase, prophase  
 **e.** prophase, metaphase, anaphase, telophase

**67.** How many chromosomes did you get from your mother?  
 **a.** depends on whether you are male or female  
 **b.** 23  
 **c.** 46  
 **d.** 92  
 **e.** all the tetrads

**Biology 100 Test #4**

**1.** Mendel crossed round-seed pea plants with angular-seed plants and got all round-seed plants in the next

generation. What was the genotype of the angular-seed plants?   
 **a.** homozygous dominant  
 **b.** heterozygous dominant  
 **c.** homozygous recessive  
 **d.** heterozygous recessive  
 **e.** none of the above

**2.** What was the genotype of the second generation round-seed plants? (Refer to previous question.)  
 **a.** homozygous dominant  
 **b.** heterozygous dominant  
 **c.** homozygous recessive  
 **d.** heterozygous recessive  
 **e.** none of the above

**3.** Mendel used pure-breeding strains of pea plants. What term best describes “pure-breeding”?  
 **a.** homozygous dominant  
 **b.** homozygous recessive  
 **c.** heterozygous dominant  
 **d.** homozygous   
 **e.** heterozygous

**4.** The alternate forms of a gene are called  
 **a.** genotypes  
 **b.** phenotypes  
 **c.** mutations  
 **d.** translocations  
 **e.** alleles

**5.** How many homologous pairs of chromosomes does a human have?  
 **a.** no pairs  
 **b.** 1 set  
 **c.** 23  
 **d.** 46  
 **e.** two pairs

**6.** How many #12 chromosomes end up in a single gamete of a human?  
 **a.** 46  
 **b.** 23  
 **c.** 16  
 **d.** 2  
 **e.** 1

**7.** Any particular trait is controlled by genes. If there is a gene controlling eye color, then how many genes

do you have for eye color?  
 **a.** 46  
 **b.** 23  
 **c.** 16  
 **d.** 2  
 **e.** 1

**8.** How many genetically different gametes can be formed if you are heterozygous for a gene trait?  
 **a.** 0  
 **b.** 1  
 **c.** 2  
 **d.** 4  
 **e.** 23

**9.** Suppose brown eyes in people (B) is dominant to blue(b). Could a marriage between two blue-eyed

people produce a brown-eyed child?  
 **a.** yes, 25% of the children  
 **b.** yes, 50% of the children  
 **c.** yes, 75% of the children  
 **d.** yes, all of the children  
 **e.** no

**10.** Could a marriage between a homozygous brown-eyed person and a blue-eyed person result in blue-eyed

children?  
 **a.** yes, 25% of the children  
 **b.** yes, 50% of the children  
 **c.** yes, 75% of the children  
 **d.** yes, all of the children  
 **e.** no

**11.** Diabetes is thought to be inherited (at least in some cases) as a recessive (d) gene. Two normal people

have a diabetic child. What are the genotypes of the parents?  
 **a.** homozygous dominant  
 **b.** homozygous recessive  
 **c.** heterozygous  
 **d.** one parent is homozygous dominant, and the other is recessive  
 **e.** one parent is homozygous dominant, and the other is heterozygous

**12.** If you are homozygous recessive, then we know that your mother gave you a recessive gene.  
 **a.** yes  
 **b.** no

**13.** In terms of sex chromosomes, a female is  
 **a.** XO  
 **b.** XX  
 **c.** XY  
 **d.** YY  
 **e.** none of the above

**14.** Concerning sex-linked traits, a male would carry \_\_\_\_ genes (as compared to the female).  
 **a.** 0  
 **b.** 1  
 **c.** 2  
 **d.** 4  
 **e.** none of the above

**15.** Which parent determines the sex of the children?  
 **a.** father  
 **b.** mother

**16.** The name of the condition when chromosomes fail to properly separate in meiosis and the child receives

an abnormal number of chromosomes is called  
 **a.** double helix  
 **b.** daughter cells  
 **c.** nondisjunction  
 **d.** homologous interruption  
 **e.** translocation

**17.** If you wanted to determine the exact genotype of a dominant phenotype individual, what genotype

would you use as a test cross?  
 **a.** homozygous recessive  
 **b.** homozygous dominant  
 **c.** heterozygous  
 **d.** all of the above will work equally well  
 **e.** it cannot be determined by any cross

