Biology Keystone (PA Core) Quiz
Genetics - (BIO.B.2.2.2) Protein Role, (BIO.B.2.3.1) Mutations, (BIO.B.2.4.1) Genetic Engineering

Student Name: ____________________________  Date: __________
Teacher Name: Jared George  Score: __________

1) __________ produce proteins by following coded instructions that come from the nucleus of the cell.
   A) Actins   C) Microtubules
   B) Flagella   D) Ribosomes

2) The ribosome of a cell, is most responsible for what function?
   A) production of ATP   C) manufacture of proteins
   B) storage of materials   D) direction of all cellular activities

3) Identify the correct sequence of molecules, as a gene goes from coded information in the nucleus, to the product the cell wants to make.
   A) DNA -> messenger RNA -> transfer RNA -> protein
   B) DNA -> transfer RNA -> messenger RNA -> protein
   C) DNA -> transfer RNA -> protein -> messenger RNA
   D) Protein -> messenger RNA -> transfer RNA -> DNA

4) Without ribosomes, a cell would not produce
   A) lipids.   C) salt.
   B) proteins.   D) water.

5) Which organelle modifies cell products, packages them for distribution, and then may turn into vesicles and bubble off the surface of the cell?
   A) lysosome   C) Golgi apparatus
   B) cell membrane   D) endoplasmic reticulum
6) Letter D is the part of the cell that makes proteins. What is letter D?
   A) ribosomes  
   B) chromosomes  
   C) chloroplast  
   D) golgi apparatus

7) In cells, the production of proteins is handled by the ribosomes and endoplasmic reticulum, while the processing and packaging of proteins is handled by the ________ body.
   A) Golgi  
   B) nuclear  
   C) plastid  
   D) cytoplasmic

8) Which type of RNA carries a genetic code from DNA to the ribosome?
   A) mRNA  
   B) qRNA  
   C) rRNA  
   D) tRNA

9) Cells often store materials like water, salts, proteins and carbohydrates in sac-like structures called
   A) chloroplasts.  
   B) lysosomes.  
   C) mitochondria.  
   D) vacuoles.

10) In the cell, newly made proteins move directly from the ribosomes into the rough ________ ________, where they are chemically modified.
    A) Golgi apparatus  
    B) mitochondrial matrix  
    C) cytoplasmic reticulum  
    D) endoplasmic reticulum

11) A particular bird species found in North America obtains most of its food energy by catching and eating insects. A mutation arises in this bird population that increases the length of its beak. Although many mutations are harmful, this particular mutation has increased the ability of the bird to catch and eat certain insects. Which of these is the MOST LIKELY outcome of this mutation?
    A) The insects that are eaten by this bird are likely to become extinct.  
    B) Sharp pointed beaks will result in the birds eating other more unusual food items.  
    C) Other bird species will be more likely to also develop pointed beaks in order to compete.  
    D) Individual birds with the mutation will be more likely to survive and reproduce than birds without the mutation.
12) All of the following circumstances, EXCEPT _________ can produce new combinations of genetic traits in sperm and eggs that are different from the parents.

A) errors during meiosis
B) errors during mitosis
C) crossing over during meiosis
D) mutations due to exposure to chemicals

13) The karyotype for trisomy 21 illustrates an example of a genetic mutation caused by

A) insertion.
B) inversion.
C) crossing over.
D) nondisjunction.

14) During the replication process, polymerase proofreads the DNA molecule so that few mistakes or _________ occur.

A) interferons
B) mutations
C) oppositions
D) vexations
15) A change in the natural sequence of bases in DNA structure is called a
A) mutation. C) revolution.
B) reconstruction. D) translation.

16) ultra violet radiation
X-rays
nitrous acid
viruses
fungal-infected peanuts

All of the substances are __________, which cause inheritable changes in genetic material.
A) agents C) pathogens
B) mutagens D) vectors

17) Locations of Low-Level Nuclear Waste Disposal Facilities

Under the 1980 Low-Level Radioactive Waste Policy Act, each state must take responsibility for its non-defense related, low-level nuclear waste. If nuclear waste was NOT regulated and disposed of properly, which of these could be a possible effect?
A) The risk of cancer in humans would decrease. C) Waste disposal regulations would not affect anything environmentally.
B) We would be able to grow more crops, and thus, end world hunger. D) Higher incidence of cancers in humans and the contamination of crops and livestock.
Nandita’s Table

<table>
<thead>
<tr>
<th>Cells in the Human Body</th>
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<tbody>
<tr>
<td>Heart muscle cell</td>
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<tr>
<td>Skeletal muscle cell</td>
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<td>Skin cell</td>
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<td>Sex cell</td>
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<td>Fat cell</td>
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<tr>
<td>Blood cell</td>
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<tr>
<td>Gland cell</td>
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Nandita is learning about cells in the human body and made this table. A mutation in which type of cell can be passed along from parent to child?

