

**Test:** 2021 Biology NCE (HS)

### Question 1 of 75

What happens to the surface area to volume ratio as a cell grows?

- A) It decreases.
- B) It increases.
- C) It doubles
- D) It does not change

### Question 2 of 75

Why do multicellular organisms have emergent properties?

- A) They have more genes than unicellular organisms
- B) Properties of unicellular organisms are enhanced by having many cells
- C) All of their genes are expressed whereas unicellular organisms express only some
- D) They show properties that can only result from the interaction of many cells

### Question 3 of 75

What is a characteristic of the human Y chromosome?

- A) It is made of DNA and histones covered by phospholipids
- B) It contains some genes that are not present on the X chromosome
- C) It is the largest chromosome in the human karyotype
- D) It has a condensed length of approximately 100  $\mu\text{m}$

### Question 4 of 75

Which example provides evidence of evolution?

- A) White wings of a peppered moth turn black in industrial areas
- B) Antibiotic resistant bacteria replace non-resistant bacteria over time
- C) Some Galapagos finches' beaks become smaller during dry years
- D) Polar bears are found in warmer latitudes following global warming

**Question 5 of 75**

What promotes natural selection?

- I. Overpopulation
- II. Competition
- III. Variation

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- A) I and II only
- B) I and III only
- C) II and III only
- D) I, II and III

**Question 6 of 75**

Which structure found in eukaryotes has a single membrane?

- 
- A) Nucleus
- B) Lysosome
- C) Chloroplast
- D) Mitochondrion

**Question 7 of 75**

What is required for a skeletal muscle to exert force?

- 
- A) Extensor & flexor muscles
- B) Synovial joints
- C) Attachments to bones
- D) Ligaments

**Question 8 of 75**

What occurs in the body after the injection of a vaccine containing antigens?

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- A) Activated B-cells divide to form memory cells.
- B) The receiver of the vaccine develops passive immunity.
- C) Helper T-cells produce specific antibodies.
- D) Macrophages are cloned and destroy the antigen.

**Question 9 of 75**

What is required to replicate DNA?

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- A) Temperature of 37 °C
- B) Free nucleotides carrying A, C, G and T bases
- C) Plasmids
- D) Endonuclease

**Question 10 of 75**

What property makes water an important coolant in the natural world?

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- A) It is cohesive.
- B) It requires much energy to evaporate.
- C) It has a lower temperature than blood.
- D) It has a low specific heat.

**Question 11 of 75**

Which can be explained by the solvent properties of water?

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- A) Sodium chloride is transported as Na<sup>+</sup> and Cl<sup>-</sup> in blood.
- B) Movement of water occurs under tension in the xylem.
- C) Water is the coolant in sweat.
- D) Ice floats on liquid water.

**Question 12 of 75**

What is a community composed of?

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- A) Habitats
- B) Populations
- C) Abiotic factors
- D) Biotic & abiotic factors

**Question 13 of 75**

What is a population?

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- A) Organisms of the same genus living in an ecosystem
- B) Organisms living together and interacting in the same habitat
- C) Organisms of a species living together in the same area
- D) Organisms that can breed together

**Question 14 of 75**

What best describes the mode of nutrition of a heterotroph?

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- A) It ingests only non-living organic matter.
- B) It obtains organic molecules from other organisms.
- C) It synthesizes its organic molecules from inorganic substances.
- D) It produces its organic molecules from chemical reactions using light.

**Question 15 of 75**

Which is an effect of protein denaturation?

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- A) The order of amino acids is changed when the protein overheats.
- B) The bonds between amino acids are broken by condensation.
- C) Parts of the protein become linked together by hydrolysis.
- D) The three-dimensional structure of the protein is altered.

**Question 16 of 75**

The most abundant structural protein in the human body is found in ligaments and skin. What is the name of this protein?

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- A) Collagen
- B) Hemoglobin
- C) Myoglobin
- D) Immunoglobulin

**Question 17 of 75**

What is a role of sulfur in living organisms?

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- A) Formation of proteins
- B) Formation of carbohydrates
- C) Formation of teeth
- D) Transmission of nerve impulses

**Question 18 of 75**

What is a role of cholesterol in animal cells?

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- A) It increases body fat.
- B) It controls membrane fluidity.
- C) It lines the inner wall of capillaries.
- D) It is a constituent of bile.

**Question 19 of 75**

Which process is possible due to the fluidity of cell membranes?

