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Version Demo

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Topic Break Down

Topic	No. of Questions
Topic 1, Biology	110
Topic 2, Chemistry	79
Topic 3, Natural Sciences	119
Topic 4, Mathematics	93
Topic 5, Physics	93
Total	494

QUESTION NO: 1

Which of the following is found in prokaryotic cells only?

- A. DNA
- B. Ribosomes
- C. Nucleoid region
- D. Golgi apparatus
- E. Cytoplasm

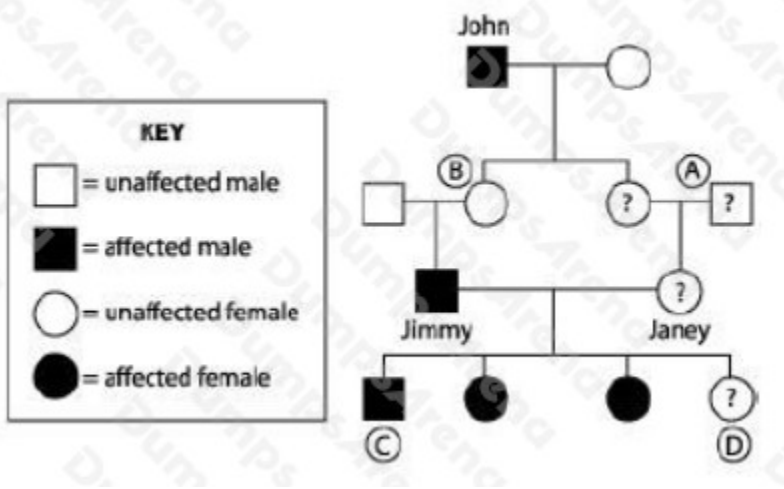
ANSWER: C

Explanation:

In prokaryotes, the genetic material is not separated from the remainder of the cell by a membrane, but instead is clustered into the nucleoid region.

QUESTION NO: 2

Duchenne muscular dystrophy (DMD) is a sex-linked recessive disorder that results in a degenerative disease of the muscles of the body. As muscles gradually deteriorate, patients lose the ability to control the muscles and eventually die as breathing muscles are rendered useless. An extended family was studied over several generations and the incidence of DMD was followed as indicated in the pedigree below.



Using the lower case letter d as the recessive allele for DMD, what is the genotype of the individual labeled "C" in the pedigree?

- A. XdXd

- B. XY
- C. XX
- D. XdX
- E. XdY

ANSWER: E

Explanation:

Individual C is a male, as seen by the square on the pedigree. Males are XY to start, and if a sex-linked allele were present, such as the allele for DMD, it would be found on his lone X chromosome – thus, XdY.

QUESTION NO: 3

Which of the following is true of any rational number?

- A. It is always the root of an algebraic equation with integer coefficients.
- B. Its decimal always begins to repeat eventually.
- C. You can find an integer which, when multiplied by the number, gives another integer.
- D. all of the above.

ANSWER: D

QUESTION NO: 4

Red plants (R) are dominant to green plants (r). Crossing homozygous red plants with homozygous green plants would result in which of the following phenotype/genotype combinations?

- A. RR.. red
- B. Rr.. red
- C. rr.. green
- D. rr.. red
- E. Rr.. red with green patches

ANSWER: B

Explanation:

Crossing red plants (RR) with green ones (rr) would result in 100% Rr offspring, which would all be red since they have at least one copy of the dominant allele (R).

QUESTION NO: 5

What percentage of energy is passed on to each successive organism in the energy pyramid?

- A. 1%
- B. 10%
- C. 40%
- D. 60%
- E. 80%

ANSWER: B**Explanation:**

There is a great deal of energy lost at each level of the energy pyramid: only about 10% of the energy of a producer is transferred to the consumer that eats it.

QUESTION NO: 6

Jane likes to keep her 6 school books in a neat row on her shelf. How many different ways can she line up her 6 books?

- A. 720
- B. 64
- C. 36
- D. 216

ANSWER: A**QUESTION NO: 7**

Bio-organic farmers add compost to the soil to replace lost nutrients. This practice is superior to the use of chemical fertilizers because

- A. there is more leaching of the nutrients from the soil into ground water
- B. there is less leaching of nutrients from the soil into ground water
- C. it is economically advantageous to use organic matter

- D. it takes less time
- E. there is no difference in the methods except the politics behind them

ANSWER: B

Explanation:

The nutrients in commercial fertilizers are in the form of ionic salts that are very water-soluble compared to the bioorganic compounds in compost.

QUESTION NO: 8

If you have a class consisting of 10 girls and 20 boys, in how many different ways can you form a committee from the class members such that there will be 2 girls and 2 boys on the committee?

- A. 50
- B. 8,550
- C. 34,200
- D. none of the above.

ANSWER: B

QUESTION NO: 9

Chlorine has the highest oxidation state in which of these compounds?

- A. HCl
- B. HClO
- C. HClO₄
- D. HClO₃
- E. Cl₂

ANSWER: C

Explanation:

Chlorine has an oxidation state of +7 in HClO₄.

