

**DIAGNOSTIC TEST IN GENERAL BIOLOGY 2**  
**SY 2022-2023**

**Instructions:** Read each question carefully and shade the correct answer in the answer sheet provided to you. Do not write anything on this test questionnaire.

1. Which of the following best describe Genetic Engineering?
  - A. Mating of organisms with desirable qualities or traits.
  - B. Natural cross-breeding of a male and a female organism.
  - C. Changes in species of organisms that occur over a long period of time.
  - D. Modification of the characteristics of an organism by manipulating its genetic material.**
  
2. The headline ***“Improved Soybeans Produce Healthier Vegetable Oils”*** accompanies an article describing how a biotechnology company controls the types of lipids (fats) present in soybeans. The improved soybeans are most likely being developed by the process of:
  - A. Asexual reproduction
  - B. Genetic engineering**
  - C. Habitat modification
  - D. Natural selection
  
3. Which statement best describes human insulin that is produced by genetically engineered bacteria?
  - A. This insulin will not function normally in humans because it is produced by bacteria.
  - B. This insulin is produced as a result of human insulin being inserted into bacteria cells.**
  - C. This insulin is produced as a result of exposing bacteria cells to radiation, which produces a mutation.
  - D. This insulin may have fewer side effects than the insulin previously extracted from the pancreas of other animals.
  
4. Which of the following sequence of four time frames are arranged from the oldest to the youngest?
  - A. Cenozoic Era, Mesozoic Era, Paleozoic Era, Precambrian Time
  - B. Mesozoic Era, Precambrian Time, Cenozoic Era, Paleozoic Era
  - C. Paleozoic Era, Mesozoic Era, Precambrian Time, Cenozoic Era
  - D. Precambrian Time, Paleozoic Era, Mesozoic Era, Cenozoic Era**

5. When the scientist who discovered the fossil above came back to his laboratory, would probably use which of the following terms in recording the findings in his journal?



Figure 1. Fossils

Photo Source: <https://www.propofs.com/quiz-school/story.php?title=foss>

- A. body fossil
  - B. bone fossil
  - C. cast fossil
  - D. mold fossil**
6. According to the theory of evolution, which of the following is the cause on the differences in species?
- A. natural selection**
  - B. mutagenic agents
  - C. disuse of body structures
  - D. transmission of acquired characteristics
7. A fossil of a fern and other large-leafed plants were found in an area of Alaska. What does this suggest about this area in Alaska?
- A. A forest is now covered with snow.
  - B. A farm was once located in the area.
  - C. The area once had a warmer climate.**
  - D. Prehistoric man ate large-leafed plants.
8. A small group of people living in a remote area have high incidence of "blue skin", a condition that results from a variation in the structure of haemoglobin. All of the "blue-skinned" people can trace their ancestry to one couple, who were among the original settlers of this area. The unusual high frequency of "blue skin" in this area is an example of?
- A. mutation
  - B. genetic drift**
  - C. natural selection
  - D. artificial selection

9. Figure 2 below shows the bones in the forelimbs of three different organisms. What hypothesis that supports on the similarities on the arrangements of the bones?

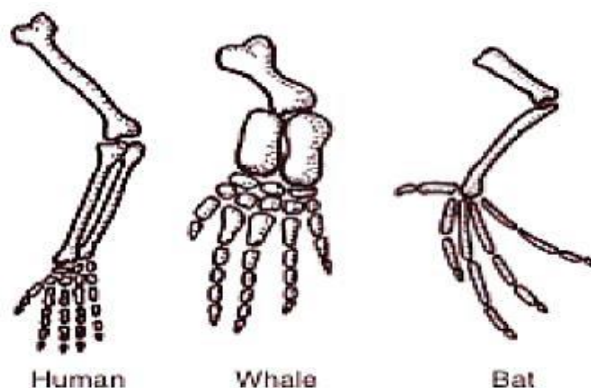


Figure 2. Evolution

Photo Source: [shorturl.at/hELO4](http://shorturl.at/hELO4)

- A. These organisms are members of the same species.
  - B. These organisms are all contain the same genetic information.
  - C. These organisms may have descended from a common ancestor.**
  - D. These organisms have no adaptations to survive in different environments.
10. Which of the following provides the best explanation for the illustration given as an evidence of evolution?

