NATIONAL DOUBLE ELIMINATION - 4

TOSS-UP

1. MATH; Multiple Choice: If a right circular cone is cut parallel with the axis of symmetry, you would reveal

   (W) a circle.
   (X) a hyperbola.
   (Y) an elipse.
   (Z) a parabola.

   ANSWER: X– A HYPERBOLA

BONUS

1. MATH; Short Answer: How many prime numbers are there between 30 and 60?

   ANSWER: SEVEN

TOSS-UP

2. PHYS; Multiple Choice: Weather satellites transmit cloud cover and temperature-humidity profiles back to Earth using images of which combination of the electromagnetic radiation types?

   (W) infra-red and visible light
   (X) ultraviolet and nuclear magnetic
   (Y) ultraviolet and infra-red
   (Z) ultraviolet and visible light

   ANSWER: W– INFRA-RED AND VISIBLE LIGHT

BONUS

2. PHYS; Multiple Choice: What is the theoretical limit of the efficiency of a single-crystal single-junction cell in a photovoltaic system?

   (W) 9 percent
   (X) 29 percent
   (Y) 79 percent
   (Z) 99 percent

   ANSWER: X– 29 PERCENT

TOSS-UP

3. BIOL; Multiple Choice: Calcitonin is produced by specialized cells in the

(W) anterior pituitary.
(X) posterior pituitary.
(Y) gonads.
(Z) thyroid gland.

ANSWER: Z– THYROID GLAND

BONUS

3. BIOL; Multiple Choice: The treatment of Addison's disease involves

(W) decreasing the activity of the adrenal cortex.
(X) decreasing the activity of the adrenal medulla.
(Y) doses of adrenal cortical hormones.
(Z) doses of noradrenaline.

ANSWER: Y– DOSES OF ADRENAL CORTICAL HORMONES

TOSS-UP

4. CHEM; Multiple Choice: A reaction is likely to proceed to completion if

(W) a liquid is formed.
(X) a gas is formed.
(Y) no water is formed.
(Z) it occurs in water.

ANSWER: X– A GAS IS FORMED

BONUS

4. CHEM; Multiple Choice: When the concentration of an ion that is part of the solubility expression is added to a saturated solution, what will occur?

(W) Nothing will occur.
(X) The solubility will increase.
(Y) The solution will become unsaturated.
(Z) Precipitation will occur.

ANSWER: Z– PRECIPITATION WILL OCCUR

TOSS-UP

5. COMP; Multiple Choice: The interface that enables similar networks to communicate is called

(W) bus network.
(X) bulletin board network.
(Y) cable modem.
(Z) bridge.

ANSWER: Z– BRIDGE

BONUS

5. COMP; Multiple Choice: The acronym TCP/IP (read T-C-P slash I-P) stands for

(W) To Computer Personnel/Internet Personnel.
(X) To Communications Protocol and Interested Parties.
(Y) Transmission Control Protocol/Internet Protocol.
(Z) Telecommuting Control Protocol/Intranet Protocol.

ANSWER: Y– TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL

TOSS-UP

6. BIOL; Multiple Choice: The beta cells of the pancreas secrete

(W) luteinizing hormone.
(X) oxytocin.
(Y) insulin.
(Z) glucagon.

ANSWER: Y– INSULIN

BONUS

6. BIOL; Multiple Choice: When the neurosecretory cells of the hypothalamus are stimulated, ADH and oxytocin are released in the

(W) posterior pituitary.
(X) anterior pituitary.
(Y) thyroid.
(Z) parathyroid.

ANSWER: W– POSTERIOR PITUITARY

TOSS-UP

7. PHYS; Multiple Choice: A solar cell does NOT respond to red light, but DOES respond to green light. The solar cell will be able to respond to

(W) microwaves.
(X) infra-red light.
(Y) ultraviolet light.
(Z) all of the above

ANSWER: Y– ULTRAVIOLET LIGHT

BONUS

7. PHYS; Short Answer: A 50 millimeter focal length camera lens photographs a 4 meter tall tree at a distance of 20 meters. How tall is the image of the tree?

ANSWER: 10 MILLIMETERS

TOSS-UP

8. CHEM; Multiple Choice: The ionic compound formed in an acid-base neutralization reaction is

(W) an indictor.
(X) a hydride.
(Y) a hydroxide.
(Z) a salt.

ANSWER: Z– A SALT

BONUS

8. CHEM; Multiple Choice: A substance is generally considered sparingly soluble if its solubility per liter of water is

(W) less than 0.01 mole.
(X) less than 0.1 mole.
(Y) less than 1.0 mole.
(Z) more than 1.0 mole.

