

TOSS-UP

1. BIOLOGY *Short Answer* This type of terrestrial biome is found near the equator in South America, Central Africa, and Southern Asia. It receives the highest rainfall, and it is among the most productive and diverse biomes on Earth. Name this biome.

ANSWER: TROPICAL RAINFOREST

TOSS-UP

2. BIOLOGY *Multiple Choice* Which of the following patterns of dispersion would be exhibited by fungi whose spores have been dispersed by the wind?

(W) Clumped

(X) Uniform

(Y) Random

(Z) Loose

ANSWER: Y

TOSS-UP

3. CHEMISTRY *Multiple Choice* Which of the following is an Arrhenius base?

(W) Ammonia

(X) Sodium hydroxide

(Y) Ethanol

(Z) Butoxide

ANSWER: X

TOSS-UP

4. CHEMISTRY *Multiple Choice* According to the VSEPR Model, which of the following hybridizations produces a molecule that is planar?

(W) d^2sp^3

(X) dsp^3

(Y) sp^3

(Z) sp^2

ANSWER: Z

TOSS-UP

5. PHYSICS *Short Answer* A ball of mass 4 kilograms is swung on a rope with tension 9 Newtons. If the radius at which the ball swings is 4 meters, how fast is the ball traveling?

ANSWER: 3 METERS/SECOND

TOSS-UP

6. PHYSICS *Short Answer* Which effect, caused by the rotation of the Earth, causes a deflection in the path of moving objects so that they appear to move along a curve rather than in a straight line?

ANSWER: CORIOLIS EFFECT

TOSS-UP

7. MATH *Short Answer* A vase has been bought for \$21. It was on sale for 30% off. What was the original cost of the vase?

ANSWER: \$30

TOSS-UP

8. MATH *Short Answer* How many ways can you pay for a 30-cent pencil using only quarters, and dimes, and nickels?

ANSWER: 5

TOSS-UP

9. ENERGY *Multiple Choice* In which country does nuclear power provide the greatest percentage of energy?

(W) Japan

(X) France

(Y) China

(Z) United States

ANSWER: X

TOSS-UP

10. ENERGY *Short Answer* Which country is the largest South American exporter of shale oil?

ANSWER: VENEZUELA

TOSS-UP

11. EARTH AND SPACE SCIENCE *Short Answer* Which two gas giants are referred to as the “ice giants” because their atmosphere is composed largely of ices such as ammonia and methane?

ANSWER: URANUS AND NEPTUNE

TOSS-UP

12. EARTH AND SPACE SCIENCE *Short Answer* This gas giant was the first to be predicted through mathematical calculation rather than empirical evidence. It has an atmosphere with wind speeds as high as 2100 km/hr. It has active and visible weather patterns, such as the Great Dark Spot. Name this planet.

ANSWER: NEPTUNE

TOSS-UP

13. BIOLOGY *Multiple Choice* Which of the following types of symbiosis is a +/- interaction?

(W) Commensalism

(X) Ammensalism

(Y) Parasitism

(Z) Mutualism

ANSWER: Y

TOSS-UP

14. BIOLOGY *Short Answer* In a community, which type of species has a disproportionately large effect on a community relative to its abundance?

ANSWER: KEYSTONE SPECIES

TOSS-UP

15. CHEMISTRY *Short Answer* Which law is an expression of the law of conservation of energy and states that the enthalpy change for a reaction involving a series of steps is equal to the sum of the enthalpy changes of the individual steps?

ANSWER: HESS'S LAW

TOSS-UP

16. CHEMISTRY *Multiple Choice* The Friedel-Crafts reactions are which type of reactions?

- (W) SN1 nucleophilic substitution
- (X) SN2 nucleophilic substitution
- (Y) Electrophilic aromatic substitution
- (Z) Electrophilic Aliphatic substitution

ANSWER: X

TOSS-UP

17. PHYSICS *Multiple Choice* Which of the following is a nonconservative force?

- (W) Gravity
- (X) Friction
- (Y) Electromagnetic force
- (Z) Spring force

ANSWER: X

TOSS-UP

18. PHYSICS *Multiple Choice* Which of the following is not a result of the fact that gravity is a conservative force?

- (W) The line integral through any closed loop is zero
- (X) The change in potential energy is independent of the path taken
- (Y) The curl of the vector field is zero
- (Z) The direction of the force of gravity is always opposite the direction of motion

ANSWER: Z

TOSS-UP

19. MATH *Short Answer* Find the slope of the line that passes through the points (-1, 2) and (1, -8)

ANSWER: 5

TOSS-UP

20. MATH *Short Answer* Simplify the following expression into one logarithm of base e: $2 \ln x - \frac{\log y}{\log e^2}$.

ANSWER: $\text{LN } \frac{X^2}{\sqrt{Y}}$

TOSS-UP

21. ENERGY *Multiple Choice* Which of the following is not part of one molecule of ATP?

(W) Adenine

(X) Ribose

(Y) Nicotinamide

(Z) Phosphate

ANSWER: Y

TOSS-UP

22. ENERGY *Short Answer* Which vitamin is required in the synthesis of FAD?

ANSWER: RIBOFLAVIN (B₂)

TOSS-UP

23. EARTH AND SPACE SCIENCE *Multiple Choice* Which of the following is the largest division of the geologic time scale?

(W) Epoch

(X) Era

(Y) Eon

(Z) Ego

ANSWER: Y

TOSS-UP

24. EARTH AND SPACE SCIENCE *Short Answer* During which era of which eon did the Cambrian explosion occur?

ANSWER: PHANEROZOIC EON, PALEOZOIC ERA

TOSS-UP

25. BIOLOGY *Short Answer* The nodules of legumes are red due to the presence of which protein?

ANSWER: LEGHEMOGLOBIN

TOSS-UP

26. BIOLOGY *Multiple Choice* Which of the following gases is an intermediate in the conversion of atmospheric nitrogen or organic nitrogen to nitrate by soil bacteria?

(W) Ammonia

(X) Nitric oxide

(Y) Nitrogen dioxide

(Z) Trinitrotolulene

ANSWER: W
