# 2022 MIT Science Bowl High School Invitational Tiebreak Round 4

**TOSSUP**

1) CHEMISTRY *Multiple Choice* What salt is formed when carbon monoxide gas is bubbled into a solution of hot, concentrated sodium hydroxide?

ANSWER: Sodium formate (ACCEPT: $NaHCO_2$)

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**TOSS UP**

2) EARTH AND SPACE *Multiple Choice* Stars in luminosity class IV (read: *four*) can be classified as which of the following?

W) Supergiants
X) Giants
Y) Subgiants
Z) Main sequence stars

ANSWER: Y) Subgiants

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**TOSS UP**

3) PHYSICS *Short Answer* An insulating sphere has a uniform, nonzero charge density. Inside the sphere, the electric field is proportional to the distance from the center to what power?

ANSWER: 1 (ACCEPT: Linear)

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**TOSS UP**

4) BIOLOGY *Multiple Choice* Evidence that charophyte (*KAR-oh-fite*) algaes are the closest living relatives of land plants comes from the fact that both share rosette-shaped structures of certain enzymes. These enzymes synthesize what compound?

W) Cellulose
X) Chlorophyll a
Y) Lignin
Z) Tubulin

ANSWER: W) Cellulose

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**TOSS UP**

5) MATH *Multiple Choice* Which of the following points is in the interior of the circle whose graph is given by $x^2 + (y-1)^2 = 25$?

W) $(4, -1)$
X) $(-3, -3)$
Y) $(0, -5)$
Z) $(4, 5)$

ANSWER: W) $(4, -1)$

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