ANSWER: W– LESS THAN 0.01 MOLE

TOSS-UP

9. ASTR; Multiple Choice: What civilization created the Zodiac to divide the path of the Sun into twelve equal places?

(W) Egyptians
(X) Chinese
(Y) Greeks
(Z) Babylonians

ANSWER: Z– BABYLONIANS

BONUS

9. ASTR; Short Answer: Since the signs of the Zodiac were established, the Sun has gradually shifted its position with respect to the background stars. As a result, the Sun in early December is in front of a constellation that is not part of the Zodiac. Name it.

ANSWER: OPHIUCHUS

TOSS-UP

10. PHYS; Multiple Choice: What reflecting surface forms a geometrically perfect image of a point source located at infinity (such as that approximated by a star)?

(W) Paraboloid
(X) Ellipsoid
(Y) Spherical
(Z) Hyperboloid

ANSWER: W– PARABOLOID

BONUS

10. PHYS; Multiple Choice: A block of metal that weighs 60 newtons in air and 40 newtons under water has a density, in kilograms per meter cubed, of

(W) 1000.
(X) 3000.
(Y) 5000.
(Z) 7000.

ANSWER: X– 3000

TOSS-UP

11. CHEM; Multiple Choice: The acid dissociation constant measures an acid's

(W) concentration.
(X) strength.
(Y) number of protons.
(Z) degree of sourness.

ANSWER: X– STRENGTH

BONUS

11. CHEM; Multiple Choice: The strength of a Bronsted-Lowry base is determined by its

(W) effect on skin and clothing.
(X) ability to furnish protons.
(Y) degree of bitterness.
(Z) attraction for protons.

ANSWER: Z– ATTRACTION FOR PROTONS

TOSS-UP

12. BIOL; Multiple Choice: If an amphibian has a tail after it undergoes metamorphosis, it is probably a

(W) toad.
(X) frog.
(Y) snake.
(Z) salamander.

ANSWER: Z– SALAMANDER

BONUS

12. BIOL; Multiple Choice: In the circulatory systems of adult amphibians, the first loop carries

(W) oxygen-poor blood to the lungs.
(X) oxygen-poor blood to the ventricles.
(Y) oxygen-rich blood from the body.
(Z) oxygen-rich blood to the ventricles.

ANSWER: W– OXYGEN-POOR BLOOD TO THE LUNGS

TOSS-UP

13. ERSC; Multiple Choice: An earthquake with a magnitude of 8.8 on the Richter scale releases how many times more energy than an earthquake with a magnitude of 7.8?

(W) 10
(X) 100
(Y) 32
(Z) 64

ANSWER: Y– 32

BONUS

13. ERSC; Multiple Choice: What kind of faults are caused by compressional forces?

(W) Normal
(X) Strike-slip
(Y) Reverse
(Z) Plastic

ANSWER: Y– REVERSE

TOSS-UP

14. CHEM; Multiple Choice: Acidic hydrogens are usually bonded to elements that attract electrons

(W) very weakly.
(X) somewhat weakly.
(Y) somewhat strongly.
(Z) very strongly.

ANSWER: Z– VERY STRONGLY

BONUS

14. CHEM; Multiple Choice: The correct name of the acid HBr is

(W) hydrobromic acid.
(X) hydrobromous acid.
(Y) bromate acid.
(Z) bromite acid.

ANSWER: W– HYDROBROMIC ACID

TOSS-UP

15. PHYS; Multiple Choice: Five coulombs of charge are placed on a thin-walled conducting shell. Once the charge has come to rest, the electric potential inside the hollow conducting shell is found to be

(W) zero.
(X) uniform inside the sphere and equal to the electric potential on the surface of the sphere.
(Y) smaller than the electric potential outside the sphere.
(Z) varying as one over r squared.

ANSWER: X– UNIFORM INSIDE THE SPHERE AND EQUAL TO THE ELECTRIC POTENTIAL ON THE SURFACE OF THE SPHERE

BONUS

15. PHYS; Short Answer: A two farad and a four farad capacitor are connected in series. What single capacitance is "equivalent" to this combination?

ANSWER: 4/3 FARADS OR 1.33 FARADS

TOSS-UP

16. BIOL; Multiple Choice: The first fishes were covered with

(W) bony plates and had jaws.
(X) bony plates and were jawless.
(Y) scales and had jaws.
(Z) scales and were jawless.

