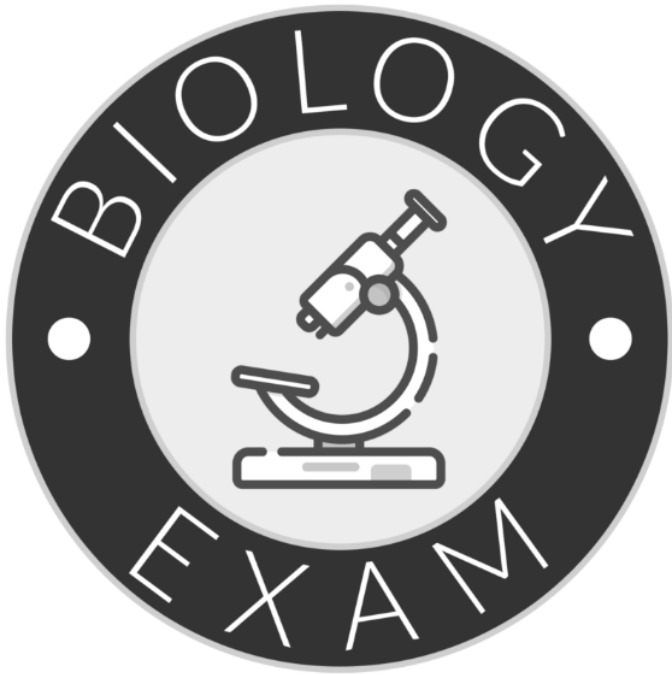




Biology Examination IAC European Championships 2025

Instructions – Mark your answers on the scantron provided. Correct answers are worth 2 points. Incorrect answers are worth –1 point. Questions left blank are worth 0 points. Write the answer to your tiebreaker question in the box at the top of your scantron.

1. Which of the following joints allows for the greatest range of motion?
 - A. Ball and socket
 - B. Hinge
 - C. Pivot
 - D. Gliding
2. What type of molecule contains uracil?
 - A. RNA
 - B. Water molecule
 - C. DNA
 - D. Glucose
3. Which of the following organelles contains cis and trans faces?
 - A. Smooth endoplasmic reticulum
 - B. Rough endoplasmic reticulum
 - C. Lysosome
 - D. Golgi apparatus
4. Which of the following processes is involved in cellular respiration?
 - A. Calvin cycle
 - B. Cooling effect
 - C. Krebs cycle
 - D. Light-dependent reactions
5. Which of the following biomes does NOT consist of permafrost?
 - A. Tundra
 - B. Steppe
 - C. Taiga
 - D. Savanna
6. What gland produces hormones such as cortisol and epinephrine?
 - A. Thyroid gland
 - B. Parathyroid gland
 - C. Adrenal gland
 - D. Pituitary gland
7. Which of the following structures can be easily visible under a light microscope?
 - A. Macromolecules
 - B. Nucleus
 - C. Vesicles
 - D. Microfilaments
8. How many legs in total do arachnids have?
 - A. 4
 - B. 6
 - C. 8
 - D. 3
9. What substance do goblet cells, found in the intestinal and respiratory tracts, produce?
 - A. Blood
 - B. Mucus
 - C. Growth hormone
 - D. Melanin
10. What organ produces insulin?
 - A. Liver
 - B. Pancreas
 - C. Spleen
 - D. Appendix
11. What is the primary function of the ribosome?
 - A. contains enzymes to break down cellular waste
 - B. provides structural support to the cell
 - C. generate ATP
 - D. assembles proteins using genetic information
12. In which of the following blood disorders is there an abnormal hemoglobin structure?
 - A. Sickle cell anemia
 - B. Hemophilia
 - C. Thalassemia minor
 - D. Polycythemia vera

