

Science Bowl Questions 1994

Round 12

Toss-Up

1. ERSC; Short Answer: What four elements are most abundant by weight in the Earth's crust?

ANSWER: OXYGEN, SILICON, ALUMINUM, AND IRON

Bonus

1. ERSC; Multiple Choice: Which of the following are the most common minerals in the Earth's crust?

- a) olivines
- b) feldspars
- c) pyroxenes
- d) halites

ANSWER: B - FELDSPARS

Toss-Up

2. CHEM; Short Answer: Give the EMPIRICAL formula for the organic compound cyclopentene.

ANSWER: C_5H_8

Bonus

2. CHEM; Short Answer: How many oxygen atoms are there in one formula unit of magnetite?

ANSWER: FOUR

Toss-Up

3. COMP; Short Answer: What are the 4 major divisions in a COBOL program?

ANSWER: IDENTIFICATION, ENVIRONMENT, DATA, PROCEDURE

Bonus

3. COMP; Multiple Choice: A COBOL source program has 4 divisions. Which of the following divisions contains the equipment configuration?

- a) Identification
- b) Environment
- c) Data
- d) Procedure

ANSWER: B - ENVIRONMENT

Toss-Up

4. BIOL; Multiple Choice: Which of the following traits would a species with an opportunistic life history strategy be expected to possess?

- a) first reproduction occurs at an early age
- b) large offspring
- c) long lifespan
- d) low juvenile mortality rate

ANSWER: A – FIRST REPRODUCTION OCCURS AT AN EARLY AGE

Bonus

4. BIOL; Multiple Choice: Trout lilies live in the deciduous forests of eastern North America. They have small seeds, each of which has a small fat-body attached to its exterior surface. Which of the following organisms disperses the seeds of trout lilies?

- a) Short-tailed shrews
- b) White-footed mice
- c) White-throated sparrows
- d) Ants

ANSWER: D - ANTS

Toss-Up

5. PHYS; Multiple Choice: What particles, in addition to helium, are produced when lithium is bombarded by fast neutrons?
- a) tritons
 - b) deuterons
 - c) photon
 - d) protons

ANSWER: A - TRITONS

Bonus

5. PHYS; Multiple Choice: A golfer drives her ball from the tee down the fairway in a high arcing shot. When the ball is at the highest point of its flight, which of the following statements is true?
- a) its velocity and acceleration are both zero
 - b) its velocity is zero but its acceleration is nonzero
 - c) its velocity and acceleration are both nonzero
 - d) its velocity is nonzero but its acceleration is zero

ANSWER: C – ITS VELOCITY AND ACCELERATION ARE BOTH NONZERO

Toss-Up

GENR; Short Answer: Who invented dynamite?

ANSWER: (ALFRED) NOBEL

Bonus

GENR; Short Answer: What did Gail Borden give to the world in 1853?

ANSWER: CONDENSED MILK

Toss-Up

7. CHEM; Short Answer: What vitamin has the common name of calciferol?

ANSWER: VITAMIN D

Bonus

7. CHEM; Multiple Choice: In a liquid crystal, what is the name given to the simplest ordering of molecules?

- a) Nematic
- b) Smectic
- c) Cholesteric
- d) Lipidic

ANSWER: A - NEMATIC

Toss-Up

8. ASTR; Short Answer: Name the planets that are currently (1994) closest and furthest from the Sun.

ANSWER: MERCURY AND NEPTUNE (UNTIL 1998)

Bonus

8. ASTR; Short Answer: How many astronauts have set foot on the moon?

ANSWER: 12

Toss-Up

9. BIOL; Multiple Choice: Which of the following characteristics do the sieve tube elements of angiosperms share with the red blood cells of mammals?
- a) both generate ATP exclusively by anaerobic means
 - b) neither has a cell wall at maturity
 - c) neither has a plasmalemma at maturity
 - d) neither has a nucleus at maturity

ANSWER: D – NEITHER HAS A NUCLEUS AT MATURITY

Bonus

9. BIOL; Multiple Choice: Which of the following minerals is essential to the nutrition of vertebrate herbivores, yet usually not present in plants in high concentrations?
- a) calcium
 - b) sodium
 - c) potassium
 - d) iron

