NATIONAL ROUND ROBIN- 8

TOSS-UP

1. **MATH; Multiple Choice: If the determinant of a matrix is zero, the matrix is said to be**

   (W) an eigen-matrix.
   (X) singular.
   (Y) invertible.
   (Z) Gaussian.

   ANSWER: X– SINGULAR

BONUS

1. **MATH; Multiple Choice: Matrix multiplication differs from scalar multiplication in that matrix multiplication is not**

   (W) commutative.
   (X) associative.
   (Y) distributed over addition.
   (Z) well-defined.

   ANSWER: W—COMMUTATIVE

TOSS-UP

2. **PHYS; Multiple Choice: Materials that transmit sound easily are**

   (W) nonelastic.
   (X) elastic.
   (Y) nonmetallic.
   (Z) metals only.

   ANSWER: X– ELASTIC

BONUS

2. **PHYS; Multiple Choice: The interaction between two waves arriving at the same point at the same time is called**

   (W) refraction.
   (X) reflection.
   (Y) diffraction.
   (Z) interference.

   ANSWER: Z– INTERFERENCE

TOSS-UP

3. BIOL; Multiple Choice: The grasslands of South Africa are the

(W) velds.
(X) pampas.
(Y) steppes.
(Z) prairies.

ANSWER: W– VELDS

BONUS

3. BIOL; Multiple Choice: Tropical grasslands in which the seasons change from wet to dry are

(W) savannahs.
(X) velds.
(Y) prairies.
(Z) tsunamis.

ANSWER: W– SAVANNAHS

TOSS-UP

4. CHEM; Multiple Choice: For collisions to be effective, they must

(W) be frequent enough.
(X) be energetic enough.
(Y) occur at high concentration.
(Z) occur in the presence of a catalyst.

ANSWER: X– BE ENERGETIC ENOUGH

BONUS

4. CHEM; Multiple Choice: The energy required to break bonds during a chemical reaction comes from

(W) potential energy converted to kinetic energy.
(X) kinetic energy converted to potential energy.
(Y) potential energy converted to chemical energy.
(Z) kinetic energy converted to another form of kinetic energy.

ANSWER: X– KINETIC ENERGY CONVERTED TO POTENTIAL ENERGY

TOSS-UP

5. COMP; Multiple Choice: Java is

(W) a language which must be recompiled for each different platform on which it runs.
(X) a language which generates native machine code.
(Y) a language which is cross-platform.
(Z) a language which generates only applets.

ANSWER: Y– A LANGUAGE WHICH IS CROSS-PLATFORM

BONUS

5. COMP; Multiple Choice: Which pixel operation causes a display pixel to be toggled on and off and still returns the pixel to its original value without extra storage?

(W) bitwise exclusive OR
(X) bitwise AND
(Y) bitwise NOR
(Z) none of the above

ANSWER: W– BITWISE EXCLUSIVE OR

TOSS-UP

6. BIOL; Multiple Choice: The distinct zones of the ocean depend upon

(W) distance from shore and temperature.
(X) distance from shore and depth.
(Y) temperature and types of organisms.
(Z) types of organisms and distance from shore.

ANSWER: X– DISTANCE FROM SHORE AND DEPTH

BONUS

6. BIOL; Multiple Choice: The region of the ocean in which photosynthesis occurs is the

(W) deep-sea zone.
(X) zooplankton zone.
(Y) nutrient zone.
(Z) photic zone.

ANSWER: Z– PHOTIC ZONE

TOSS-UP

7. PHYS; Multiple Choice: The speed of sound is

(W) slower in elastic materials in the same phase.
(X) slower in denser materials in the same phase.
(Y) faster in gases than in liquids.
(Z) faster in liquids than in solids.

ANSWER: X– SLOWER IN DENSER MATERIALS IN THE SAME PHASE

BONUS

7. PHYS; Multiple Choice: The loudness of a sound is called its

(W) timbre.
(X) intensity.
(Y) frequency.
(Z) pitch.

ANSWER: X– INTENSITY

TOSS-UP

8. CHEM; Multiple Choice: A homogeneous reaction is one in which reactants are

(W) well mixed.
(X) at the same temperature.
(Y) at the same pressure.
(Z) in the same state.

ANSWER: Z– IN THE SAME STATE

BONUS

8. CHEM; Multiple Choice: In a rate law, k has a fixed value

(W) under all conditions.
(X) at constant concentration.
(Y) at a particular temperature.
(Z) at atmospheric pressure.