13. What is the primary protein found in red blood cells?

- A. Actin
- B. Spectrin
- C. Hemoglobin
- D. Collagen

14. Within a hive, which type of honeybee secretes the substance called “royal jelly,” which is fed to another member?

- A. Worker
- B. Queen
- C. Nurse
- D. Drone

15. What body part characterizes an ungulate?

- A. Scales
- B. Hooves
- C. Wings
- D. Tails

16. What type of muscle tissue is found in the walls of blood vessels?

- A. Cardiac muscle
- B. Skeletal muscle
- C. Smooth muscle
- D. Striated muscle

17. Which scientist coined the term “cell” in a publication titled Micrographia?

- A. Gregor Mendel
- B. Carl Linneaus
- C. Rachel Carson
- D. Robert Hooke

18. What type of immune cell consumes foreign pathogens?

- A. Basophil
- B. Macrophage
- C. Mast cell
- D. Neutrophil

19. Which of the following animals does NOT use echolocation?

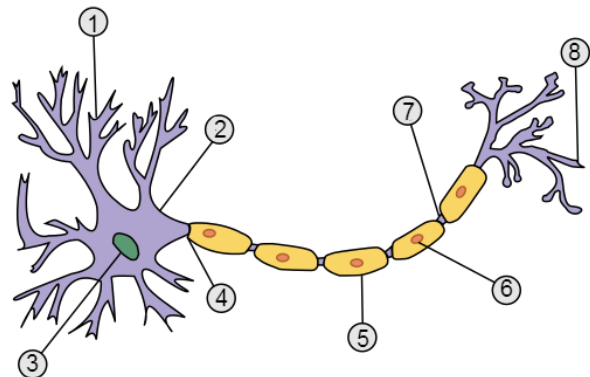
- A. Octopus
- B. Bat
- C. Dolphin
- D. Whale

20. Which of the following is the correct sequence of events in protein synthesis?

- A. Translation → Transcription → Processing
- B. Processing → Translation → Transcription
- C. Transcription → Processing → Translation
- D. Transcription → Translation → Processing

21. Which of the following dinosaurs was a herbivore?

- A. Spinosaurus
- B. Triceratops
- C. Velociraptor
- D. Allosaurus



22. What part of the neuron is labeled as “2” in the image provided?

- A. Soma
- B. Node of Ranvier
- C. Axon
- D. Dendrites

23. What is the cell wall of bacteria composed of?

- A. Pectin
- B. Chitin
- C. Cellulose
- D. Peptidoglycan

24. Which of the following is the main nitrogenous waste in reptiles?

- A. Ammonia
- B. Urea
- C. Uric acid
- D. Amine

25. The national tree of India, the banyan, is in a genus whose Latin name is associated with which fruit?

- A. Persimmon
- B. Quince
- C. Cherry
- D. Fig

26. What is the significance of the protein, p53?

- A. It stabilizes the brain
- B. It helps skin maintain its elasticity
- C. It is used as a target for vaccines
- D. It is a tumor suppressor

27. Which of the following is the primary function of stomata in plants?

- A. Storage of water
- B. Transport of minerals
- C. Gas exchange
- D. Secretion of enzymes

28. The primary auditory cortex is located in which of the following lobes?

- A. Occipital
- B. Frontal
- C. Parietal
- D. Temporal

29. What mutation is characterized as changes in the DNA that do not alter the amino acid sequence of a protein?

- A. Frameshift mutation
- B. Silent mutation
- C. Missense mutation
- D. Translocation mutation

30. Which of the following is NOT an example of continuous variation in humans?

- A. Height
- B. Skin color
- C. Shoe size
- D. Blood type

31. Which of the following is a characteristic of a population that has reached carrying capacity?

- A. Birth rate equals death rate
- B. Exponential growth
- C. Absence of limiting factors
- D. Reduction in competition

32. DNA replication occurs in which of the following phases of the cell cycle?

- A. G₂
- B. M
- C. G₀
- D. S

33. What is the primary function of helper T cells in the immune system?

- A. Produce antibodies
- B. Activate B cells and other immune cells
- C. Directly destroy infected cells
- D. Produce histamine during allergic reactions

34. Which of the following lipids regulates membrane fluidity?

- A. Cholesterol
- B. Triglyceride
- C. Phosphatidylcholine
- D. Sphingomyelin

35. Which of the following diseases is NOT caused by prions?

- A. Fatal familial insomnia
- B. Rabies
- C. Kuru
- D. Creutzfeldt-Jakob disease

36. Which of the following vessels carries oxygenated blood?

- A. Middle hepatic vein
- B. Hepatic portal vein
- C. Pulmonary vein
- D. Pulmonary artery