**18.** Charles Darwin traveled on the ship H.M.S. Beagle when he was in his  
 **a.** twenties  
 **b.** forties  
 **c.** sixties

**19.** How long was he gone during his trip on the Beagle?  
 **a.** 6 months  
 **b.** 1 year  
 **c.** 5 years  
 **d.** 15 years  
 **e.** 20 years

**20.** Darwin was the first European scientist to suggest that plants and animals might change over long

periods of time.  
 **a.** yes  
 **b.** no

**21.** What was the force that Lamarck thought was responsible for causing animals to change over time?  
 **a.** natural selection  
 **b.** mutation  
 **c.** a god  
 **d.** using structure in a particular way made animals change  
 **e.** selective breeding

**22.** What was the most famous example used by Lamarck’s theory?  
 **a.** finches  
 **b.** turtles  
 **c.** salamanders  
 **d.** cattle  
 **e.** giraffes

**23.** What theory of Malthus’ gave a very important insight to Darwin?  
 **a.** natural selection  
 **b.** geographical isolation  
 **c.** overpopulation  
 **d.** survival of the fittest  
 **e.** migration

**24.** Darwin proposed that the mechanism for evolution was  
 **a.** acquired characteristics  
 **b.** God  
 **c.** natural selection  
 **d.** progress toward perfection  
 **e.** mutation

**25.** Darwin got many of his insights by comparing related animals on \_\_\_\_ islands with animals living on

\_\_\_\_.  
 **a.** Coronado, California  
 **b.** Madagascar, Africa  
 **c.** Galapagos, South America  
 **d.** British Isles, Central America  
 **e.** Midway Island, Hawaii

**26.** When was the *Origin of Species* published?  
 **a.** 1550’s  
 **b.** 1650’s  
 **c.** 1750’s  
 **d.** 1850’s  
 **e.** 1950’s

**27.** The segment of the DNA molecule that is responsible for manufacturing a protein is called  
 **a.** centromere  
 **b.** dominant or recessive  
 **c.** gene  
 **d.** spindle fiber  
 **e.** chromatin

**28.** Your genetic individuality is not the result of possessing a trait that no other individual has, but is a

result of a   
 **a.** mutation  
 **b.** recessive gene  
 **c.** dominant gene  
 **d.** environmental influence  
 **e.** particular combination of genes

**29.** What process *creates* the various alleles in a species?  
 **a.** environment  
 **b.** natural selection  
 **c.** mutation  
 **d.** crossing-over  
 **e.** over-population

**30.** The error during meiosis where non-homologous chromosomes synapse and cross-over is called  
 **a.** mutation  
 **b.** prophase   
 **c.** non-disjunction  
 **d.** translocation  
 **e.** random assortment

**31.** “Only one copy of the two copies of a gene that you have is put into each gamete that you make.” This

principle is called  
 **a.** Rule of the Gene  
 **b.** Rule of Dominant and Recessive  
 **c.** Rule of Independent Assortment  
 **d.** Rule of Segregation  
 **e.** Rule of Incomplete Dominance

**32.** Failure to distinguish between red and green colors is a recessive allele and is a sex-linked gene. A red-

green color-blind male mated with a normal female. Of their six children (four boys and two girls), all

have normal vision. Will any of their male children pass this disorder on?  
 **a.** yes  
 **b.** no

**33.** According to the lab book chapter on evolution, evolution is  
 **a.** constant improvement  
 **b.** one-direction  
 **c.** one-direction leading to humans  
 **d.** genetic change  
 **e.** stopped today

**34.** All of the alleles in a species (or a population) alive at a particular time is called   
 **a.** crossing-over  
 **b.** random assortment  
 **c.** independent fertilization  
 **d.** clone  
 **e.** gene pool

**35.** What process makes it impossible for all genes to remain unchanged from generation to generation in a

species?  
 **a.** random assortment  
 **b.** crossing-over  
 **c.** random fertilization  
 **d.** mutation  
 **e.** asexual reproduction

**36.** What process prevents chromosomes from being passed on exactly (in the same form) from one

generation to the next?  
 **a.** mitosis  
 **b.** crossing-over  
 **c.** protein synthesis  
 **d.** cloning  
 **e.** asexual reproduction

