

SCIENCE BOWL QUIZ: Name _____

Mark you answers clearly on sheet. For multiple choice circle your answer. For others write out answer clearly and put a circle around your final answer. You have 15 minutes to complete the quiz and there are 20 questions total so use your time carefully (may be best to skip as needed).

TOSS-UP

1) BIOLOGY *Multiple Choice* The common cold is an infection caused by which of the following?

- W) Virus
- X) Bacteria
- Y) Fungi
- Z) Protist

BONUS

1) BIOLOGY *Short Answer* A mammalian cell is enucleated, what is the most likely identity of this cell?

TOSS-UP

2) BIOLOGY *Multiple Choice* Which of the following descriptions best describes Huntington's disease?

- W) Autosomal recessive
- X) Autosomal dominant
- Y) Sex-linked recessive
- Z) Sex-linked dominant

BONUS

2) BIOLOGY *Short Answer* Tay-Sachs disease is caused by the defect of what organelle, resulting in lipid build up in the brain?

TOSS-UP

3) MATH *Short Answer* Anka is creating an outfit out of hats and scarves. If she has 4 different hats and 5 different scarves, how many outfits can she make if she must choose one hat and one scarf?

BONUS

3) MATH *Short Answer* What is the sum of all odd integers between 1 and 11, inclusive?

TOSS-UP

4) MATH *Short Answer* The variance of a set of temperature measurements taken in degrees Celsius has a numerical value of 5. If they are converted to degrees Fahrenheit by multiplying each reading by 1.8 and then adding 32, what is the new numerical value of the variance?

BONUS

4) MATH *Short Answer* Four circles of radius 1 are centered at the corners of a square with side length 2. A fifth circle with radius r and center coinciding with the center of the square is tangent to the other four circles. Find r .

TOSS-UP

5) PHYSICS *Multiple Choice* What force perpendicular to a surface is responsible for keeping objects on the surface?

- W) Friction
- X) Normal Force
- Y) Gravity
- Z) Buoyancy

BONUS

5) PHYSICS *Short Answer* A 10 kilogram ball is rolled along a frictionless surface at a constant velocity of 6 meters per second. What is the linear momentum of the ball?



TOSS-UP

6) PHYSICS *Multiple Choice* At what angle does polarization by reflection occur at the intersection of two media?

- W) Critical angle
- X) Brewster's angle
- Y) Snell's angle
- Z) Maxwell's angle

BONUS

6) PHYSICS *Short Answer* Light must pass through two polarizers to reach a target. The angle between the transmission axes of the polarizers is 30° . In terms of the initial intensity of light I , what is the transmitted intensity at the back of the two polarizers?

TOSS-UP

7) CHEMISTRY *Short Answer* What is the atomic number of oxygen?

BONUS

7) CHEMISTRY *Multiple Choice* Which of the following particles is not found in a carbon atom?

W) Photon

X) Neutron

Y) Proton

Z) Electron

TOSS-UP

8) CHEMISTRY *Short Answer* Identify all of the following 3 statements about sigma and pi bonds that are true:

1. Pi bonds are higher in energy than sigma bonds
2. Pi bonds display cylindrical symmetry
3. Triple bonds contain 1 sigma bond and 2 pi bonds

BONUS

8) CHEMISTRY *Short Answer* Order the following three compounds in order of least to most positive oxidation state of oxygen:

1. CO₂

2. OF₂

3. Na₂O₂

TOSS-UP

9) EARTH AND SPACE *Multiple Choice* Plate tectonics is driven by which of the following?

- W) Convection under the Earth's surface
- X) Conduction under the Earth's surface
- Y) Radiation under the Earth's surface
- Z) Advection under the Earth's surface

BONUS

9) EARTH AND SPACE *Multiple Choice* What type of rock is sandstone?

- W) Igneous
- X) Sedimentary
- Y) Metamorphic
- Z) Mineral

TOSS-UP

10) EARTH AND SPACE *Multiple Choice* Pointing a spectrometer at a source of electromagnetic radiation passing through a medium, what type of spectrum would occur?

- W) Continuous
- X) Emission
- Y) Absorption
- Z) Paschen

BONUS

10) EARTH AND SPACE *Multiple Choice* Which of the following would not increase the resolution power of a telescope?

- W) Utilizing interferometry
- X) Increasing lens diameter
- Y) Increasing seeing
- Z) Increasing the telescope's altitude

ANSWERS

1. W) Virus
Erythrocyte
2. X) Autosomal dominant
Lysosome
3. 20
36
4. 16.2
 $\sqrt{2} - 1$
5. Normal force
60 kilograms meters per second
6. Brewster's angle
 $31/8$
7. 8
W) Photon
8. 1 and 3
1, 3, 2
9. W) Convection under the Earth's surface
X) Sedimentary
10. Y) Absorption
Y) Increasing seeing