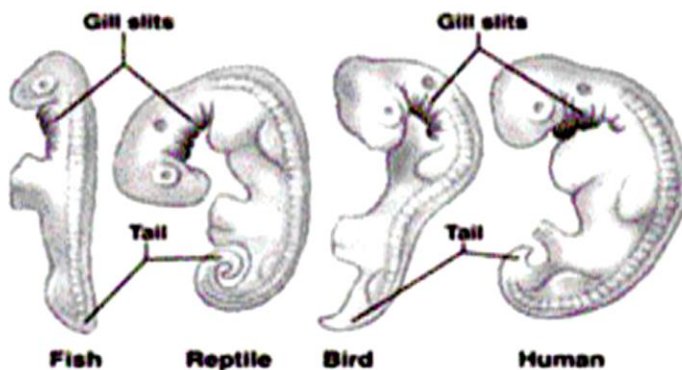


Figure 3. Embryological Evidence of Evolution

Photo Source: [shorturl.at/uSVX5](http://shorturl.at/uSVX5)

- A. The similar features of the embryos are evidence of common ancestry.
- B. DNA similarity of organisms can help determine the species' relatedness.**
- C. Evolution of unique species is an example of the effect of geography on evolution.
- D. Some structures have no apparent function and appear to be residual parts from past ancestor.

11. Which of the following is an example of an evolutionary adaptation?
- A. A change in frequency of a neutral allele by genetic drift.
  - B. Fixation in a population of a selectively advantageous allele.**
  - C. The loss of an allele in a population due to a population bottleneck.
  - D. Constancy in the rate of accumulation of genetic changes in a molecule over time.
12. In the area of evolution, which of the following statements describes Homologous Structure?
- A. Structures that develop during an embryo various stages of growth
  - B. Body part with the same underlying anatomical features in different animals.**
  - C. Structures with no apparent function appear to be residual parts from the past ancestor.
  - D. Structures that performed the same function but with different embryological development.
13. Fossils are remnants of ancient organisms trapped in rocks, tar pits, frozen in ice, or embedded in amber. How do fossils support evolution?
- A. Organisms in the fossil record are identical to living organisms.
  - B. Individual species disappear and reappear in the fossil record over time.
  - C. The fossil record provides evidence that organisms have changed over time.**
  - D. The fossil record provides evidence that all organisms developed at the same time.
14. Which of the following statements is/are true?
- I. **Analogous structures** are structures found in different species with similar functions resulting from common ancestors.
  - II. **Analogous structures** are structures found in different species that have similar functions resulting from natural selection
  - III. **Homologous structures** are structures found in different species that have similar anatomical forms, resulting from a common ancestor
  - IV. **Homologous structures** are structures found in different species that have similar anatomical forms, resulting from natural selection
- A. I only
  - B. III only
  - C. II and III**
  - D. I and IV

15. A cladogram is constructed by grouping organisms together based on their shared derived characteristics. Based on Figure 4 below, sharks are MOST closely related to which organism?