**37.** You received chromosomes from your mother and chromosomes from your father. What process during

meiosis makes it nearly impossible for you to pass on all of those chromosomes to your children?  
 **a.** random assortment  
 **b.** translocation  
 **c.** DNA replication  
 **d.** mutation  
 **e.** asexual reproduction

**38.** Is it possible for one generation of humans to pass on all of its alleles in exactly the same form and

frequency (%) to the next generation?  
 **a.** yes  
 **b.** no

**39.** In terms of sex chromosomes, the human male is  
 **a.** XO  
 **b.** XX  
 **c.** XY  
 **d.** YY  
 **e.** none of the above

**40.** Does DNA stay the same from generation to generation?  
 **a.** yes  
 **b.** no

**41.** From a scientific point of view, what is the one question about evolution that is no longer considered

appropriate in an argument?  
 **a.** Is evolution true?  
 **b.** How fast can it happen?  
 **c.** How much change can it create?

**42.** Scientifically speaking, evolution happens only when brand new genes are added to the species.  
 **a.** yes  
 **b.** no

**43.** Evolution means that only the “best” gene survives and is passed on to future generations.  
 **a.** yes  
 **b.** no

**44.** Scientists expect that species living on islands would look like those of the same species living on the

mainland.  
 **a.** yes  
 **b.** no

**45.** When some particular aspect of the environment causes organisms with certain alleles to survive better

and reproduce more than organisms with other alleles, the process is called  
 **a.** small group phenomenon  
 **b.** gene pool  
 **c.** migration  
 **d.** natural selection  
 **e.** mutation

**46.** In order for one species to evolve into two species, which must come first?  
 **a.** mutation  
 **b.** sexual reproduction  
 **c.** separation  
 **d.** time  
 **e.** competition

**47.** Change is usually fastest when \_\_\_\_ groups are involved.  
 **a.** small  
 **b.** medium  
 **c.** large

**48.** Natural selection creates new alleles in the gene pool.  
 **a.** yes  
 **b.** no

**49.** Which human groups are most similar in DNA?  
 **a.** Northern Asian and African  
 **b.** Northern Asian and Native American  
 **c.** African and Native American

**50.** In Africa, who developed where compared to the Rift Valley?  
 **a.** humans on the West, chimps on the East  
 **b.** humans on the East, chimps on the West  
 **c.** humans on the East and West, chimps on the East and West  
 **d.** humans on the West, chimps on the East and West

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 **a.** centromere  
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**52.** Your genetic individuality is not the result of possessing a trait that no other individual has, but is a

result of a   
 **a.** mutation  
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 **c.** dominant gene  
 **d.** environmental influence  
 **e.** particular combination of genes

**53.** The locus is the . . .  
 **a.** allele  
 **b.** dominant gene  
 **c.** recessive gene  
 **d.** location of a gene  
 **e.** site of protein synthesis

**54** Alleles are variations of .  
 **a.** the same gene   
 **b.** different genes

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 **c.** mutation  
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 **e.** over-population

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 **d.** clone  
 **e.** gene pool

**63.** What process makes it impossible for all genes to remain unchanged from generation to generation in a

species?  
 **a.** random assortment  
 **b.** crossing-over  
 **c.** random fertilization  
 **d.** mutation  
 **e.** asexual reproduction

**64.** What process makes it nearly impossible for any *one* chromosome to be passed on to the next generation

with the same set of alleles?  
 **a.** random assortment  
 **b.** crossing-over  
 **c.** random fertilization  
 **d.** cloning  
 **e.** asexual reproduction

**65.** You received chromosomes from your mother and chromosomes from your father. What process during

meiosis makes it nearly impossible for you to pass on all of those chromosomes to your children?  
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 **b.** crossing-over  
 **c.** random fertilization  
 **d.** mutation  
 **e.** asexual reproduction