ANSWER: X– BONY PLATES AND WERE JAWLESS

BONUS

16. BIOL; Multiple Choice: The jawless fishes include the

(W) skates and rays.
(X) lungfish and rays.
(Y) skates and lampreys.
(Z) lampreys and hagfishes.

ANSWER: Z– LAMPREYS AND HAGFISHES

TOSS-UP

17. CHEM; Multiple Choice: The reaction of the anions and cations of salts with water to form acid or base solutions is called

(W) amphoterism.
(X) dissociation.
(Y) hydrolysis.
(Z) neutralization.

ANSWER: Y– HYDROLYSIS

BONUS

17. CHEM; Multiple Choice: The acid that is often called the "King of Chemicals" is

(W) sulfuric acid.
(X) nitric acid.
(Y) phosphoric acid.
(Z) acetic acid.

ANSWER: W– SULFURIC ACID

TOSS-UP

18. MATH; Multiple Choice: Imagine the earth to be a balloon with a 4,000 mile radius. If we inflate the earth to increase the radius l ft., the increase in the distance around the earth is

(W) 6.28 feet.
(X) 62.8 feet.
(Y) 628 feet.
(Z) 62,800 feet.

ANSWER: W– 6.28 FEET

BONUS

18. MATH; Short Answer: A woman has an equal number of nickels, dimes and quarters. If she has $12 in total, how many coins does she have?

ANSWER: 90 COINS

TOSS-UP

19. ASTR; Short Answer: One of the oldest constellations is associated with a legendary early king of Athens and is supposed to be a charioteer. Name it.

ANSWER: AURIGA

BONUS

19. ASTR; Short Answer: Name the comet, responsible for the Leonid meteor showers, that returned in February 1998.

ANSWER: TEMPEL-TUTTLE

TOSS-UP

20. BIOL; Multiple Choice: Tadpoles, salamander larvae, and a few adult salamanders get rid of excess carbon dioxide through their

(W) gills.
(X) lungs.
(Y) mouth cavities.
(Z) skin.

ANSWER: Z– SKIN

BONUS

20. IOL; Multiple Choice: The circulatory system of a tadpole, unlike that of an adult frog, has a

(W) double loop.
(X) triple loop.
(Y) two-chambered heart.
(Z) three-chambered heart.

ANSWER: Y– TWO-CHAMBERED HEART

TOSS-UP

21. GENR; Short Answer: What nocturnal animal group makes up one-fourth of all mammal species?

ANSWER: BATS or CHIROPTERA (PRON: KIE'RAHP-TUH-RUH)

BONUS

21. GENR; Multiple Choice: Who is considered the Father of the American Space Program?

(W) Edward Teller
(X) Werner von Braun
(Y) John Glenn
(Z) Robert Oppenheimer

ANSWER: X– WERNER von BRAUN

TOSS-UP

22. ERSC; Short Answer: Which discontinuity is located nearly halfway to the center of the earth at a depth of 2900 kilometers?

ANSWER: GUTENBERG

BONUS

22. ERSC; Multiple Choice: What forms when water that is flowing down a steep slope loses energy as it begins flowing on a level surface?

(W) alluvial fan
(X) delta
(Y) cirque
(Z) slump

ANSWER: W– ALLUVIAL FAN

TOSS-UP

23. PHYS; Short Answer: A machine performs 8 Joules of work in 2 seconds. How much power is delivered by this machine?

ANSWER: 4 WATTS

BONUS

23. PHYS; Short Answer: Name any four of the five elements that are ferromagnetic at room temperature (25 degrees Celsius).

ANSWER: IRON; COBALT; NICKEL; GADOLINIUM; DYSPROSIUM

TOSS-UP

24. COMP; Short Answer: For transmitting voice, video, and data simultaneously as digital signals over twisted-pair telephone lines from country to country, a set of international communications standard is used called

ANSWER: ISDN

BONUS

24. COMP; Multiple Choice: Smalltalk is

(W) an object-oriented programming language.
(X) a very concise program.
(Y) documentation.
(Z) a low level programming language.

ANSWER: W– AN OBJECT-ORIENTED PROGRAMMING LANGUAGE

TOSS-UP

25. GENR; Short Answer: Occasionally, a bad cold will cause a decrease in a person's hearing ability. What is the name of the tube that becomes blocked to cause this problem?

ANSWER: EUSTACHIAN TUBE (pron: yu-stay-shen)

BONUS

25. GENR; Multiple Choice: In which country was a method for making rust-resistant iron discovered in the fifth century B.C.?

(W) Sumeria
(X) Egypt
(Y) India
(Z) Babylon

ANSWER: Y– INDIA