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- A) Endocytosis
- B) Osmosis
- C) ATP production
- D) Cell recognition

**Question 20 of 75**

Which functions of life are carried out by all unicellular organisms?

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- A) Response, homeostasis, growth and photosynthesis
- B) Metabolism, ventilation, reproduction and nutrition
- C) Response, homeostasis, metabolism and growth
- D) Reproduction, ventilation, response and nutrition

**Question 21 of 75**

What provides evidence for the endosymbiotic theory?

- A) Mitochondrial DNA in eukaryotic cells
- B) 70S ribosomes in prokaryotic cells
- C) Gene transfer from prokaryotic cells to eukaryotic cells using plasmids
- D) Prokaryotic cells (*Escherichia coli*) in the large intestine digest proteins

**Question 22 of 75**

How can the rate of photosynthesis be measured?

- I. By the amount of oxygen produced
- II. By the increase in biomass
- III. By the amount of carbon dioxide produced

- A) I only
- B) I and II only
- C) I and III only
- D) I, II and III

**Question 23 of 75**

Which process can be used to amplify small fragments of DNA?

- A) Gel electrophoresis
- B) Polymerase chain reaction
- C) DNA profiling
- D) Electron microscopy

**Question 24 of 75**

Which is a possible risk associated with a genetic modification of crops?

- A) Crop plants will become weaker with time.
- B) It can increase mutations in the organisms that consume them.
- C) Starch obtained from genetically modified plants will be more difficult to digest.
- D) Resistance to herbicide genes can be transferred to weeds.

**Question 25 of 75**

What is the composition of eukaryotic chromosomes?

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- A) DNA only
- B) DNA & ribose
- C) DNA & RNA
- D) DNA & proteins

**Question 26 of 75**

What contributes to the enhanced greenhouse effect?

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- A) Ozone from violent thunderstorms
- B) Carbon particles in diesel engine exhaust
- C) Methane from agricultural sources
- D) Carbon dioxide from active volcanoes around the world

**Question 27 of 75**

In ecosystems the amount of energy that passes from one trophic level to the next is called the conversion efficiency. What is the average conversion efficiency from primary to secondary consumers in most ecosystems?

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- A) 1%
- B) 10%
- C) 50%
- D) 90%

**Question 28 of 75**

At each trophic level energy is lost. How is this energy regained by the ecosystem?

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- A) Heat
- B) Nutrients
- C) Photosynthesis
- D) Recycling

**Question 29 of 75**

Which of the following is an example of a negative feedback loop?

- A) house thermostat turning heat on and off
- B) increasing temperature melting sea ice, which makes ocean absorb more heat which melts more ice
- C) drought causes plants to die off which causes less water vapor to be released into air, which causes less rain making drought worse, and more plants die
- D) blood clotting- when platelets arrive at injury site they release clotting factors that cause more platelets to be released.

**Question 30 of 75**

What percent of animal species are chordates?

- A) 1%
- B) 5%
- C) 25%
- D) 50%

**Question 31 of 75**

When coral kick out their symbiotic algae, in response to increasing temperature and acidity it is called

- A) coal weakening
- B) algal deterioration
- C) coral bleaching
- D) coral withering

**Question 32 of 75**

Ethology is

- A) study of ethos
- B) study of ecosystems
- C) study of volcanoes
- D) study of animal behavior



**Question 33 of 75**

Kidneys that conserve water are essential to homeostasis because

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- A) some animals live in dry or salty environments
- B) cells will be unable to convert ammonia into urea if excess water is excreted
- C) some animals drink water
- D) urea and its by-products are not soluble in water

**Question 34 of 75**

Which of the following does not nourish their young with mother's milk

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- A) monotremes
- B) sphenodontia
- C) marsupials
- D) placentals

**Question 35 of 75**

Which part of the brain is devoted to thought and memory

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- A) cerebellum
- B) brain stem
- C) cerebrum
- D) medulla oblongata

**Question 36 of 75**

A skeleton made of fluid filled body segments that allow an animal to move is a(n)

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- A) endoskeleton
- B) exoskeleton
- C) joints
- D) hydrostatic skeleton

**Question 37 of 75**

Body parts that have similar functions but different structure and development are

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- A) analogous structures
- B) vestigial structures
- C) homologous structures
- D) embryological formations

**Question 38 of 75**

All species-living and extinct- are united by same ancient ancestor is the basis for

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- A) Darwin's Law
- B) Principle of Common Descent
- C) Malthusian Principle
- D) Tragedy of the Commons

**Question 39 of 75**

The idea that organisms could change or evolve by using or not using various parts of their body was developed by

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- A) Darwin
- B) Hutton
- C) Lamarck
- D) Malthus

**Question 40 of 75**

Which of the following is not a parameter of natural selection?