ANSWER: B - SODIUM

Toss-Up

10. MATH; Short Answer: What is the total edge length on a cube of a side x ?

ANSWER: $12x$

Bonus

10. MATH; Short Answer: Probability, odds, chance, and risk are all terms used when quantifying something uncertain, or stochastic, as opposed to something certain, or deterministic. If the odds of an event occurring are 5 to 2, what is the probability of the event not occurring

ANSWER: $2/7$

Toss-Up

11. PHYS; Multiple Choice: What color of light has a wavelength ranging from about 622 to 780 nanometers?

- a) yellow
- b) green
- c) red
- d) violet

ANSWER: C - RED

Bonus

11. PHYS; Multiple Choice: A car going around a curve of radius R at a speed V experiences a centripetal acceleration A . What is its acceleration if it goes around a curve of radius $3R$ at a speed of $2V$?

- a) $2A/3$
- b) $4A/3$
- c) $2A/9$
- d) $3A/2$

ANSWER: B – $4A/3$

Toss-Up

12. CHEM; Short Answer: What is another name for milk sugar?

ANSWER: LACTOSE

Bonus

12. CHEM; Multiple Choice: One property a colloidal dispersion has that a solution does not is:

- a) homogeneity
- b) filterability
- c) the Tyndall effect
- d) osmotic pressure

ANSWER: C – THE TYNDALL EFFECT

Toss-Up

13. COMP; Short Answer: Give the FORTRAN field descriptor for the following: -123.45

ANSWER: F7.2

Bonus

13. COMP; Multiple Choice: Which of the following is NOT characteristic of an operating system?

- a) is a resource manager
- b) is a library of utility programs
- c) defines the “user interface”
- d) shares the hardware among users

ANSWER: B – IS A LIBRARY OF UTILITY PROGRAMS

Toss-Up

14. BIOL; Multiple Choice: On which of the following hosts does Black Stem Rust produce unredinospores?

- a) Barberry
- b) Goldenrod
- c) Wheat
- d) White pine

ANSWER: C - WHEAT

Bonus

14. BIOL; Multiple Choice: Given a flower with 6 stamens, 3 stigmas, 1 style, and 1 ovary, how many carpels does the gynoecium contain?

- a) 6
- b) 3
- c) 2
- d) 1

ANSWER: B - 3

Toss-Up

15. ASTR; Short Answer: What constellation is known as The Water Bearer?

ANSWER: AQUARIUS

Bonus

15. ASTR; Multiple Choice: The number of zeros in the estimated number of stars in the Milky Way is the same as the number of the first Manned Apollo Mission to the surface of the Moon. What is this number?

- a) 7
- b) 9
- c) 11
- d) 12

ANSWER: C – THERE ARE APPROXIMATELY 200,000,000,000 STARS IN THE MILKY WAY AND APOLLO 11 WAS THE FIRST MANNED MISSION TO THE MOON

Toss-Up

16. PHYS; Short Answer: A 2 ton truck travels south at 40 mi/hr and collides head-on with a 3 ton truck moving at 30 mi/hr. The trucks stick together. Which way does the wreckage move?

ANSWER: TO THE NORTH (IN THE DIRECTION OF THE TRUCK OF GREATER MOMENTUM)

Bonus

16. PHYS; Multiple Choice: An unknown force F is applied to two unknown masses, A and B . Their accelerations are measured. From these data we can determine:

- a) the magnitude of F only
- b) the masses of A and B only
- c) the magnitudes of F and the masses A and B only
- d) the ratio of mass A to mass B only

ANSWER: D – THE RATIO OF MASS A TO MASS B ONLY

Toss-Up

17. CHEM; Short Answer: How many electron lone pairs are on the central atom in hydrogen sulfide?

ANSWER: TWO

Bonus

17. CHEM; Short Answer: Which member of the GROUP SIX A elements is the least metallic?

ANSWER: OXYGEN

Toss-Up

18. ERSC; Multiple Choice: The “greenhouse effect” describes the tendency of atmospheric gases to trap and retain solar energy. Which of the following gases is not a contributor to the “greenhouse effect”?

