

NATIONAL ROUND ROBIN - 9

TOSS-UP

1. ERSC; Multiple Choice: The largest group of rock-forming minerals consists of the

(W) quartzes.
(X) halides.
(Y) silicates.
(Z) oxides.

ANSWER: Y– SILICATES

BONUS

1. ERSC; Short Answer: What basin in West Texas has yielded the greatest amount of oil from upper Paleozoic formation in the Western U.S.?

ANSWER: PERMIAN

TOSS-UP

2. BIOL; Multiple Choice: Parasitism is a type of

(W) commensalism.
(X) mutualism.
(Y) predation.
(Z) symbiosis.

ANSWER: Z– SYMBIOSIS

BONUS

2. BIOL; Multiple Choice: The symbiotic relationship between sea anemones and shrimp is an example of

(W) mutualism.
(X) parasitism.
(Y) commensalism.
(Z) parasitism.

ANSWER: Y– COMMENSALISM

TOSS-UP

3. COMP; Multiple Choice: In the JAVA language, the output of a JAVA compiler is known as what type of file?

(W) a class file
(X) a method file
(Y) a pseudo-binary file
(Z) an object-oriented program

ANSWER: W– A CLASS FILE

BONUS

3. COMP; Multiple Choice: Which of the following is a method for diagonalization of large matrices?

(W) Graham-Schmidt orthogonalization
(X) Spline projection
(Y) Bessel's method
(Z) Lanczos' algorithm (pron: lan-rose)

ANSWER: Z– THE LANCZOS' ALGORITHM

TOSS-UP

4. PHYS; Multiple Choice: Fundamental tones always have the

(W) lowest possible overtones.
(X) highest possible overtones.
(Y) lowest possible pitch.
(Z) highest possible pitch.

ANSWER: Y– LOWEST POSSIBLE PITCH

BONUS

4. PHYS; Multiple Choice: The property of sound that increases when sounds get louder is

(W) frequency.
(X) pitch.
(Y) intensity level.
(Z) wavelength.

ANSWER: Y– INTENSITY LEVEL

TOSS-UP

5. GENR; Short Answer: Which prefix is often used with scientific terms to indicate that something is the same, equal or constant?

ANSWER: ISO

BONUS

5. GENR; Multiple Choice: The study of how people use tools to perform work and how people physically relate to their working environment is called

(W) engineering.

(X) ergonomics.

(Y) agronomy.

(Z) physiology.

ANSWER: X– ERGONOMICS

TOSS-UP

6. CHEM; Multiple Choice: Who first proposed the concept of free energy?

(W) Hess

(X) Dalton

(Y) Gibbs

(Z) Lavoisier

ANSWER: Y– GIBBS

BONUS

6. CHEM; Multiple Choice: The maximum work that a spontaneous process can provide is given by

(W) delta S.

(X) delta G.

(Y) delta H.

(Z) delta T.

ANSWER: X– DELTA G

TOSS-UP

7. ASTR; Multiple Choice: The local group of galaxies contains

(W) The Milky Way and three large elliptical galaxies.
(X) Hundreds of large and small galaxies.
(Y) Three spiral galaxies and a number of smaller galaxies.
(Z) Six large spiral galaxies.

ANSWER: Y– THREE SPIRAL GALAXIES AND A NUMBER OF SMALLER GALAXIES

BONUS

7. ASTR; Multiple Choice: The Hubble Space Telescope found evidence for a black hole at the center of several galaxies by measuring

(W) The emission of X-rays.
(X) The size of the galaxy's nucleus.
(Y) Gravitational density waves near the galaxy's center.
(Z) The rotational velocity of stars near the galaxy's center.

ANSWER: Z– THE ROTATIONAL VELOCITY OF STARS NEAR THE GALAXY'S CENTER

TOSS-UP

8. BIOL; Multiple Choice: A species that grows exponentially for some time and then suddenly crashes is showing a

(W) delayed logistic growth curve.
(X) boom and bust growth curve.
(Y) delayed exponential growth curve.
(Z) logistic growth curve.

ANSWER: X– BOOM AND BUST GROWTH CURVE

BONUS

8. BIOL; Multiple Choice: The first, and perhaps the best known, case of biological magnification involved the pesticide

(W) PCB.
(X) Dieldrin.
(Y) NO.
(Z) DDT.

