



NATIONAL Science Bee

The National Science Bee – Varsity/Junior Varsity Division 2019-2020 National Qualifying Exam – C Set Version

NAME: _____ GRADE: _____ (e.g. 8th, 9th, 10th, etc.)

SCHOOL / HOMESCHOOL AFFILIATION: _____

* = Students in 6th- 8th grades are eligible to compete in both JV and Middle School Divisions. Students in 5th grade and younger are eligible to compete in both the JV and Elementary School Divisions. If you are in 8th grade or younger and you qualify for JV Nationals off this Exam, then you are also eligible to compete at Middle School or Elementary School Nationals (depending on your grade).

Email to report score to: _____
(print neatly!)

Instructions: Print the Correct Answer in the space provided or leave it blank. Write Neatly!!! Correct answers are worth 2 points. Incorrect answers are -1 point. Questions left blank are worth 0 points.

You have 20 minutes to complete this Exam. If you are also taking any other exam(s), you have 40 minutes in which to complete them, and you may do them simultaneously or one after the other.

- _____ 1) Organic chemistry principally studies compounds that contain what chemical element?
A) Nitrogen B) Oxygen C) Hydrogen D) Carbon
- _____ 2) In the mass-energy equivalence formula ($E=mc^2$), which of the following quantities is represented by c ?
A) force of gravity B) speed of light C) activation energy D) weight of the Earth
- _____ 3) Rosalind Franklin is best known for her work on the discovery of what structure?
A) DNA B) mitochondria C) cell membrane D) Helium atom
- _____ 4) The element of a circuit that inhibits the flow of electricity is known as what?
A) galvanometer B) resistor C) inductor D) capacitor
- _____ 5) A pair of 2-dimensional Cartesian coordinates can be used to calculate all of the following except?
A) length of a line segment B) perimeter of a square
C) angle of a ray D) volume of a cone
- _____ 6) A widely-used test of a computer's ability to imitate human behavior was created by what man?
A) Charles Babbage B) Alan Turing C) Stephen Hawking D) Richard Feynman
- _____ 7) The majority of the earth's core is composed of iron and what other element?
A) Nickel B) Copper C) Aluminum D) Silicon

- _____ 8) Regis, Proxima Centauri, and Antares are all instances of what astronomical feature?
A) moons B) stars C) galaxies D) planets
- _____ 9) The mesopause and tropopause are used to delineate sections of which of the following?
A) the atmosphere B) the mantle C) asteroid belt D) cloud structure
- _____ 10) Gregor Mendel is known for his work in advancing what branch of biology?
A) histology B) ecology C) genetics D) nutrition
- _____ 11) Potassium and sodium are found in what periodic group, also numbered Group I?
A) transition metals B) chalcogens C) halogens D) alkali metals
- _____ 12) Protein synthesis is accomplished by what organelle?
A) ribosome B) mitochondrion C) Golgi complex D) lysosome
- _____ 13) Which of the following is often used in web page design?
A) Java B) C++ C) HTML D) Oracle
- _____ 14) Skin, nails, and hair are all part of which organ system?
A) lymphatic B) integumentary C) musculoskeletal D) excretory
- _____ 15) What liquid, when placed in a glass container, forms a convex meniscus?
A) mercury B) water C) honey D) dish soap
- _____ 16) Which of the following landforms is not caused by glacial movement?
A) moraine B) esker C) fjord D) steppe
- _____ 17) The hypotenuse is a line opposite what type of angle in a triangle?
A) acute B) obtuse C) right D) reflex
- _____ 18) Gaseous matter, when ionized, transitions into what other phase of matter?
A) solid B) plasma C) liquid D) magnetic
- _____ 19) A sequence of instructions used to complete a process is known in computing as what?
A) software B) cryptogram C) recursion D) algorithm
- _____ 20) The Hertzsprung-Russell diagram is a scatter plot used by scientists in what field?
A) atomic chemistry B) astronomy C) cell biology D) geology
- _____ 21) Which of the following elements is classified as a metalloid?
A) Iodine B) Lead C) Mercury D) Arsenic
- _____ 22) Which of the following is the highest (or most complex) level of biologic organization?
A) tissue B) organism C) biome D) population
- _____ 23) Calcium carbonate (CaCO_3) would best be described as which of the following?
A) element B) compound C) mixture D) suspension
- _____ 24) The rotational analog of linear force is known as what?
A) friction B) momentum C) torque D) impulse