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- A) more babies born than can survive
- B) there is a struggle for existence
- C) natural heritable variation affects ability to survive and reproduce
- D) traits are chosen for by specialty breeders

**Question 41 of 75**

For an organism to be able to survive and reproduce is called

- 
- A) fitness
  - B) adaptation
  - C) artificial selection
  - D) genetic bottleneck

**Question 42 of 75**

A complete diploid set of chromosomes grouped together in pairs and in order of decreasing size is a

- 
- A) autosomal pairs
  - B) karyotype
  - C) codominant alleles
  - D) spatial chromosomes

**Question 43 of 75**

Which of the following disorders does NOT result from nondisjunction in meiosis?

- 
- A) Down Syndrome
  - B) Turner's Syndrome
  - C) Sickle Cell Disease
  - D) Klinefelter's Syndrome

**Question 44 of 75**

Males are more likely to be colorblind because the allele for colorblindness is

- 
- A) dominant and located on the X chromosome
  - B) dominant and located on the Y chromosome
  - C) recessive and located on the Y chromosome
  - D) recessive and located on the X chromosome

**Question 45 of 75**

In a normal human karyotype, how many chromosomes are there?

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- A) 46
- B) 23
- C) 2
- D) 44

**Question 46 of 75**

In order to take advantage of naturally occurring variation of organisms in order to pass them on to future generations is called ?

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- A) inbreeding
- B) selective breeding
- C) mutation
- D) hybridization

**Question 47 of 75**

A genetically engineered substance put into transgenic rice has the potential to treat

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- A) malaria
- B) high blood pressure
- C) vitamin A deficiency
- D) cancer

**Question 48 of 75**

In order to understand the activity levels of hundreds of genes at once, a scientist would likely use

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- A) PCR
- B) DNA sequencing
- C) positive enzyme testing
- D) a DNA microarray

**Question 49 of 75**

The disruption of genetic equilibrium in a population as predicted by the Hardy-Weinberg Principle is caused by

- A) immigration of new individuals
- B) random mating
- C) large population sizes
- D) polygenic traits

**Question 50 of 75**

How do mineral ions in the soil move into the root?

- A) Osmosis
- B) Mass flow of water
- C) Translocation
- D) Through phloem

**Question 51 of 75**

Which is a statement of Mendel's law of independent assortment?

- A) Allele pairs separate during gamete formation and recombine during fertilization.
- B) Allele pairs for different genes separate independently during gamete formation.
- C) Unlinked alleles are assorted with a 9 : 3 : 3 : 1 ratio in a dihybrid cross.
- D) Allele pairs for the same gene are assorted independently during gamete formation.

**Question 52 of 75**

What process occurs during the light-independent reactions of photosynthesis?

- A) Oxygen is released into the atmosphere.
- B) Protons are pumped from the thylakoid space to the stroma.
- C) RuBP is carboxylated then regenerated in the Calvin cycle.
- D) Triose phosphate is converted to glycerate 3-phosphate.

**Question 53 of 75**

Energy is stored in the chemical bonds of living cells as

- 
- A) ATP
  - B) NADH+
  - C) RNA
  - D) carrier proteins

**Question 54 of 75**

What are light-independent reactions of photosynthesis called?

- 
- A) Biosynthetic phase
  - B) Carbon cycle
  - C) NADP+ cycles
  - D) Calvin cycle

**Question 55 of 75**

Which factor does not affect the rate of photosynthesis

- 
- A) temperature
  - B) waxy cuticles
  - C) light intensity
  - D) water availability

**Question 56 of 75**

Which of the following statements is incorrect?

- 
- A) Active immunity is the stimulation of the immune system to produce antigen-specific antibodies.
  - B) Vaccines produce immunological memory similar to that acquired by having the natural disease.
  - C) The most common way to acquire passive immunity is to have the natural disease.
  - D) Killed forms of a microorganism can act as an antigen.

**Question 57 of 75**

This is a sequence of nucleotides from a section of mRNA.

AUGAAACGCACGCAG

From which DNA sequence has it been transcribed?

