

Science Bowl Questions 1994

Round 6

Toss-Up

1. ASTR; Multiple Choice: Hydrogen fusion for a one solar mass Main Sequence star lasts for about:
 - a) ten million years
 - b) one hundred million years
 - c) one billion years
 - d) ten billion years

ANSWER: D – TEN BILLION YEARS

Bonus

1. ASTR; Multiple Choice: A white dwarf star containing about the mass of the sun would be about the size of
 - a) the Sun
 - b) the Earth's orbit around the sun
 - c) The earth
 - d) an asteroid

ANSWER: C – THE EARTH

Toss-Up

2. BIOL; Multiple Choice: A certain group of archaeobacteria derives their energy from the reduction of carbon dioxide to combustible gas. These bacteria are collectively called:
 - a) gasifiers
 - b) methanogens
 - c) methylotrophs
 - d) propionibacteria

ANSWER: B - METHANOGENS

Bonus

2. BIOL; Multiple Choice: The bacterial conversion of nitrate to gaseous nitrogen is a process called:
 - a) nitrification
 - b) ammonification
 - c) denitrification
 - d) nitrogen fixation

ANSWER: C - DENITRIFICATION

Toss-Up

3. PHYS; Multiple Choice: The condition necessary for the conservation of momentum in a given system is that:
- a) energy is conserved
 - b) one body is at rest
 - c) no external force acts
 - d) internal forces equal external forces

ANSWER: C – NO EXTERNAL FORCE ACTS

Bonus

3. PHYS; Multiple Choice: Since sound intensity varies with the square of the frequency of the sound wave, and with the square of the amplitude, it has the dimensions of:
- a) energy per unit area
 - b) power per unit area
 - c) force per unit area
 - d) energy per length

ANSWER: B – POWER PER UNIT AREA

Toss-Up

4. CHEM; Short Answer: Name two of the German scientists who discovered the atomic fission of uranium and set the stage for the nuclear age.

ANSWER: HAHN, STRASSMAN, AND MEITNER

Bonus

4. CHEM; Short Answer: Who was the first American chemist to receive a Nobel Prize? He was selected in 1914 for his precise determination of atomic weights

ANSWER: (THEODORE) RICHARDS

Toss-Up

5. GENR; Short Answer: What part of a nuclear reactor is composed of groups of fuel assemblies?

ANSWER: THE CORE

Bonus

5. GENR; Multiple Choice: If the nucleus of an atom were magnified to about the size of a dime, then the atom itself would be about the size of a.

- a) football stadium
- b) small sports car
- c) dinner plate
- d) watermelon

ANSWER: A – FOOTBALL STADIUM

Toss-Up

6. COMP; Multiple Choice: What function or functions does the DOS FORMAT command perform?

- a) erases the disk
- b) creates tracks and sectors
- c) creates the file allocation table
- d) all of the above

ANSWER: D – ALL OF THE ABOVE

Bonus

6. COMP; Short Answer: What is the pixel resolution of a standard VGA monitor?

ANSWER: 640 x 480 (ACCEPT 600 – 680 X 450 – 500)

Toss-Up

7. CHEM; Short Answer: Who is accredited in the history of modern chemistry of proving that neutrons exist?

ANSWER: (JAMES) CHADWICK

Bonus

7. CHEM; Short Answer: Which halogen has the largest atomic radius:

ANSWER: ASTATINE

Toss-Up

8. BIOL; Multiple Choice: Bacteria which are capable of causing damage to a plant or animal host are said to be;

- a) virulent
- b) destructive
- c) pathogenic
- d) parasitic

ANSWER: C – PATHOGENIC

Bonus

8. BIOL; Short Answer: The use of fetal nerve cells to treat Parkinson's disease is being investigated. The hypothesis is that the cells will produce a certain class of necessary biochemicals that are either missing or present in low levels in patients with Parkinson's disease. Name that class of biochemicals.