A) sex cell                      
B) blood cell                    
C) gland cell                    
D) heart muscle cell

19) Selective pressures created by environmental factors can lead to success of ________ individuals in a population.

A) asexual                      
B) average                      
C) eugenic                      
D) mutant

20) Ultraviolet radiation is dangerous because it has a high enough energy to damage skin cells. What is the BEST explanation of the relationship between wavelength and wave energy?

A) Wave energy is related only to frequency, not wavelength.  
B) Longer wavelengths have lower frequencies but higher energy.  
C) The shorter the wavelength, the lower the frequency and the higher the energy.  
D) The shorter the wavelength, the higher the frequency and the higher the energy.
21) Farmer Brown grows corn for a living. One day, Farmer Green suggests to Farmer Brown that he should clone his best corn plant in order to produce more ears of corn per plant. Farmer Brown is not sure about Farmer Green’s idea.

Why might Farmer Brown be hesitant to clone his corn?

A) Cloning the corn plants is difficult and expensive to accomplish.
B) The cloned corn would not have the same taste as the original plants.
C) Cloning eliminates the ability to sexually reproduce and provide genetic variability.
D) Cloned plants would have increased genetic variability as well as a shortened life expectancy.

22) Which advance in biotechnology has benefited mankind by providing a DNA catalogue for further research in genetics and disease prevention?

A) recombinant DNA
B) DNA fingerprinting
C) Human Genome Project
D) cloning of Dolly the Sheep

23) A segment of DNA that is artificially created from two or more organisms, through use of DNA enzymes in a laboratory is called

A) a clone.
B) a vector.
C) plasmid DNA.
D) recombinant DNA.

24) All of the following EXCEPT the resistance of _______ demonstrate artificially selected resistance.

A) beef cattle, to “shipping fever”,
B) many agricultural wheat varieties, to drought and fungus,
C) Antarctarctic fish to freezing, due to antifreeze proteins in their blood,
D) many common grasshopper species to pesticides, such as diazinon, sevin, and others,

25) Gene therapy, which includes the correction of defective genes, is a significant part of the human genome project. Which of these is an application of the technique?

A) A new protein, which can repair defective genes, is injected.
B) Mutated DNA sequences, which can pair with existing genes, are introduced.
C) The DNA sequences of the entire genomes of disease-causing microbes are compared.
D) A new gene, which codes for the protein that can repair defective genes, is introduced.

26) How do scientists produce new genetic variations not found in nature? By

A) transforming RNA
B) using gel electrophoresis.
C) using lasers to cut and paste DNA.
D) causing mutations with chemicals or radiation.

27) The selective breeding of wild mustard has _______ _______ and produced at least four other vegetable crops.

A) increased biodiversity
B) decreased biodiversity
C) maintained biodiversity
D) eliminated biodiversity
28) ‘Ding-dong’, the prized racehorse of Kentucky Bob Bluegrass, is tragically killed by a runaway tractor. Thinking quickly, Kentucky Bob sends a tissue sample from the horse to Zerox DNA labs, which can clone animals. Zerox DNA labs will need to correctly follow a series of steps to clone ‘Ding-dong’.

Place the steps for cloning the horse in the correct order.

1) Cloned horse born.
2) Collect tissue from dead horse.
3) Remove nucleus from dead horse skin cell.
4) X-ray donor egg to destroy nucleus.
5) Impregnate surrogate mare with modified egg.
6) Implant desired nucleus into donor egg.
7) Collect donor egg from surrogate mother horse.

A) 2, 3, 7, 4, 6, 5, 1  
B) 2, 5, 7, 4, 3, 6, 1  
C) 7, 4, 2, 3, 6, 5, 1  
D) 7, 2, 4, 3, 6, 5, 1

29) Plant tissue culture is a method of asexual reproduction used to produce clones of a plant with desirable traits. Plant tissue culture relies on the fact that plant cells have the ability to regenerate a whole plant. Single cells are dosed with certain chemicals that trigger dividing cells to produce roots, shoots, and leaves.

Which tenet of cell theory BEST serves as a basis for this type of biotechnology?

A) All living things are made up of cells.  
B) All cells come from other cells by cell division.  
C) All cells are basically the same in chemical composition.  
D) The cell is the structural and functional unit of all living things.

30) Scientists have learned a great deal from studying and using stem cells. Which diseases/disorders are not involved in stem cell research?

A) cancer  
B) diabetes  
C) bird flu  
D) spinal cord injuries