- 
- A) ATGAAACGCACGCAG
  - B) UACUUUGCGUGCGAC
  - C) TACUUUGCGTGCGTC
  - D) TACTTTGCGTGCGTC

**Question 58 of 75**

Which are characteristics of a species?

- I. The potential to interbreed to produce fertile offspring
- II. The formation of a population with members of the same species within a community
- III. The overproduction of offspring

- 
- A) I and II only
  - B) I and III only
  - C) II and III only
  - D) I, II and III

**Question 59 of 75**

Which fungi are named a reproductive cell that resembles a club?

- 
- A) radiolarians
  - B) basidiomycetes
  - C) chloanozoa
  - D) rhodophytes

**Question 60 of 75**

Which of the following is a good bioindicator of the state of the atmosphere?

- 
- A) ascomycetes
  - B) chytrids
  - C) lichens
  - D) zygomycetes

**Question 61 of 75**

Which group of animals are characterized by being the simplest animals to have specialized tissues, radial body symmetry and are usually aquatic carnivores?

- 
- A) uniramia
  - B) porifera
  - C) arthropods
  - D) cnidarians

**Question 62 of 75**

Choose the simplest to most complex for levels of organization in human body.

- 
- A) cells, tissues, organs, organ systems
  - B) organ systems, organs, tissues, cells
  - C) cells, organs, organ systems, tissues
  - D) organ systems, organs, cells, tissues

**Question 63 of 75**

In maintaining homeostasis, what is the correct order of events? 1. the liver removes glucose from blood 2. body absorbs food after eating 3. as glucose is used for energy, liver releases stored glucose into blood 4. levels of glucose in blood rise

- 
- A) 3,4,1,2
  - B) 1,2,3,4
  - C) 2,4,1,3
  - D) 4,1,2,3



**Question 64 of 75**

Name the immune response that creates redness and swelling around damaged cells

- 
- A) cell-mediated response
  - B) inflammatory response
  - C) humoral response
  - D) autoimmune response

**Question 65 of 75**

Which region of the brain is responsible for voluntary activities such as learning, intelligence and judgment?

- 
- A) brain stem
  - B) thalamus
  - C) cerebellum
  - D) cerebrum

**Question 66 of 75**

When gated sodium channels open to admit Na<sup>+</sup>, the potential reverses. This rapidly moving potential is called ?

- 
- A) action potential
  - B) CNS potential
  - C) autonomic potential
  - D) impulse potential

**Question 67 of 75**

Some joints in the human body allow one bone to slide in two directions. What are these joints called?

- 
- A) pivot joints
  - B) saddle joints
  - C) ball-and-socket joints
  - D) hinge joints

**Question 68 of 75**

The immune system and the endocrine systems main function is to

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- A) control body temperature
- B) regulate the amount of water in the body
- C) restore homeostasis
- D) stimulate growth and development

**Question 69 of 75**

Which of the following would NOT be in a model of invertebrate nervous system?

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- A) ganglia
- B) brain
- C) interneurons
- D) cerebellum

**Question 70 of 75**

A species that lays eggs that develop outside of the mother's body is

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- A) oviparous
- B) ovoviviparous
- C) viviparous
- D) nonviviparous

**Question 71 of 75**

Oxygen is constantly diffuses from the air or water into an animals bloodstream. What must the concentration of oxygen in the blood be?

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- A) greater than concentration of carbon dioxide in air or water
- B) lower than the concentration of carbon dioxide in air or water
- C) lower than the concentration of oxygen in the air or water
- D) greater than the concentration of oxygen in the air or waer

**Question 72 of 75**

Ammonia can be converted into uric acid by both butterflies and houseflies. Where does this occur?

- 
- A) kidneys
  - B) Malpighian tubules
  - C) nephrons
  - D) testes

**Question 73 of 75**

When did monotremes, marsupials, and placentals evolve?

- 
- A) beginning of Cenozoic
  - B) end of Cenozoic
  - C) beginning of Mesozoic
  - D) end of Paleozoic

**Question 74 of 75**

Which of these traits distinguish fungi from plants?

- 
- A) lack of cell walls
  - B) use of asexual reproduction
  - C) use of sexual reproduction
  - D) cell walls made of chitin

**Question 75 of 75**

What process occurs when a single species evolves into several distinct species?

- 
- A) convergent evolution
  - B) coevolution
  - C) genetic drift
  - D) adaptive radiation