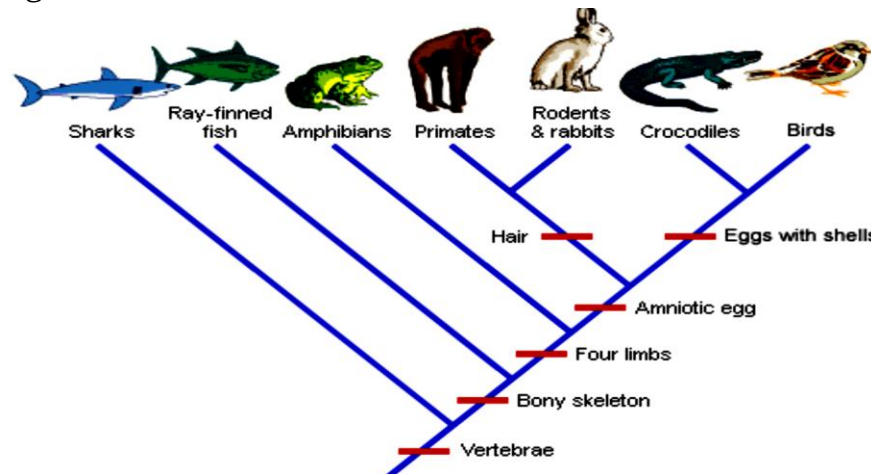


Figure 4. The cladogram displays the relations between the organisms.  
Source. <https://www.pinterest.ph/pin/281756520418598840/>

- A. Amphibians
  - B. Birds
  - C. Crocodiles
  - D. Ray-finned fish**
16. Protein cytochrome-c, an important enzyme found in virtually all organisms. Based on Table 1 below, do you agree that the Rhesus monkey is the most closely related to a human? Why?

**Table 1. Differences in Amino Acids in the Protein Cytochrome-c**

Species Pairing	Number of Differences
Human – Rhesus monkey	1
Human – Kangaroo	10
Human – Snapping turtle	15
Human – Bullfrog	18
Human - Tuna	21

- A. Agree. Rhesus monkey is the most closely related to a human because it has the least number of differences in cytochrome-c.**
- B. Disagree. Tuna is the most closely related to a human because it has the greatest number of differences in cytochrome-c.
- C. Disagree. Kangaroo is the most closely related to a human because it has the greatest number of differences in cytochrome-c.
- D. Disagree. Bullfrog is the most closely related to a human because it has the greatest number of differences in cytochrome-c.

17. Which of the following branch of science that deals of classifying organisms?
- A. biology
  - B. genetics
  - C. physics
  - D. taxonomy**
18. Which question would help you decide if an organism you found was a plant or fungus?
- A. Does the organism reproduce sexually?
  - B. Does the organism perform photosynthesis?**
  - C. Is there nervous tissue present in the organism?
  - D. Is there a cell wall around the cells of the organism?
19. A dichotomous key is a tool that helps identify unknown organisms to some taxonomic level. What question might be the focus of a dichotomous key investigation?
- A. Do all insects have wings?
  - B. How are observations collected by the scientists?
  - C. When should observations be taken during an investigation?
  - D. What are the similarities and differences between organisms?**
20. Callao and Tatil (2017) investigated and calculated the biodiversity in 6m x 6m quadrant at the shore in Socorro, Surigao Del Norte. They have found different species and counted the number of individuals per species. This investigation concluded that the biodiversity index of a small piece of beach/coast has a low biodiversity index resulting from low species diversity. How is Diversity index calculated?
- A. The number of individuals in the area divides the number of species.
  - B. The number of species in the area divides the total number of individuals in the area.**
  - C. The number of species in the area (n) minus the total number of individuals in the area.
  - D. The number of species in the area (n) multiplied by the total number of individuals in the area.
21. Which of the following organisms exhibit solely sexual reproduction?
- A. Corals
  - B. Humans**
  - C. Hydra
  - D. Starfish

22. In this sketch, what kind of procreation does the organism represent?

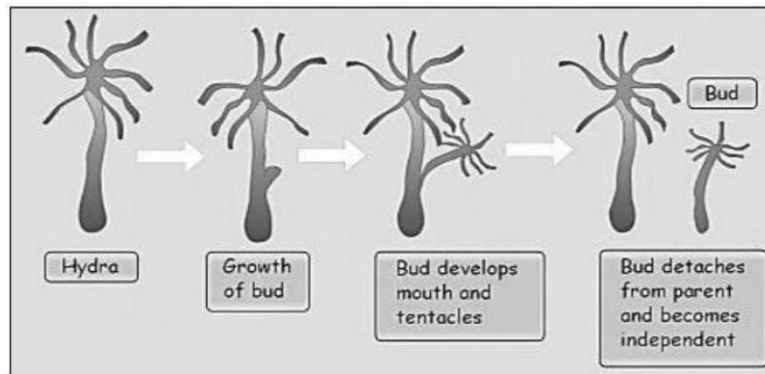


Figure 5. Reproduction by a hydra.