ANSWER: NEUROTRANSMITTERS

Toss-Up

9. PHYS; Short Answer: Sub-atomic particles are composed of two smaller units. Name them.

ANSWER: QUARKS AND LEPTONS

Bonus

9. PHYS; Short Answer: Compared to an electron, what charge can a quark have?

ANSWER: +/- 1/3 or +/- 2/3 (ACCEPT 1/3 OR 2/3)

Toss-Up

10. ERSC; Multiple Choice: Ceratosaurs, Allosaurus, and Tyrannosaurus Rex are classified as what type of dinosaurs?

- a) Tetanurans
- b) Raptors
- c) Sauropods
- d) Theropods

ANSWER: D - THEROPODS

Bonus

10. ERSC; Multiple Choice: The great Saurischian dinosaur, Diplodocus, herbavore, and Allosaurus, a carnivore, differ greatly in size and other characteristics. During field excavations, what simple rule can be used to differentiate between herbivorous and carnivorous dinosaurs?

- a) fossil herbivorous dinosaur bones tend to be bigger
- b) fossil carnivorous dinosaur bones tend to be hollow
- c) fossil carnivorous dinosaur bones are denser
- d) fossil herbivorous dinosaur bones tend to have rounded crests

ANSWER: B – FOSSIL CARNIVOROUS DINOSAUR BONES TEND TO BE HOLLOW

Toss-Up

11. BIOL; Multiple Choice: Identify the anatomical name for the wishbone of a bird:

- a) furcula
- b) pygostyle
- c) synsacrum
- d) procoracoid

ANSWER: A - FURCULA

Bonus

11. BIOL; Multiple choice: Acetic acid, ethanol, lactic acid, propionic acid, and formic acid are all possible end products of the fermentation pathway called:

- a) glyoxylate cycle
- b) Krebs cycle
- c) glycolysis
- d) Calvin cycle

ANSWER: C – GLYCOLYSIS

Toss-Up

12. PHYS; Multiple Choice: The Pauli Exclusion Principle applies to:

- a) particles with whole-integer spin
- b) particles with half-integer spin
- c) particles with no spin
- d) particles with spin numbers > 10

ANSWER: B – PARTICLES WITH HALF-INTEGER SPIN

Bonus

12. PHYS; Multiple Choice: A particle with half-integer spin is called a:

- a) boson
- b) meson
- c) hadron
- d) fermion

ANSWER: D - FERMION

Toss-Up

13. CHEM; Multiple Choice: Which of the following is NOT an aliphatic hydrocarbon?

- a) n-octane
- b) propylene
- c) n-tridecane
- d) xylene

ANSWER: D – XYLENE

Bonus

13. CHEM; Multiple Choice: Which one of the following is NOT a vitamin?

- a) ascorbic acid
- b) niacin
- c) trypsin
- d) riboflavin

ANSWER: C - TRYPSIN

Toss-Up

14. MATH; Short Answer: To what power of 10 does the SL (s.l.) unit prefix giga-refer?

ANSWER: 9TH (ACCEPT THE 9TH POWER)

Bonus

14. MATH; Short Answer: What SI unit prefix refers to 10 to the minus 18th power?

ANSWER: ATTO

Toss-Up

15. GENR; Multiple Choice: In the nuclear industry, what is the average annual radiation exposure for a typical worker in the U.S.?
- a) 290 mrem (milli-rem)
 - b) 2,900 mrem
 - c) 29,000 mrem
 - d) 29 mrem

ANSWER: A – 290 MREM

Bonus

15. GENR; Multiple Choice: AVLIS (pron: ov-lis), a technology for enriching uranium, is an acronym for:
- a) Atomic Vapor Laser Ionization System
 - b) Advanced Vapor Laser Ion Separation
 - c) Atomic Vapor Laser Isotope Separation
 - d) Advanced Vapor Laser Isomer Structure

ANSWER: C – ATOMIC VAPOR LASER ISOTOPE SEPARATION

Toss-Up

16. BIOL; Multiple Choice: The production of cottage cheese, silage, cheese, sauerkraut, pickles, and yogurt is based on the ability of bacteria to produce:
- a) ethanol and carbon dioxide
 - b) xanthin gum
 - c) acetone and butanol
 - d) organic acids and alcohols

ANSWER: D – ORGANIC ACIDS AND ALCOHOLS

Bonus

16. BIOL; Multiple Choice: The anaerobic bacteria used to produce such economically important solvents as acetone and butanol belong to the genus:
- a) Escherichia
 - b) Acetobacter
 - c) Clostridium
 - d) Bacillus

ANSWER: C - CLOSTRIDIUM

Toss-Up

17. ASTR; Multiple Choice: Heavy elements like silver and gold are created primarily in:

- a) Main Sequence stars
- b) white dwarfs
- c) nova explosions
- d) supernovae

ANSWER: D - SUPERNOVAE

Bonus

17. ASTR; Multiple Choice: The Hubble constant is closely related to what property of the universe?

- a) age
- b) luminosity
- c) mass
- d) temperature

ANSWER: A – AGE

Toss-Up

18. PHYS; Multiple Choice: Power P is required to lift a body a distance d at a constant speed v . What power is required to lift the body a distance $2d$ at a constant speed $3v$?

