

LIGHTNING ROUND 1

TOSS-UP

1) GENERAL SCIENCE *Multiple Choice* What is the point group symmetry of the water molecule?

- W) T_d
- X) C_{2v}
- Y) D_{3h}
- Z) C_{2h}

ANSWER: X) C_{2v}

TOSS-UP

2) GENERAL SCIENCE *Multiple Choice* What scientist won the Nobel Prize in Chemistry in 1936 for his study of dipole moments?

- W) Willem Keesom
- X) Fritz London
- Y) Peter Debye
- Z) Johannes van der Waals

ANSWER: Y) PETER DEBYE

TOSS-UP

3) GENERAL SCIENCE *Short Answer* By name or number, identify which of the following statements are true.

- I. Bonds involving a highly charged cation will be primarily covalent.
- II. Bonds involving an extremely small cation will be primarily ionic.
- III. Bonds involving an extremely large anion will be primarily covalent.

ANSWER: I AND III

TOSS-UP

4) GENERAL SCIENCE *Multiple Choice* What is the scientific method of dating using tree rings?

- W) branchronology
- X) dendrochronology
- Y) arborchronology
- Z) botanochronology

ANSWER: X) DENDROCHRONOLOGY

TOSS-UP

5) GENERAL SCIENCE *Short Answer* Who won the Nobel Prize in Physics in 1921 for his work with the photoelectric effect?

ANSWER: ALBERT EINSTEIN

TOSS-UP

6) GENERAL SCIENCE *Short Answer* What unit measures the electric dipole moment and is equivalent to 1×10^{-18} statcoulombcentimeters?

ANSWER: DEBYE

TOSS-UP

7) GENERAL SCIENCE *Short Answer* What effect describes the phenomenon of electrons being emitted from matter as a consequence of their absorption of energy from electromagnetic radiation?

ANSWER: PHOTOELECTRIC EFFECT

TOSS-UP

8) GENERAL SCIENCE *Short Answer* What order is the chimaera fish part of?

ANSWER: CHIMAERIFORMES

TOSS-UP

9) GENERAL SCIENCE *Multiple Choice* What substance is used as a hexadentate ligand, and is also sometimes used to dissolve limescale?

- W) EDTA
- X) CFC
- Y) DIBAL
- Z) DMSO

ANSWER: W) EDTA

TOSS-UP

10) GENERAL SCIENCE *Short Answer* What set of rules, developed in 1923, are used to predict the ionic and covalent character of a bond based on the relative charges and sizes of the cation and anion?

ANSWER: FAJANS' RULES

TOSS-UP

11) GENERAL SCIENCE *Short Answer* What is the term given to an ion or molecule that binds to a central metal atom to form a coordination complex?

ANSWER: LIGAND

TOSS-UP

12) GENERAL SCIENCE *Short Answer* How many planes of reflection does the water molecule have?

ANSWER: 2

TOSS-UP

13) GENERAL SCIENCE *Short Answer* By name or number, identify which of the following statements are true.

- I. Bonds involving a highly charged cation will have a lot of covalent character.
- II. Bonds involving an extremely small cation will have little to no covalent character.
- III. Bonds involving an extremely large anion will have a lot of covalent character.

ANSWER: I AND III

TOSS-UP

14) GENERAL SCIENCE *Short Answer* What is the name of the cartilaginous fish known informally as the ghost shark, ratfish, spookfish or rabbitfish?

ANSWER: CHIMAERA

TOSS-UP

15) GENERAL SCIENCE *Multiple Choice* Which of these is not a divergent boundary?

- W) Mid-Atlantic Ridge
- X) Gakkel Ridge
- Y) East Pacific Rise
- Z) Mariana Trench

ANSWER: Z) MARIANA TRENCH

TOSS-UP

16) GENERAL SCIENCE *Multiple Choice* What is the scientific method of dating using tree rings?

- W) branchronology
- X) dendrochronology
- Y) arborchronology
- Z) botanochronology

ANSWER: X) DENDROCHRONOLOGY

TOSS-UP

17) GENERAL SCIENCE *Short Answer* What features of a tree, seen in a horizontal cross section of a cut through the trunk of the tree, are the result of new growth in the vascular cambium, a lateral meristem, and are synonymous with secondary growth?

ANSWER: GROWTH RINGS (accept TREE RINGS or ANNUAL RINGS)

TOSS-UP

18) GENERAL SCIENCE *Short Answer* Name four noble metals.

ANSWER: RUTHENIUM, RHODIUM, PALLADIUM, SILVER, OSMIUM, IRIDIUM, PLATINUM, GOLD (any 4 in any order)

TOSS-UP

19) GENERAL SCIENCE *Multiple Choice* Which of the following is the most expensive?

- W) gold
- X) silver
- Y) platinum
- Z) rhodium

ANSWER: Z) RHODIUM

TOSS-UP

20) GENERAL SCIENCE *Short Answer* What process is considered the driving force of plate tectonics?

ANSWER: CONVECTION

TOSS-UP

21) GENERAL SCIENCE *Short Answer* What is the term used to reference the emission of short bursts of light from imploding bubbles in a liquid when excited by sound?

ANSWER: SONOLUMINESCENCE

TOSS-UP

22) GENERAL SCIENCE *Multiple Choice* What element, gifted to him by Marie Curie, did Ernest Rutherford use as an emitter of alpha particles in his famous Gold Foil Experiment?

- W) polonium
- X) radium
- Y) bismuth
- Z) uranium

ANSWER: X) RADIUM

TOSS-UP

23) GENERAL SCIENCE *Short Answer* What is the method of separating mixtures based on their differences in boiling points?

ANSWER: DISTILLATION

TOSS-UP

24) GENERAL SCIENCE *Multiple Choice* Which scientist, author of *Philosophiae Naturalis Principia Mathematica*, is known as one of the fathers of differential calculus?

- W) Gottfried Leibniz
- X) Albert Einstein
- Y) Isaac Newton
- Z) Rene Descartes

ANSWER: Y) ISAAC NEWTON

TOSS-UP

25) GENERAL SCIENCE *Short Answer* What German chemist is often referred to as the “Father of Biochemistry” for coining the term “biochemistry” in 1903?

ANSWER: CARL NEUBERG