ANSWER: Y– AT A PARTICULAR TEMPERATURE

TOSS-UP

9. ASTR; Short Answer: What giant moon of Neptune has a retrograde orbit?

ANSWER: TRITON

BONUS

9. ASTR; Multiple Choice: The prominent cloud belts and zones on the planet Jupiter are formed by what process?

(W) Transport of solar energy from the equator to the poles
(X) The flow of gas over a rocky surface
(Y) Intense solar heating of the cloud decks
(Z) Convection and rapid rotation of the planet

ANSWER: Z– CONVECTION AND RAPID ROTATION OF THE PLANET

TOSS-UP

10. PHYS; Multiple Choice: Intensity of sound is directly related to

(W) frequency.
(X) wavelength.
(Y) amplitude.
(Z) timbre.

ANSWER: Y– AMPLITUDE

BONUS

10. PHYS; Multiple Choice: Pitch is related to how

(W) loud the sound is.
(X) high the sound is.
(Y) quiet the sound is.
(Z) intense the sound is.

ANSWER: X– HIGH THE SOUND IS

TOSS-UP

11. CHEM; Multiple Choice: Reaction rate is the change in

(W) concentration per unit volume.
(X) time per change in concentration.
(Y) temperature per unit time.
(Z) concentration per unit time.

ANSWER: Z– CONCENTRATION PER UNIT TIME

BONUS

11. CHEM; Multiple Choice: Activation energy equals the

(W) energy at the peak of a reaction.
(X) difference between the peak energy and the energy of the reactants.
(Y) difference between the peak energy and the energy of the products.
(Z) difference between the energy of the products and the energy of the reactants.

ANSWER: X– DIFFERENCE BETWEEN THE PEAK ENERGY AND THE ENERGY OF THE REACTANTS

TOSS-UP

12. BIOL; Multiple Choice: About half of the energy plants absorb from the sun is

(W) stored as fat.
(X) stored as protein.
(Y) stored as energy.
(Z) used immediately.

ANSWER: Z– USED IMMEDIATELY

BONUS

12. BIOL; Multiple Choice: The first of these steps to occur when a lake becomes stagnant is that

(W) an algal bloom occurs.
(X) algae begin to die and bacteria take over.
(Y) nitrogen compounds enter it in large amounts.
(Z) the concentration of oxygen drops below the necessary level.

ANSWER: Y– NITROGEN COMPOUNDS ENTER IT IN LARGE AMOUNTS

TOSS-UP

13. ERSC; Multiple Choice: All of the following rocks are basaltic igneous rocks except

(W) gabbro.
(X) granite.
(Y) basalt.
(Z) scoria.

ANSWER: X– GRANITE

BONUS

13. ERSC; Short Answer: What are large mineral grades in a porphyritic igneous rock called?

ANSWER: PHENOCRYSTS

TOSS-UP

14. CHEM; Multiple Choice: The rate-determining step of a reaction is the

(W) fastest step.
(X) slowest step.
(Y) first step.
(Z) last step.

ANSWER: X– SLOWEST STEP

BONUS

14. CHEM; Multiple Choice: What is the general relationship between concentration and reaction rate?

(W) The higher the concentration, the higher the reaction rate
(X) The higher the concentration, the lower the reaction rate
(Y) Concentration and reaction rate vary inversely
(Z) There is no relationship between the two

ANSWER: W– THE HIGHER THE CONCENTRATION, THE HIGHER THE REACTION RATE

TOSS-UP

15. PHYS; Multiple Choice: Refraction occurs because waves

(W) are absorbed.
(X) move at different speeds in different media.
(Y) strike a barrier and bounce back.
(Z) bend around the edges of barriers.

ANSWER: X– MOVE AT DIFFERENT SPEEDS IN DIFFERENT MEDIA

BONUS

15. PHYS; Multiple Choice: Sonar refers to

(W) all waves of high frequency.
(X) all ultrasonic waves.
(Y) the science of sound.
(Z) sound navigation and ranging.

ANSWER: Z– SOUND NAVIGATION AND RANGING

TOSS-UP

16. BIOL; Multiple Choice: Long-term use of marijuana can result in reduced levels of the hormone

(W) estrogen.
(X) testosterone.
(Y) thyroxine.
(Z) ACTH.

ANSWER: X– TESTOSTERONE

BONUS

16. BIOL; Multiple Choice: The dust bowl of the 1930s resulted from

W) cutting down temperate forests.
(X) periodic fires.
(Y) overfarming the grasslands.
(Z) overgrazing of bison.

ANSWER: Y– OVERFARMING THE GRASSLANDS

TOSS-UP

17. CHEM; Multiple Choice: If gas A undergoes combustion faster than gas B under the same conditions, what factor accounts for the difference in rates?