- a) carbon dioxide
- b) methane
- c) oxygen
- d) water vapor

ANSWER: C – OXYGEN

Bonus

18. ERSC; Multiple Choice: Although carbon dioxide concentration in the atmosphere is known to be increasing might cause future global warming, which other greenhouse gas has the strongest effect in keeping the Earth’s atmosphere warm?

- a) methane
- b) water vapor
- c) ozone
- d) chlorofluorocarbons

ANSWER: B – WATER VAPOR

Toss-Up

19. GENR; Short Answer: What fraction pure is 18-carat gold?

ANSWER: THREE - QUARTERS

Bonus

19. GENR; Short Answer: What American is considered the pioneer of modern rocketry?

ANSWER: ROBERT H. GODDARD

Toss-Up

20. PHYS; Multiple Choice: Which of the following refers to the collision of a photon and a free electron in which the electron recoils and a photon of longer wavelength is emitted?

- a) The Tyndall Effect
- b) The photoelectric effect
- c) The Auger Effect
- d) The Compton Effect

ANSWER: D – THE COMPTON EFFECT

Bonus

20. PHYS; Multiple Choice: The acceleration due to gravity on the moon is only about $1/6^{\text{th}}$ of that on Earth. An astronaut whose weight on Earth is 600 Newtons travels to the lunar surface. What is his approximate mass on the moon?

- a) 610 kg
- b) 100 kg
- c) 61 kg
- d) 10 kg

ANSWER: C – 61 KG

Toss-Up

21. BIOL; Multiple Choice: In a Mark-Recapture study of a field mouse population, 50 mice were captured, marked, and released. In a second capture two weeks later, 100 mice were captured, 10 of them bearing a mark. What is the estimated number of individuals in the field mouse population?
- a) 250
 - b) 500
 - c) 1000
 - d) 1500

ANSWER: B – 500

Bonus

21. BIOL; Multiple Choice: Which of the following groups of Protistans contains at least some species which are multicellular?
- a) Brown algae
 - b) Diatoms
 - c) Dinoflagellates
 - d) Euglenoids

ANSWER: A – BROWN ALGAE

Toss-Up

22. CHEM; Short Answer: A beaker of ethyl alcohol is marked 90 proof. What percentage of the liquid is ethyl alcohol?

ANSWER: 45%

Bonus

22. CHEM; Short Answer: Name the Greek philosopher who first proposed the idea that matter was composed of small indivisible particles.

ANSWER: DEMOCRITUS

Toss-Up

23. PHYS; Short Answer: Within the elastic limit of a material, stress is proportional to strain. Name this law.

ANSWER: HOOKE'S LAW

Bonus

23. PHYS; Multiple Choice: If two metal blocks of different masses slide freely down the same frictionless incline, which of the following is true?

- a) they have equal accelerations
- b) they have unequal accelerations, but the forces acting on them are equal
- c) the more massive block reaches the bottom first
- d) the less massive block reaches the bottom first

ANSWER: A – THEY HAVE EQUAL ACCELERATIONS

Toss-Up

24. MATH; Short Answer: What is the average of the first ten integers greater than thirteen?

ANSWER: 18.5

Bonus

24. MATH; Short Answer: A Undecagon is a polygon with each internal angle about 147 degrees. What is the sum of the internal angles

ANSWER: 1620 DEGREES (ACCEPT 1617)

Toss-Up

25. BIOL; Multiple Choice: Which of the following plant groups is homosporous?

- a) Dicotyledons
- b) Gymnosperms
- c) Ferns
- d) Monocotyledons

ANSWER: C – FERNS

Bonus

25. BIOL; Multiple Choice: the shoot of a plant sitting in a sunny window bends towards the sun. What accounts for this phenomenon?

- a) Abscisic acid causes cells on the sunny side of the stem to stop dividing
- b) Auxin causes cells on the shaded side of the stem to elongate
- c) Cytokinin causes cells on the shaded side of the stem to divide more rapidly
- d) Ethylene causes cells on the sunny side of the stem to shrink in size

ANSWER: B – AUXIN CAUSES CELLS ON THE SHADED SIDE OF THE STEM TO ELONGATE.