Source: <https://www.pinterest.ph/pin/28175652041859884>

**A. asexual**

B. bisexual

C. sexual

D. trisexual

23. Suppose you can predict the outcome of a scheme. If the modes of procreation changes due to evolution and depopulation an example would be The Philippines Eagle (*Pithecophaga jefferyi*), what would be the best program to prevent these scenario?

A. Genomic and Genetic Engineering

B. Allow Natural Selection takes its course

C. Animal captivity program for entertainment.

**D. Endangered species protection, habitat preservation and repopulation program.**

24. Relate where the moment of new life is created and at what point do the combined gametes begin to become a cell?

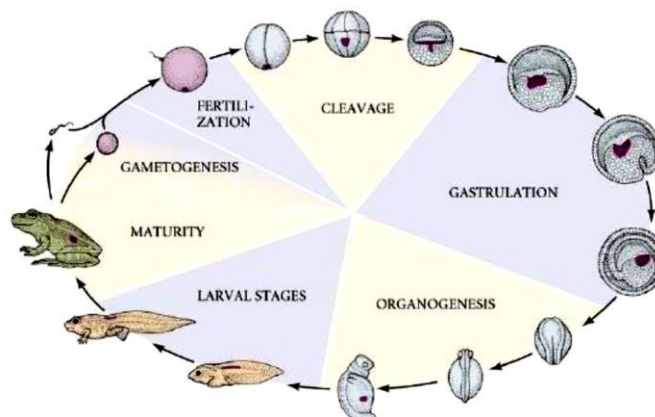


Figure 6. Animal Development

Source: <https://bastiani.biology.utah.edu/>



- A. Cleavage
  - B. Fertilization**
  - C. Maturity
  - D. Organogenesis
25. If you have a spermatogonium with (2N) and N=46 chromosomes, how many chromosomes are there in one spermatocyte?
- A. 46 Chromosomes
  - B. 32 Chromosomes
  - C. 23 Chromosomes**
  - D. 20 Chromosomes
26. What compound in food is essential to life and health? It provides us with energy, building blocks for growth & repair, and substances necessary to regulate chemical processes.
- A. Atoms
  - B. Carbon Dioxide
  - C. Nutrients**
  - D. Water
27. How do you prepare with parasitism and predation, using the knowledge of nutrients and animal development?
- A. Wipe out those species with one fell swoop
  - B. Become Alpha and destroy those organism
  - C. Don nothing and let nature go on its course**
  - D. Make preparation or study the behaviour of those organisms to devise a plan or laws that prevent them from interacting with our species
28. Is the statement "*The more you eat the more nutrients you receive*" true or false?
- A. True, because eating is the action of which you gain nutrients.
  - B. False, the statement encourages eating rather nutrient absorption.
  - C. True, due to nutrients have different absorption rates, animals have limited and most essential elements or recycle nutrients is reuse.
  - D. True, but the statement is a contradiction with the absorption or digestive system with an organism, nutrients is needs to be optimal to prevent complication.**



29. In the given figure here, what interpretation can we derive from both processes?

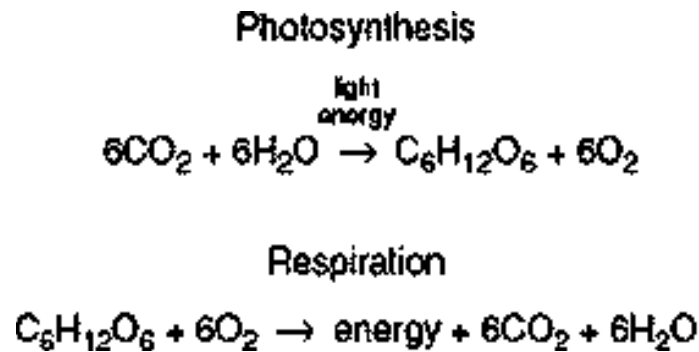


Figure 7. Photosynthesis and Cellular Respiration Equation  
Source: [www.pinterest.co.uk](http://www.pinterest.co.uk)