- _____ 25) Which of the following is not considered a parallelogram?
A) rhombus B) rectangle C) trapezoid D) square
- _____ 26) Which planet has a comet-like tail due to weak atmospheric forces?
A) Mercury B) Mars C) Saturn D) Neptune
- _____ 27) The cuboid, navicular, and metatarsals are bones found in what part of the human skeleton?
A) head B) hands C) legs D) feet
- _____ 28) What metal exhibits the greatest electrical conductivity?
A) Titanium B) Mercury C) Silver D) Lead
- _____ 29) As a wave's wavelength increases, which of the following properties decreases?
A) density B) frequency C) period D) speed of sound
- _____ 30) The tonoplast is a membrane surrounding what cellular structure?
A) vacuole B) nucleus C) peroxisome D) chloroplast
- _____ 31) What term denotes a line that intersects a circle at two points?
A) tangent B) secant C) radius D) origin
- _____ 32) The theory of inheritance of acquired characteristics is known by what term?
A) Lamarckism B) Phylogenetics C) Natural selection D) Allopatric speciation
- _____ 33) The endocrine system is not responsible for the production of which compound?
A) adrenaline B) oxytocin C) lymph D) insulin
- _____ 34) Which of the following structures is used to transport water up the stems of vascular plants?
A) xylem B) phloem C) meristem D) phellem
- _____ 35) Sodium and chlorine are joined by what structure to form table salt?
A) polar covalent B) ionic C) metallic D) non-polar covalent
- _____ 36) The change in acceleration in relation to time is known as what?
A) velocity B) speed C) jerk D) direction
- _____ 37) The limit of $(1+1/n)^n$ as n approaches infinity can be expressed by what constant?
A) pi B) tau C) Euler's number D) Avogadro's number
- _____ 38) A set of points defined as being equidistant from a focal point and a line is known by what term?
A) ellipse B) parabola C) circle D) hyperbola
- _____ 39) The hollow area formed after a volcanic eruption is known as a what?
A) fissure vent B) pyroclastic shield C) caldera D) lava dome
- _____ 40) The plum pudding model of atomic structure was proposed by what physicist who had earlier discovered the electron?
A) John Dalton B) Neils Bohr C) J.J. Thompson D) Ernest Rutherford
- _____ 41) The force perpendicular to the surface on which an object rests is known as what?
A) normal force B) frictional force C) reaction force D) gravitational force

- _____ 42) Which acid-base model defines acids as substances that dissociate in aqueous solutions?
A) Bronsted-Lowry B) Arrhenius C) Lewis D) Solvent System
- _____ 43) A computer scientist can utilize LaTeX for what process?
A) calculations B) translation C) word processing D) typesetting
- _____ 44) The electromagnetic waves with the longest wavelengths are known as what?
A) ultraviolet waves B) x-rays C) microwaves D) radio waves
- _____ 45) The trapezoid rule is used to approximate the area under a curve in which field?
A) algebra B) trigonometry C) computer science D) calculus
- _____ 46) Which of the following particles has a composite structure that can be subdivided?
A) hadron B) lepton C) fermion D) boson
- _____ 47) Which of the following terms can be used to refer to a fluid-filled cavity in the spinal cord in humans or a vocal organ in ornithology?
A) tympanum B) caries C) epiglottis D) syrinx
- _____ 48) Which ocean basin sees on average the greatest incidence of tropical cyclogenesis annually?
A) Western Indian Ocean B) North Atlantic Ocean
C) Western North Pacific Ocean D) Eastern North Pacific Ocean
- _____ 49) What name is given to the scientific process by which macromolecules are separated by size and charge?
A) enzyme assay B) protein purification
C) gel electrophoresis D) two-hybrid screening
- _____ 50) Nodes of Ranvier and myelin sheaths can be found along what cell structure?
A) axon B) nucleus C) terminal D) mitochondrion