- a) P
- b) $3P$
- c) $6P$
- d) $3P/2$

ANSWER: B – $3P$

Bonus

18. PHYS; Multiple Choice: A pick-up truck weighing 6000 lbs and traveling 20 mph runs straight into a car weighing 1500 lbs. After the collision, the truck and car interlock bumpers and are completely at rest. How fast was the car traveling?

- a) 40 mph
- b) 60 mph
- c) 80 mph
- d) 100 mph

ANSWER: C – 80 MPH

Toss-Up

19. CHEM; Short Answer: For what physical property of liquids of a Poise the unit of measure?

ANSWER: VISCOSITY

Bonus

19. CHEM; Short Answer: What term describes the orientation of orbitals in the sp^3 hybridized atom?

ANSWER: TETRAHEDRAL

Toss-Up

20. ERSC; Multiple Choice: During the Pleistocene, or Ice Age, the maximum southerly extent of continental glaciers in the United States was:

- a) Wisconsin
- b) Colorado
- c) Kansas
- d) New York

ANSWER: C – KANSAS

Bonus

20. ERSC; Short Answer: Name three of the six U.S. states where glaciers are currently found.

ANSWER: ALASKA, COLORADO, CALIFORNIA, WASHINGTON,
WYOMING, MONTANA

Toss-Up

21. COMP; Short Answer: If “last-in-first-out” describes a stack, what describes a queue?

ANSWER: FIRST-IN-FIRST-OUT

Bonus

21. COMP; Multiple Choice: Which computer was the first to make use of magnetic tape and the first to be mass-produced, rather than individually build, for the designers own use?

- a) ENIVAC
- b) UNIVAC
- c) IBM
- d) 8088

ANSWER: B – UNIVAC

Toss-Up

22. BIOL; Short Answer: The cell cycle is comprised of a sequence of phases during which nuclear and cell division occur in a mitotically dividing eukaryotic cell. During which phase the cells’ DNA synthesized?

ANSWER: S PHASE

Bonus

22. BIOL; Multiple Choice: Cancer causing genes, known as oncogenes, can be activated by which of the following mechanisms:

- a) amino acid substitution
- b) gene duplication
- c) gene rearrangement
- d) all of the above

ANSWER: D – ALL OF THE ABOVE

Toss-Up

23. MATH; Multiple Choice: Given a set T consisting of integers 1 through 10 inclusive, the subset of the odd numbers and the subset of the even numbers are:

- a) complementary
- b) intersecting
- c) absorptive
- d) idempotent

ANSWER: A - COMPLEMENTARY

Bonus

23. MATH; Short Answer: The intersection of these two subsets would be:

ANSWER: ZERO (ACCEPT EMPTY SET OR NOTHING)

Toss-Up

24. PHYS; Multiple Choice: A motor is lifting a mass of 35 kg at a constant speed of 6 m/s. If friction is neglected, the power developed by the motor to do this lifting is:

- a) 210 Watts
- b) 740 Watts
- c) 1500 Watts
- d) 2100 Watts

ANSWER: D – 2100 WATTS

Bonus

24. PHYS; Multiple Choice: Starting from rest, if a rock falls for one second, what is its average speed, in feet per second, during that second?

- a) 1 ft/s
- b) 4 ft/s
- c) 16 ft/s
- d) 32 ft/s

ANSWER: C – 16 FT/S

Toss-Up

25. CHEM; Short Answer: What is the type of bond in hydrogen chloride?

ANSWER: POLAR COVALENT

Bonus

25. CHEM; Short Answer: Cinnabar, pyrite, and galena are minerals which consist of one or more metals combined with the same element. Name the common element>

ANSWER: SULFUR
