2022 MIT Science Bowl High School Invitational Tiebreak Round 1

TOSSUP

1) CHEMISTRY *Multiple Choice* Which of the following modes of decay is most likely for a pre-lanthanide element below the band of stability?

W) Alpha decay
X) Beta-plus decay
Y) Beta-minus decay
Z) Gamma decay

ANSWER: X) Beta-plus decay

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2) EARTH AND SPACE *Short Answer* What term describes rocks that differ from the rocks in their environment due to long distance glacial transport?

ANSWER: Erratics

TOSS UP

3) PHYSICS *Short Answer* What is the mechanical advantage of a frictionless inclined plane at an angle of 30 degrees with respect to the horizontal?

ANSWER: 2

TOSS UP

4) BIOLOGY *Short Answer* By name or number, identify all of the following three point mutations that are nonsynonymous mutations:

1) Missense
2) Nonsense
3) Silent

ANSWER: 1 and 2

TOSS UP

5) MATH *Short Answer* By name or number, identify all of the following three angle measures whose sine is negative:

1) 100 degrees
2) 1000 degrees
3) -420 degrees

ANSWER: 2 and 3 (ACCEPT: All but 1)