- A. There is no significant interpretation of the processes.
  - B. The processes show great stoichiometry in the reaction.
  - C. The processes are balanced and needs energy to proceed to the reaction.**
  - D. It signifies that these processes needed both compounds to be produced.
30. Review Figure 8, what letter keeps the whole operation from water loss and what is its function?

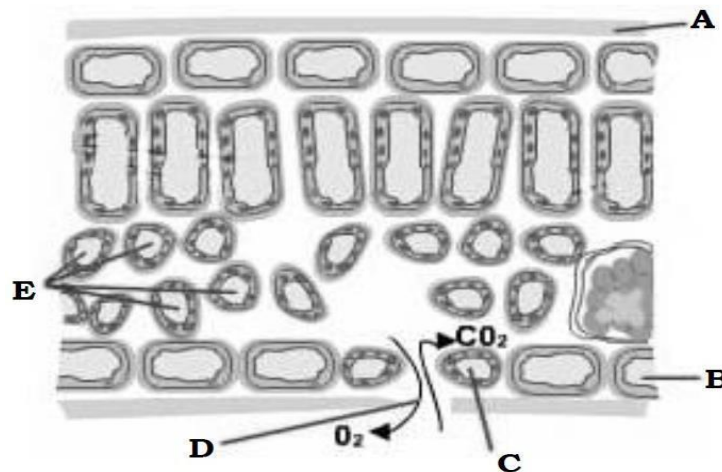


Figure 8. Anatomy of a leaf on how plants obtain CO<sub>2</sub> through stomata  
Source: <https://quizlet.com/271611849/64>

- A. Letter E. because it the spongy layer.
- B. Letter C, the guard cells guards the sunlight.
- C. Letter D, the Stomata keep the gas exchange between membranes.
- D. Letter A, the waxy cuticle helps prevent water loss and protects other liquid compound from solidifying.**

31. In plant there is a source cell and a sink cell. What kind of plant vascular tissue does it mean?
- A. Phloem
  - B. Xylem
  - C. Ascent of xylem sap
  - D. Pressure flow or bulk flow**
32. Distinguish the importance of both Erythrocytes and Leukocytes.
- A. Both functions as parts of the blood or constituents of it
  - B. It is essential because both cells are important in our body.
  - C. Erythrocytes are the RBC and Leukocytes are WBC, which are part of the blood.
  - D. The importance of erythrocytes is link to the transport of oxygen and carbon dioxide while leukocytes functions as the defender of it.**
33. Debating whether mammalian and bird hearts are better than any other species. Which among these best rebuttals should be expressed to the debate?
- A. Mammalian and bird hearts have evolved for the apex predators.
  - B. Mammalian and bird hearts have been on the genetic lottery winning streak.
  - C. Mammalian and bird hearts have adapted to the terrestrial and aerial niche of the game of life, winning a perfect system on circulation.**
  - D. Mammalian and bird have eaten more species creating a mutation or genetic diversion of the original plan of heart modification.
34. What do you call about the elimination of metabolic wastes including nitrogenous wastes and also helps in the regulation of water and ion balance?
- A. Osmosis
  - B. Excretion**
  - C. Internal Environment
  - D. None of the above
35. How would you compare the relative environment between Osmoconformers and Osmoregulators in terms of optimal environment?
- A. Osmoconformers environment is cold and dry: Osmoregulators environment is hot and wet.
  - B. Osmoconformers environment is hot and dry: Osmoregulators environment is cold and wet.
  - C. Osmoconformers environment surrounded by fluid but needed hot: Osmoregulators environment dry but always cold
  - D. Osmoconformers environment surrounded by fluid in any temperature: Osmoregulators environment dry in any temperature**