37. Which of the following species is a hybrid of citron and bitter orange?

- A. Mandarin
- B. Lemon
- C. Grapefruit
- D. Tangelo

38. Which of the following animals is the only one that can digest cellulose?

- A. Snake
- B. Human
- C. Termite
- D. Tiger

39. Which of the following is NOT a currently living species of zebra?

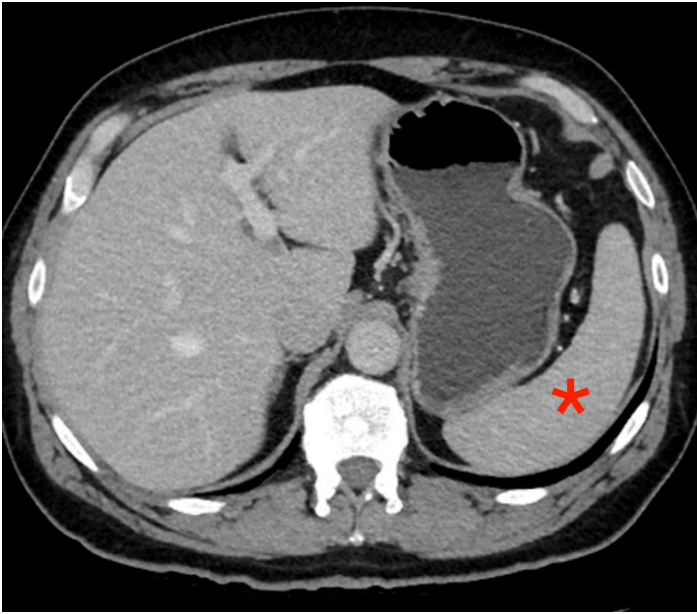
- A. Desert zebra
- B. Mountain zebra
- C. Plains zebra
- D. Grévy's zebra

40. Which of the following processes does NOT contribute to genetic variation?

- A. Crossing over
- B. Independent assortment
- C. Mitosis
- D. Random fertilization

41. Variability in gene OR-6-A-2 is theorized as the cause of three to 21 percent of people perceiving the flavor of which seasoning plant as soap-like?

- A. Sage
- B. Oregano
- C. Cilantro
- D. Rosemary



42. Which of the following organs is marked with an asterisk in the CT scan provided? [FA]

- A. Kidney
- B. Stomach
- C. Liver
- D. Spleen

43. Which of the following enzymes is responsible for unwinding the DNA double helix during replication?

- A. DNA ligase
- B. DNA polymerase
- C. Helicase
- D. Primase

44. A disease that causes a reduction in aquaporin proteins would most directly affect which of the following processes?

- A. Lipid transport
- B. Water transport
- C. Electron transport
- D. Hormone secretion

45. The Hardy-Weinberg equilibrium can be used to determine which of the following?

- A. Rate of mutation
- B. Allele frequencies
- C. Phylogenetic relationships
- D. Carrying capacity

46. In an MRI examination, the patient is exposed to...

- A. Ionizing radiation
- B. Ultrasound radiation
- C. Radio waves
- D. The patient is not exposed to any radiation

47. Which of the following is NOT true of orchids?

- A. The largest orchid can weigh several hundred pounds
- B. Some orchids can live up to a century
- C. One orchid seed pod can contain up to three million seeds
- D. Orchids are prized for their scarcity, since they only grow in a narrow, tropical climate belt

48. Which of the following cellular components is involved in detoxifying hydrogen peroxide?

- A. Lysosome
- B. Peroxisome
- C. Mitochondrion
- D. Centriole

49. All of the following words are used in the classification of worms, EXCEPT

- A. Vulpine
- B. Annelid
- C. Helminthe
- D. Nematode

50. Which of the following is true of homeostasis?

- A. Homeostasis refers to the body's ability to maintain an upright position
- B. Homeostasis crucially helps prevent toxicity from iron over supplementation
- C. Homeostasis keeps all bodily functions it controls unchanged amid variable conditions
- D. The reproductive system is the bodily system most involved with the processes of homeostasis

51. Which of the following organelles contains its own DNA?

- A. Lysosome
- B. Endoplasmic reticulum
- C. Mitochondria
- D. Golgi apparatus

52. Which of the following most directly affects the color of an adult flamingo's plumage?

- A. Sun exposure
- B. Beta-carotene in diet
- C. Geographic location of habitat
- D. Water salinity