(W) Surface area
(X) Concentration
(Y) Nature of the reactants
(Z) Temperature

ANSWER: Y– NATURE OF THE REACTANTS

BONUS

17. CHEM; Multiple Choice: Whenever products have more disorder than reactants

(W) delta H is negative.
(X) delta H is positive.
(Y) delta S is negative.
(Z) delta S is positive.

ANSWER: Z– DELTA S IS POSITIVE

TOSS-UP

18. MATH; Multiple Choice: If the limit of two functions are both zero or both infinite, the limit of the ratio of the two functions may sometimes be computed by taking the limit of the ratio of the derivatives of the two functions. The theorem that allows this is known as

(W) Simpson's rule.
(X) Liebnitz's rule.
(Y) L'Hospital's rule (pron: low-pee-tall's).
(Z) Newton's law.

ANSWER: Y– L'HOSPITAL'S RULE

BONUS

18. MATH; Short Answer: What number results when you add together the number of faces on a tetrahedron, a dodecahedron, and an icosahedron?

ANSWER: 36

TOSS-UP

19. ASTR; Multiple Choice: The Sojourner Mars rover has found evidence for

(W) Ancient catastrophic floods on the surface.
(X) Sub-surface permafrost frost.
(Y) Primitive fossils that may be Martian bacteria.
(Z) Volcanic rocks less than 1 billion years old.

ANSWER: W– ANCIENT CATASTROPHIC FLOODS ON THE SURFACE

BONUS

19. ASTR; Multiple Choice: Most of the mass of a spiral galaxy is contained in

(W) small faint stars.
(X) invisible dark matter.
(Y) gas and dust.
(Z) massive star clusters.

ANSWER: X– INVISIBLE DARK MATTER

TOSS-UP

20. BIOL; Multiple Choice: The taste buds on your tongue determine whether a food is

(W) salty or bitter.
(X) hot or cold.
(Y) sweet and hot.
(Z) sour and cold.

ANSWER: W– SALTY OR BITTER

BONUS

20. BIOL; Multiple Choice: The resting potential of a single neuron's cell membrane is

(W) 0.001 millivolt.
(X) 70 millivolts.
(Y) 500 millivolts.
(Z) 1500 millivolts.

ANSWER: X– 70 MILLIVOLTS

TOSS-UP

21. GENR; Short Answer: What is the subdivision in the Plant Kingdom comprising over 20,000 species of Mosses and Liverworts?

ANSWER: BRYOPHYTES (pron: bri'-eh-fites)

BONUS

21. GENR; Multiple Choice: The per capita birth rate of a population is known as its

(W) mortality.
(X) natality (pron: nay-tal-eh-ty).
(Y) population density.
(Z) carrying capacity.

ANSWER: X-- NATALITY

TOSS-UP

22. ERSC; Short Answer: The world's most active volcano is

ANSWER: KILAUEA

BONUS

22. ERSC; Multiple Choice: Which mechanical weathering process predominantly forms spheroidally weathered boulders?

(W) Exfoliation
(X) Frost wedging
(Y) Decomposition
(Z) Plant root dislodgement

ANSWER: W-- EXFOLIATION

TOSS-UP

23. PHYS; Short Answer: Besides solid, liquid, and gas, what is the fourth form of matter?

ANSWER: PLASMA

BONUS

23. PHYS; Multiple Choice: For a stringed instrument, higher frequency is directly related to

(W) longer strings.
(X) less tension in strings.
(Y) thinner strings.
(Z) lower intensity.

ANSWER: Y– THINNER STRINGS

TOSS-UP

24. COMP; Short Answer: What does RISC stand for?

ANSWER: REDUCED INSTRUCTION SET COMPUTER

BONUS

24. COMP; Multiple Choice: Which of the following is a definition of cache memory?

(W) Interface memory with better fetch speed than main memory.
(X) Memory that can be sold when the computer is obsolete.
(Y) Memory scheme that provides a larger memory than physical memory.
(Z) Memory based on gallium arsenide technology.

ANSWER: W– INTERFACE MEMORY WITH BETTER FETCH SPEED THAN MAIN MEMORY

TOSS-UP

25. GENR; Short Answer: What science deals with the structure of the universe and its origin?

ANSWER: COSMOLOGY

BONUS

25. GENR; Multiple Choice: You use a hydrometer to check the condition of the electrolyte in your car battery. It is actually measuring what property of the fluid?

(W) charge
(X) density
(Y) temperature
(Z) surface tension

ANSWER: X– DENSITY