36. In Mammalian Kidney, what feedback hormone is detected when a person is in dire need of conservation of water?
- A. Renin
  - B. Testosterone
  - C. Vasopressin**
  - D. none of the above
37. Which of the following classifications of sensory receptors have the same characteristics?
- A. Proprioceptors and interceptors
  - B. Thermoreceptors and interceptors
  - C. Photoreceptors and proprioceptors
  - D. Mechanoreceptors and exteroceptors**
38. Why are movement and locomotion necessary among animals?
- A. to escape from predators
  - B. need for searching of shelter, food and water
  - C. For shifting to favourable environment from an unfavourable one
  - D. all of the above**
39. Which is the correct direction of a nervous impulse along a neuron?
- I. axon
  - II. cell body
  - III. dendrite
- A. I, II, III
  - B. I, III, II
  - C. II, I, III
  - D. III, II, I**
40. What is the complex network of organs containing cells which recognizes foreign substances in the body?
- A. Circulatory System
  - B. Immune System**
  - C. Respiratory System
  - D. Skeletal System

41. Why some plants able to defend themselves against disease-causing organisms (pathogens) such as virus, bacteria and fungi?
- A. because some plants have antibiotic compounds (e.g. phytoalexins)
  - B. because some plants produced physical barriers (e.g. plant cell walls)
  - C. because plants have antibodies or special cells that search for and destroy pathogens
  - D. both A and B**
42. Which of the following statements could **NOT** be the primary function of the adaptive immune response?
- A. distinguishing adaptive from “self-antigens”
  - B. the recognition of specific “non-self” antigens
  - C. The development of an immunologic memory that cannot quickly eliminate a specific pathogen.**
  - D. The generation of pathogen in specific immunologic effector pathways that eliminates specific pathogens.
43. Which of the body’s system functions on secreting hormones and helping maintain homeostasis and coordinate processes in the body?
- A. Digestive System
  - B. Endocrine System**
  - C. Excretory System
  - D. Reproductive System
44. What type of feedback that controls glucose levels?
- A. Dynamic Equilibrium
  - B. Negative Feedback**
  - C. Positive Feedback
  - D. Both A and B
45. Why is excretion important in order to achieve osmotic balance?
- A. The body accumulates water within itself when excretion does not occur, which can have dire consequences.
  - B. Excretion regulates the movement of water within the membranes, which ultimately maintains osmotic balance.**
  - C. In the absence of excretion, there is a shift in the concentrations, which disrupts osmotic balance.
  - D. The body builds up many chemical compounds that need to be excreted to maintain homeostasis and osmotic balance.

46. Based on the recent data, one Filipino develops renal failure every hour. How will you take good care of your kidney?
- A. Eat healthy foods.
  - B. Exercise regularly.
  - B. Drink plenty of water.
  - D. I will do all of the above.**
47. What is the process that allows the body to maintain its internal temperature?
- A. Homeostasis
  - B. Ectotherm
  - C. Osmoregulation
  - D. Thermoregulation**
48. An x-ray of lower abdomen shows a shadow in the region of the ureter suspected to be a ureotelic calculus. What possible clinical symptom it inferred?
- A. Motor aphasia
  - B. Active renal failure
  - C. Chronic renal failure
  - D. Anuria and haematuria**
49. As blood glucose concentration rises, what homeostatic response would the body produce?
- A. Insulin would be released to cause blood glucose to fall.
  - B. Insulin would be released to cause blood glucose to rise.
  - C. Glucagon would be released to cause blood glucose to fall.
  - D. Insulin and glucagon would be released to cause blood glucose to rise.**
50. Some of the body's homeostatic responses rely on "negative feedback". Which of the following happens in negative feedback?
- A. The body's response acts to oppose the change in the physiological variable.**
  - B. The body's response acts to enhance the change in the physiological variable.
  - C. The body ignores changes in a physiological variable that are directed away from the set point for that variable.
  - D. The body ignores changes in a physiological variable that are directed towards the set point for that variable.