53. Which of these animals is an apex predator?

- A. Stingray
- B. Blue whale
- C. Barracuda
- D. Orca

54. In 1912, a disorder of which gland was first described by physician Haku Hashimoto?

- A. Pituitary
- B. Thyroid
- C. Pineal
- D. Apocrine

55. Which of the following body parts is associated with a ball-and-socket joint?

- A. Shoulder
- B. Knee
- C. Elbow
- D. Ankle

56. The word “marsupial” derives from a Latin word meaning what?

- A. Dense fur
- B. Almond-shaped
- C. Warlike
- D. Pouch

57. Which of the following is NOT true of ladybugs?

- A. They are not classified as bugs
- B. Their coloration primarily functions to attract mates
- C. They are carnivores
- D. Their backs can be checkerboard-patterned

58. What specialist would treat disorders such as lymphoma and thrombosis?

- A. Hematologist
- B. Cardiologist
- C. Podiatrist
- D. Nephrology

59. Which of the following is NOT a form of connection between cells?

- A. Serosome
- B. Tight junction
- C. Gap junction
- D. Desmosome

60. Which of the following is NOT the same type of structure as the others?

- A. Narwhal tusk
- B. Cobra fang
- C. Stag antler
- D. Cat premolar

61. What type of speciation occurs when a population becomes reproductively isolated due to a geographic barrier?

- A. Allopatric speciation
- B. Sympatric speciation
- C. Parapatric speciation
- D. Peripatric speciation

62. The largest terrestrial arthropod known to exist is a giant species of which of the following?

- A. Hermit crab
- B. Ostrich
- C. Shrew
- D. Gecko

63. Which of the following conditions is most closely and commonly linked with the consumption or handling of contaminated chicken products?

- A. Rhinovirus
- B. Chicken pox
- C. Salmonellosis
- D. Cat scratch fever

64. Myelin most closely belongs to which of the following systems of the human body?

- A. Integumentary
- B. Digestive
- C. Muscular
- D. Nervous

65. Which of the following plant hormones is primarily responsible for fruit ripening?

- A. Auxin
- B. Ethylene
- C. Gibberellin
- D. Absciscic acid

66. Which of the following is the only animal known to exhibit true tripedalism, using their necks as limbs in equal, or greater force, to propel themselves forward when climbing a vertical surface?

- A. Lemur
- B. Orangutan
- C. Parrot
- D. Tree frog

67. Which of the following hues appears in the name of the most common type of colorblindness?

- A. Grey
- B. Cyan
- C. Blue
- D. Green

68. In 1952, which scientists demonstrated that DNA was the genetic material using bacteriophage experiments?

- A. Watson and Crick
- B. Hershey and Chase
- C. Franklin and Wilkins
- D. Avery, MacLeod, and McCarty

69. Which of the following is centermost in the structural composition of a hair?

- A. Arrector pili
- B. Cortex
- C. Medulla
- D. Cuticle

70. Fungiform papillae assist with which of the following senses?

- A. Sight
- B. Taste
- C. Smell
- D. Touch

71. Which of the following is NOT a primary layer of human skin?

- A. Mesodermis
- B. Hypodermis
- C. Dermis
- D. Epidermis

72. Which of the following organisms does NOT undergo ecdysis in its life cycle?

- A. Cicada
- B. Sea urchin
- C. Millipede
- D. Water bear

73. Convergent evolution results in which of the following?

- A. Similar structures with different ancestry
- B. Different structures with similar ancestry
- C. Allopatric speciation
- D. Stabilizing selection

74. What is the main target of surgical removal in a cholecystectomy?

- A. Fatty cyst
- B. Gallbladder
- C. Blood clot
- D. Liver

75. *Helicobacter pylori* infection is sometimes implicated in all of the following conditions, EXCEPT

- A. Peptic ulcer
- B. Duodenum inflammation
- C. Anosmia
- D. Anemia

Tiebreaker

This question will only be scored if there is a tie for placement on the exam. **This is a required question, but there is no penalty for a wrong answer to this question.**

Write your answer legibly in the space provided on your scantron.

What is the estimated number of neurons in the human brain?