

REPLACEMENT ROUND

TOSSUP

1) Biology – *Multiple Choice* How many nuclei are there in one fully developed angiosperm pollen grain?

W) 1

X) 2

Y) 3

Z) 4

ANSWER: Y) 3 [SO]

BONUS

1) Biology – *Short Answer* Identify all of the following three mutations that can create a stop codon:

1) Insertion of 1 nucleotide;

2) Insertion of 3 nucleotides;

3) Deletion of 3 nucleotides.

ANSWER: All of them [EH]

TOSSUP

2) Biology – *Multiple Choice* Also known as club fungi, what phylum of fungi includes mushrooms, puffballs, and rusts?

W) Ascomycota

X) Basidiomycota

Y) Microsporidia

Z) Chytridiomycota

ANSWER: X) BASIDIOMYCOTA [SO]

BONUS

2) Biology – *Short Answer* Identify all of the following three results which may occur after conjugation between a Hfr cell and a F minus cell.

- I. Two Hfr cells
- II. One Hfr cell, one F plus cell
- III. One Hfr cell, one F minus cell

ANSWER: I and III [SO]

TOSSUP

3) Biology – *Multiple Choice* Also known as club fungi, what phylum of fungi includes mushrooms, puffballs, and rusts?

- W) Ascomycota
- X) Basidiomycota
- Y) Microsporidia
- Z) Chytridiomycota

ANSWER: X) BASIDIOMYCOTA [SO]

BONUS

3) Biology – *Short Answer* Identify all of the following three results which may occur after conjugation between a Hfr cell and a F minus cell.

- I. Two Hfr cells
- II. One Hfr cell, one F plus cell
- III. One Hfr cell, one F minus cell

ANSWER: I and III [SO]

TOSSUP

4) Biology – *Multiple Choice* Increased comparative growth rates of bat fingers, leading to wing development, is an example of which of the following phenomena?

W) paedomorphosis

X) allochryny

Y) heterochryny

Z) neoteny

ANSWER: Y) HETEROCHRYNY [SO]

TOSSUP

5) Math – *Short Answer* The numbers 1 through 6 are placed on the vertices of a hexagon. The sum of the numbers on the 3 pairs of opposite vertices is the same. What is this common sum?

ANSWER: 7 [RG]

TOSSUP

6) Math – *Short Answer* A 3x3 matrix has determinant 4. If every element is then doubled, what is the new determinant of the matrix?

ANSWER: 32 [RG]

BONUS

6) Math – *Short Answer* What is the ratio of the additive inverse of $\frac{3}{5}$ to the multiplicative inverse of $\frac{3}{5}$?

ANSWER: $-\frac{9}{25}$ [SO]

TOSSUP

7) Chemistry – *Multiple Choice* Which of the following best describes the shape of the curve when pressure and volume in an ideal gas are plotted against each other at constant temperature?

- W) linear
- X) quadratic
- Y) elliptical
- Z) hyperbolic

ANSWER: Z) Hyperbolic [CZ]

BONUS

8) Physics – *Short Answer* Peter is pulling rocks up a 8-meter long inclined plane set at 30 degrees above the horizontal. In watts and to one significant figure, how much average power must Peter exert to move a 2 kilogram rock from the bottom to the top of the slope in 10 seconds?

ANSWER: 8 [SO]

TOSSUP

9) Earth and Space – *Multiple Choice* In which layer of the atmosphere is most gamma and x-ray radiation absorbed?

- W) Troposphere
- X) Stratosphere
- Y) Mesosphere
- Z) Thermosphere

ANSWER: Z) Thermosphere [PB]