ANSWER: Z– DDT

TOSS-UP

9. MATH; Multiple Choice: If an integrand contains the square root of a combination of a constant and the square of the integration variable, a helpful technique for evaluating the integral is known as

(W) integration by parts.
(X) integration by trig substitution.
(Y) double integration.
(Z) antidifferentiation.

ANSWER: X-- INTEGRATION BY TRIG SUBSTITUTION

BONUS

9. MATH; Multiple Choice: In terms of factorials, how many 9 digit numbers are there with all digits different?

(W) $10!$ (10 factorial)
(X) $9*9!$ (read 9 times 9 factorial)
(Y) $9!$
(Z) $9*8!$

ANSWER: X-- $9*9!$

TOSS-UP

10. PHYS; Multiple Choice: Electromagnetic waves differ from other waves because they

(W) cause the molecules of a medium to vibrate.
(X) are transverse waves.
(Y) can travel in a vacuum.
(Z) travel slowly.

ANSWER: Y-- CAN TRAVEL IN A VACUUM

BONUS

10. PHYS; Multiple Choice: The radio waves with the highest frequencies are

(W) TV channels.
(X) AM radio.
(Y) FM radio.
(Z) microwaves.

ANSWER: Z-- MICROWAVES

TOSS-UP

11. CHEM; Multiple Choice: Exothermic reactions are

- (W) always spontaneous.
- (X) usually spontaneous.
- (Y) usually not spontaneous.
- (Z) never spontaneous.

ANSWER: X– USUALLY SPONTANEOUS

BONUS

11. CHEM; Multiple Choice: The degree to which reactions proceed to completion is due to

- (W) equilibrium.
- (X) kinetics.
- (Y) dynamics.
- (Z) composition.

ANSWER: W– EQUILIBRIUM

TOSS-UP

12. COMP; Multiple Choice: An operating system designed to support large networks is called Windows NT. What does NT stand for?

- (W) Network topology
- (X) Network technology
- (Y) New topology
- (Z) New technology

ANSWER: Z– NEW TECHNOLOGY

BONUS

12. COMP; Multiple Choice: The Macintosh operating system includes an important program, a file manager, which manages the desktop screen icons. This is called

- (W) a help menu.
- (X) active assistance.
- (Y) the Finder.
- (Z) none of the above

ANSWER: Y– THE FINDER

TOSS-UP

13. BIOL; Multiple Choice: The toxic metals dissolved by acid rain do not

(W) accumulate in the food chain.
(X) reach dangerous levels by biological magnification.
(Y) include aluminum and mercury.
(Z) result in water with a high pH.

ANSWER: Z-- RESULT IN WATER WITH A HIGH pH

BONUS

13. BIOL; Multiple Choice: The main source of harmful chlorofluorocarbons in the United States today is

(W) aerosol propellants.
(X) medical wastes.
(Y) refrigeration equipment.
(Z) sewage.

ANSWER: Y-- REFRIGERATION EQUIPMENT

TOSS-UP

14. ASTR; Multiple Choice: The end of the main sequence life of a star like our Sun occurs when

(W) the proton-proton cycle for hydrogen fusion is replaced by the carbon cycle.
(X) 90% of the star's hydrogen is fused into helium.
(Y) the core of the star contracts to form an electron degenerate gas.
(Z) the fusion of hydrogen into helium stops in the core of the star.

ANSWER: Z-- THE FUSION OF HYDROGEN INTO HELIUM STOPS IN THE CORE OF THE STAR

BONUS

14. ASTR; Multiple Choice: If all the hydrogen in the Sun was fused to helium, what fraction of Sun's mass would be lost?

(W) 0.0001
(X) 0.007
(Y) 0.1
(Z) 0.25

ANSWER: X-- 0.007

TOSS-UP

15. PHYS; Multiple Choice: Light produced from heat is called

- (W) illuminated.
- (X) fluorescent.
- (Y) incandescent.
- (Z) neon.

ANSWER: Y– INCANDESCENT

BONUS

15. PHYS; Multiple Choice: A candle flame is seen because it is

- (W) illuminated.
- (X) refracted.
- (Y) coherent.
- (Z) luminous.

ANSWER: Z– LUMINOUS

TOSS-UP

16. CHEM; Multiple Choice: A reaction is likely to be spontaneous if, compared to products, reactants are

- (W) higher in heat content.
- (X) of equal energy.
- (Y) lower in energy.
- (Z) higher in energy.

ANSWER: Y– LOWER IN ENERGY

BONUS

16. CHEM; Multiple Choice: Types of crystalline solids include all of the following except

- (W) metallic.
- (X) covalent-network.
- (Y) molecular.
- (Z) nonmetallic.