QUESTION NO: 10

The most probable oxidation number for the element with atomic number 20 is

- A. -2
- B. -6
- C. +2
- D. +4
- E. +10

ANSWER: C**Explanation:**

The element with atomic number 20 is Calcium (Ca). Elements in the second row of the periodic table form ions with a +2 oxidation state in order to have a noble electron configuration.

QUESTION NO: 11

How many electronic charges comprise a coulomb of charge?

- A. 6×10^{18}
- B. 1018
- C. 2×10^{18}
- D. 2×10^{19}
- E. 5×10^{15}

ANSWER: A**Explanation:**

Charge is given as $Q = ne$ (1). Where

Q is one coulomb of charge; n is the number of electronic charges; e is the charge on electron = 1.6×10^{-19} C;

Putting the values in equation 1 we get

$$1 = n \times 1.6 \times 10^{-19} \text{ or, } n = 6.25 \times 10^{18}$$

Since n is a number therefore number of electronic charges that make one coulomb of charge is 6×10^{18} .

QUESTION NO: 12

A common rule when preparing acidic solutions is to always add acid to water. Which of the following is not a reason for this rule?

- A. Mixing strong acids with water produces a large amount of heat.
- B. Mixing strong acids with water causes rapid cooling.
- C. Adding water to acid could result in splashing concentrated acid.
- D. Adding acid to water initially produces a very dilute solution.
- E. There is no reason to add acid to water instead of adding water to acid.

ANSWER: B

Explanation:

Dissolving acid in water is an exothermic process.

QUESTION NO: 13

The spontaneous exothermic reaction, $\text{PCl}_5(\text{l}) + \text{Cl}_2(\text{g}) \rightarrow \text{PCl}_5(\text{s})$ has what signs for ΔG , ΔH , and ΔS ?

	ΔG	ΔH	ΔS
A.	+	-	-
B.	-	+	-
C.	-	-	-
D.	-	-	+
E.	+	-	-

- A. Option A
- B. Option B
- C. Option C
- D. Option D
- E. Option E

ANSWER: C

Explanation:

Spontaneous reactions have a negative ΔG . ΔH is negative for an exothermic reaction. The entropy of the system decreases (a solid is created from a liquid and a gas), so ΔS is negative.

QUESTION NO: 14

The common scientific name for the red maple tree is *Acer rubrum*. This name includes which of the following classification divisions?

- A. Family, species
- B. Genus, species
- C. Family, genus
- D. Phylum, order
- E. Phylum, species

ANSWER: B**Explanation:**

The common scientific name uses the genus and species classifications as a shorthand version of the full name.

QUESTION NO: 15

What type of reaction is $6\text{Li} + 2\text{H} \rightarrow ?$

- A. Acid-base reaction
- B. Nuclear reaction
- C. Combustion reaction
- D. Precipitation reaction
- E. No reaction

ANSWER: B**Explanation:**

The products are two alpha-particles (2He^2). This is the initial fusion reaction that occurs in a hydrogen bomb.

QUESTION NO: 16

Which of the following represents the structure of an alkali metal?

- A. 19X9
- B. 11X5
- C. 24X12

D. 40X20

E. 40X19

ANSWER: E

Explanation:

Alkali metals are the Group 1A elements, i.e. Li, Na, K, etc. 40X19 corresponds to potassium, K.

QUESTION NO: 17

Which two planets do not have any moons?

A. Mercury and Venus

B. Mercury and Mars

C. Mars and Venus

D. Pluto and Venus

E. Pluto and Mars

ANSWER: A

Explanation:

Mercury and Venus do not have any moons.

QUESTION NO: 18

Traveling from Los Angeles to San Diego, Peter drove 30 miles at 30 miles per hour, 35 miles at 70 miles per hour, and 40 miles at 60 miles per hour. What was his average speed for the whole trip?

A. 48.46 mph

B. 54.76 mph

C. 57.97 mph

D. 60 mph

ANSWER: A

QUESTION NO: 19

If $l > m > 0 > n$, then each of the following must be true EXCEPT

A. $ln < lm$

B. $lm > mn$

C. $ln < m^2 < lm$

D. $l^4 > m^4 > n^4$

E. $\sqrt{l} > \sqrt{m}$

- A. Option A
- B. Option B
- C. Option C
- D. Option D
- E. Option E

ANSWER: D

Explanation:

Assign values for l , m , and n and determine which inequality does not make sense. For example, if $l = 3$, $m = 2$, and $n = -5$, which answer choice is not true?

QUESTION NO: 20

The reaction $\text{HCl} + \text{NaOH} \rightarrow \text{H}_2\text{O} + \text{NaCl}$ is an example of a

- A. redox reaction
- B. single replacement
- C. combustion reaction
- D. neutralization reaction
- E. nuclear reaction

ANSWER: D

Explanation:

HCl is an acid and NaOH is a base. When the two are combined, a neutralization reaction takes place.