**66.** Is it possible for one generation of humans to pass on all of its alleles in exactly the same form and

frequency (%) to the next generation?  
 **a.** yes  
 **b.** no

**Biology 100 Final Exam**

1. The equator is warmer because
   1. it is closer to the sun
   2. it has no water
   3. it is perpendicular to the sun rays
   4. it is always summer
   5. all of the above
2. The heat at the equator moves towards the poles by
   1. air only
   2. water only
   3. air and water
   4. both air and water
   5. neither air nor water
3. How much average rainfall in San Diego per year?
   1. 2-3 inches
   2. 3-5 inches
   3. 5-7 inches
   4. 10 inches
   5. 15 inches
4. San Diego gets most of its rain in the
   1. summer
   2. winter
   3. equal in both summer and winter
5. At which latitudes is air rising?
   1. equator, 30, 60, and poles
   2. equator and 30
   3. equator and 60
   4. 30 and 60
   5. 60 and poles
6. The San Diego latitude is dominated by
   1. low pressure
   2. high pressure
   3. equal time of high and low pressure
   4. no pressure at all
   5. partial pressure
7. Rain is more likely in latitudes of
   1. low pressure
   2. high pressure
   3. rain is not related to pressure
8. Low pressure indicated that air is
   1. not moving
   2. rising
   3. sinking
9. Which air mass most affects the weather of San Diego?
   1. north polar
   2. south pacific
   3. Rocky Mountain uppers
   4. Arizona desert
   5. Gulf stream
10. What usually happens to San Diego weather when the north pacific air moves towards us?
    1. hot dry winds from the west
    2. Santa Anna winds from the east
    3. cool and dry weather
    4. rain or very damp weather
    5. hail
11. If San Diego has a stationary cold front located here, and a warm front from the south pacific approaches, then what happens?
    1. warm front will blend in with the cold front
    2. warm front will push aside the cold front
    3. warm front will go under the cold front
    4. warm front will over-ride the cold front
    5. warm front will reverse its direction
12. What is likely to happen in the above scenario?
    1. dry weather
    2. more rain on the coastline than usual
    3. more rain in the desert than usual
13. Jet streams are usually about \_\_\_miles per hour.
    1. 25
    2. 75
    3. 250
    4. 500
    5. 750
14. When the jet stream is going across San Diego the weather is likely to be
    1. dry
    2. rainy
15. In the summer the jet stream is more likely to be
    1. over San Diego
    2. over Canada
16. One of the “coastal effects” in San Diego weather is
    1. warmer summer weather
    2. cooler winter weather
    3. warmer winter weather
17. During what part of the year is there a large marine layer off our coast?
    1. January
    2. March
    3. June
    4. August
    5. October
18. In the summer months air in the desert begins to \_\_\_ in the morning creating a \_\_\_ pressure area in the desert.
    1. cool, low
    2. cool, high
    3. warm, low
    4. warm, high
19. As a result of the above, the air moves from the \_\_\_ towards San Diego.
    1. north
    2. south
    3. east
    4. west
20. In June this creates
    1. zoom
    2. lagoon
    3. broom
    4. soon
    5. gloom
21. As clouds rise they
    1. cool
    2. warm
22. As rain clouds pass over our highest mountains and into the desert those clouds
    1. cool
    2. warm
23. On a cold calm winter night in Chula Vista where is it likely to be coldest?
    1. at the top of the hills
    2. on the slopes of the hills
    3. in the valleys
    4. same in all areas
24. Santa Anna winds develop when there is a high pressure area located
    1. in the south pacific
    2. in the north pacific
    3. over Oregon and Washington
    4. over Rocky Mountains
    5. over Nevada and Utah
25. What types of rocks were coming to the surface in San Diego area about 150 million years ago?
    1. sedimentary
    2. sand and gravel
    3. granite
    4. mudstone
    5. all of the above
26. Which geological plate carries San Diego?
    1. Hawaiian
    2. South American
    3. North American
    4. Pacific
    5. Atlantic
27. Which plate is it crunching against?
    1. Hawaiian
    2. South American
    3. North American
    4. Pacific
    5. Atlantic
28. What is the name of the fault separating these two plates?
    1. pacific
    2. south american
    3. peninsular
    4. san andreas
    5. transcontinental
29. What is the general tilt direction of the large fault block that includes San Diego and Los Angeles?
    1. toward the east
    2. toward the west
    3. toward the south