ANSWER: Z– NONMETALLIC

TOSS-UP

17. ERSC; Multiple Choice: What kind of rocks are formed by lava that cools quickly?

- (W) Extrusive metamorphic
- (X) Extrusive igneous
- (Y) Intrusive metamorphic
- (Z) Intrusive igneous

ANSWER: X- EXTRUSIVE IGNEOUS

BONUS

17. ERSC; Short Answer: The process of accumulation of bits of matter around an initial mass is called

ANSWER: ACCRETION

TOSS-UP

18. GENR; Short Answer: Identify the tree family that includes among its members the: fink, myrtle, turkey, jacks, laurel, white, live and pin.

ANSWER: OAK (ACCEPT QUERCUS)

BONUS

18. GENR; Multiple Choice: Which of the following vacuum pumps operates by using a very cold surface to trap the gases on the cold surface?

- (W) Sublimation pump
- (X) Turbo pump
- (Y) Cryopump
- (Z) Diffusion pump

ANSWER: Y- CRYOPUMP

TOSS-UP

19. PHYS; Multiple Choice: Ultraviolet photons are released in light that is

- (W) incandescent.
- (X) fluorescent.
- (Y) luminous.
- (Z) neon.

ANSWER: X– FLUORESCENT

BONUS

19. PHYS; Multiple Choice: The item not associated with fluorescent light is

- (W) a tungsten filament.
- (X) a phosphor.
- (Y) an ultraviolet photon.
- (Z) a mercury vapor atom.

ANSWER: W– A TUNGSTEN FILAMENT

TOSS-UP

20. BIOL; Multiple Choice: A nerve cell becomes depolarized when the

- (W) potassium gates open.
- (X) sodium gate opens.
- (Y) sodium gates close.
- (Z) both sodium and potassium gates open.

ANSWER: X– SODIUM GATE OPENS

BONUS

20. BIOL; Multiple Choice: The impulse that travels along the nerve membrane is

- (W) an action potential.
- (X) a resting potential.
- (Y) a chemical current.
- (Z) an electric current.

ANSWER: W– AN ACTION POTENTIAL

TOSS-UP

21. CHEM; Short Answer: In September 1997 the International Union of Pure and Applied Chemistry assigned names to the elements 104 through 109. Give any four of the new names.

ANSWER: RUTHERFORDIUM, DUBNIUM, SEABORGIUM, BOHRIUM, HASSIUM, MEITNERIUM

BONUS

21. CHEM; Multiple Choice: Which of the following types of crystalline solids would you expect to have the highest melting temperatures?

(W) Molecular
(X) Ionic
(Y) Network-covalent
(Z) Metallic

ANSWER: Y– NETWORK-COVALENT

TOSS-UP

22. PHYS; Short Answer: A machine's output is 4000 joules and its frictional losses are 1000 joules. What percent is its efficiency?

ANSWER: 80 (PERCENT)

BONUS

22. PHYS; Multiple Choice: An object that is seen only by means of reflected light is said to be

(W) luminous.
(X) incandescent.
(Y) illuminated.
(Z) fluorescent.

ANSWER: Y– ILLUMINATED

TOSS-UP

23. MATH; Short Answer: Which number does NOT fit in the following series

1, 3, 7, 15, 31, 63, 85, 127

ANSWER: 85

BONUS

23. MATH; Short Answer: A cube has a volume of 64 cubic units. How many units are in the sum of the lengths of all its edges?

ANSWER: 48

TOSS-UP

24. BIOL; Short Answer: The “false” ribs are not attached directly to the sternum. Of the 12 ribs, how many are “false” ribs?

ANSWER: 5

BONUS

24. BIOL; Multiple Choice: The tiny ear bone that vibrates against the thin membrane covering the oval window is the

(W) malleus.

(X) incus.

(Y) otolith.

(Z) stapes.

ANSWER: Z– STAPES

TOSS-UP

25. CHEM; Short Answer: How many karats is pure gold?

ANSWER: 24

BONUS

25. CHEM; Multiple Choice: What is the characteristic feature of a metallic crystal?

- (W) The metallic bond is directional.
- (X) The bonding forces are weak.
- (Y) The valence electrons move around the positive ion.
- (Z) The positive ion is free to move.

ANSWER: Y– THE VALENCE ELECTRONS MOVE AROUND THE POSITIVE ION