    4. toward the north
30. Differential erosion makes the landscape
    1. uneven
    2. flat
31. Which would be a rift?
    1. Point Loma
    2. Mt. Soledad
    3. Otay Mountain
    4. San Diego deserts
32. Where were the San Diego mesas formed?
    1. on lake beds
    2. off shore
    3. mountain tops
    4. deserts
    5. valleys
33. How many different mesa levels did we discuss in class?
    1. 1
    2. 2
    3. 3
    4. 5
    5. 17
34. Why aren’t the mesas continuous across the San Diego area?
    1. differential erosion
    2. block faulting
    3. both a and b
    4. neither a nor b
    5. they are continuous in exact level
35. How big is the continental shelf off San Diego?
    1. less than a few miles
    2. 20 miles
    3. 100 miles
    4. 200 miles
36. How big an area off San Diego acts as though it is a continental shelf?
    1. less than a few miles
    2. 20 miles
    3. 100 miles
    4. 200 miles
37. Which zone has the highest productivity of sea life?
    1. open ocean
    2. continental shelf
    3. both open ocean and continental shelf are about equal
38. Where did San Diego build its current sewer outfall?
    1. La Jolla
    2. Pacific Beach
    3. Del Mar
    4. Point Loma
    5. Oceanside
39. Where did San Diego build the next sewer outfall?
    1. La Jolla
    2. Tia Juana Slough
    3. Del Mar
    4. Mission Beach
    5. Oceanside
40. What best describes the San Diego offshore topography?
    1. fast drop then constant deep
    2. fast drop then parallel ridges and depressions
    3. slow drop all the way out
    4. slow drop and then a fast drop to a constant deep
    5. level all the way out
41. Which community has the highest productivity?
    1. sand beaches
    2. rocky shores
    3. bays and estuaries
    4. rivers and lakes
    5. deep marine canyons
42. Which are the habitats for the young of offshore fish?
    1. sand beaches
    2. rocky shores
    3. bays and estuaries
    4. rivers and lakes
    5. deep marine canyons
43. Which San Diego bay is the biggest?
    1. Mission Bay
    2. San Elijo
    3. San Diego
    4. Tia Juana Slough
    5. La Jolla Bay
44. In what direction does the sand move between Oceanside and San Diego?
    1. towards San Diego
    2. towards Oceanside
45. Where does that sand eventually go?
    1. Oceanside Harbor
    2. Leucadia
    3. La Jolla canyon
    4. San Diego Bay
    5. Tia Juana Slough
46. In what direction does the sand move between San Diego Bay and the Mexican Border?
    1. towards the bay
    2. towards the border
47. The sand on San Diego beaches is lowered 1-2 meters during the winter months. Where does that sand go?
    1. the bays
    2. the river mouths
    3. offshore 100meters
    4. onto the beach berms
    5. all of the above
48. What is the ultimate source for all sand on San Diego beaches?
    1. Mexico
    2. offshore
    3. Canada
    4. rivers
49. Small seasonal ponds on the San Diego mesas with very specialized and rare species are called
    1. estuaries
    2. riparian
    3. vernal pools
    4. eutrophication
    5. annual ponds
50. Small seasonal creeks and rivers are called
    1. estuaries
    2. riparian
    3. vernal pools
    4. eutrophication
    5. annual ponds
51. What is the altitude of the chaparral community?
    1. sea level
    2. sea level to 1500 ft
    3. 1500 to 3000 ft
    4. 3000 to 5000 ft
    5. above 5000 ft
52. What is the average height of plants in the Coastal Sage?
    1. 1-3 ft
    2. 3-5 ft
    3. 5-10 ft
    4. 15-25 ft
    5. above 25 ft
53. The leaves of Coastal Sage and Chaparral plants are generally
    1. darker green
    2. lighter green
54. The leaves of Coastal Sage and Chaparral plants usually point
    1. upwards
    2. sideways
    3. down
55. The plants in the Coastal Sage and Chaparral communities that lose their leaves do so in the
    1. summer
    2. winter
    3. both summer and winter
56. Annual plants would be expected in habitats that are rain in the summer?
    1. yes
    2. no
57. Plants are taller on the \_\_\_ slopes.
    1. south
    2. north
58. The plants in the Mountain Communities that lose their leaves do so in the
    1. summer
    2. winter
    3. both summer and winter
59. In San Diego there are many species of plants and animals. What is the best description of the effects of human development on these species?
    1. extinction
    2. evolution of new characteristics
    3. decrease in the range of occurrence
60. The rain shadow effect is most important to the creation of
    1. Coastal Sage
    2. Chaparral
    3. Mountain community
    4. Desert community
    5. all of the above