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OEB DIRECTORATE OF BOARDING AND NON-BOARDING SPECIAL SCHOOLS FIRST ROUND BIOLOGY MODEL EXAMNATION FOR GRADE 12 MARCH, 2018/2026

TIME ALLOWED: **2:30 HOURS**

GENERAL DIRECTIONS:

I. FOLLOW THE FOLLOWING RULES AND REGULATIONS IN DOING THE EXAMINATION:
   - IN THIS EXAM THERE ARE A TOTAL OF **100 MULTIPLE CHOICE** QUESTIONS. THERE IS ONLY ONE BEST ANSWER FOR EACH QUESTION.
   - CHOOSE THE BEST ANSWER FROM THE SUGGESTED OPTIONS AND WRITE THE LETTER OF YOUR CHOICE ON THE ANSWER SHEET PROVIDED.
   - YOU WILL BE ALLOWED TO WORK ON THE EXAM FOR 2:30 HOURS. WHEN TIME IS CALLED, YOU MUST IMMEDIATELY STOP WORKING, AND WAIT FOR FURTHER INSTRUCTIONS.
   - ANY FORM OF CHEATING OR AN ATTEMPT TO CHEAT IS PROHIBITED.

II. ATTENTION!
   - MAKE SURE THAT YOU HAVE WRITTEN ALL THE REQUIRED INFORMATION ON THE ANSWER SHEET BEFORE YOU START TO WORK ON THE EXAM.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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1. Question number 1 is based on the following contributions of Ethiopian biologists
   I. Discovered a 3.3 million-year-old humanoid child fossil.
   II. Identified impact of chemical pesticide hazard on human.
   III. Discovered and named many new plants.
   IV. Developed drought resistant strain of sorghum.

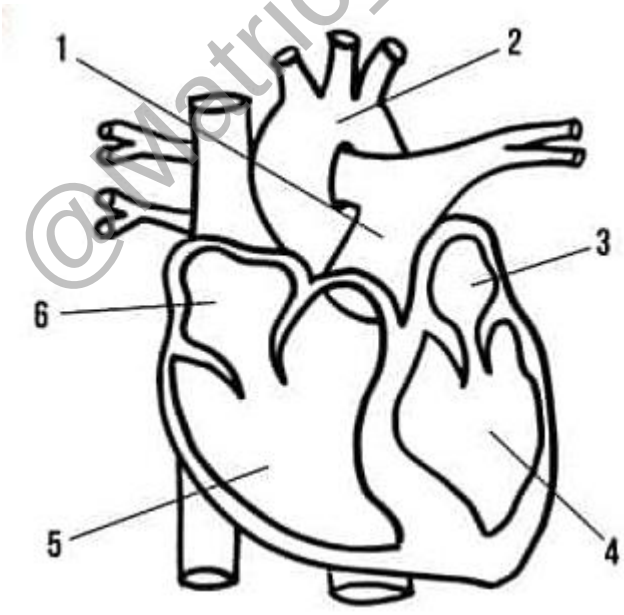
   Which one of the following list of renowned Ethiopian biologist corresponding to I, II, III, and IV respectively?
   A. Prof. Mogessoe Ashenafi, Dr. Tsehaynesh Asfaw, Prof. Ensermu Kelbesa and Prof. Gebisa Ejeta.
   B. Dr. Zeresenay Alemseged, Prof. Yalemtsehay Mekonnen, Prof. Ensermu Kelbesa and Prof. Gebisa Ejeta.
   C. Prof. Ensermu Kelbesa, Dr. Tsehaynesh Asfaw, Prof. Yalemtsehay Mekonnen, and Prof. Gebisa Ejeta.
   D. Prof. Brihane Asfaw, Prof. Yalemtsehay Mekonnen, Prof. Ensermu Kelbesa and Prof. Gebisa Ejeta.
2. Grade 9 students Bonsa and Kelbessa used microscope during laboratory session. Bonsa can observe clear image with great details while Kelbessa's image is blurred. What can you conclude from this observation?
   A. Bonsa's microscope is with great resolution, but low magnification.
   B. Kelbessa's microscope is with great resolution.
   C. Both microscopes are with great resolution and magnification.
   D. Bonsa's microscope is with great resolution and magnification.
3. Which one of the following scientists are the first to explain cell theory?
   A. Matthias Schleiden and Theodore Schwann
   B. Robert Hooke and Anton van Leeuwenhoek
   C. Matthias Schleiden and Robert Hooke
   D. Theodore Schwann and Robert Hooke
4. When comparing the water potential of a solution to that of a cell, what term describes a solution having the lower water potential than the cell?
   Isotonic B. Hypotonic C. Hypertonic D. Plasmolysis
5. Which of the following factors affecting the rate of diffusion is correctly described?
   A. A big difference in concentration leads to slower diffusion.
   B. An increase in temperature leads to faster diffusion.
   C. A thicker membrane leads to faster diffusion.
   D. A larger surface area of the membrane leads to slower diffusion.
6. Which one of the following lists of food items may be recommended by physician for a women who experienced heavy bleeding during giving birth?
   A. Dairy products, bread, fruits and common salt
   B. Vegetable, common salt, dairy products and banana
   C. Read meat, liver, eggs and green leafy vegetables
   D. Vegetables, bean, banana and orange

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7. If an individual pancreas is surgical removed, activity of which digestive organ and digestion of which food item would be primarily impaired?
   A. Stomach: Protein, Carbohydrate and fats
   B. Jejunum: Bread, Meat and Bean
   C. Ileum: Starch, Meat and Vegetables
   D. Duodenum: Protein, fats and carbohydratesu
8. An individual's inhaled air is examined and found to be 21%, 78% and 0.04% different gases. Which gases would be represented by the percentages indicated respectively?
   A. Oxygen, Nitrogen and Carbondioxide
   B. Oxygen, Carbondioxide and Nitrogen
   C. Nitrogen, Carbondioxide and Oxygen
   D. Carbondioxide, Nitrogen and Oxygen
9. This item is based on events happening during inspiration and expiration as given in the table below.

No	Parts of respiratory system	Inspiration	Expiration
1	Diaphragm	Contracts & flattens down wards	Relaxes & moves upwards
2	External intercostal muscle	Contracts	Relaxes
3	Internal intercostal muscle	Contracts	Relaxes
4	Ribcage and Sternum	Move downwards & inward	Move upwards & out wards

   Which numbers in the above table show the correct conditions happening to the different parts of respiratory tract during inspiration and expiration?
   A. 3 and 4 B. 1 and 2 C. 2 and 3 D. 1 and 4
10. Question 10 is based on the following human heart diagram.



   In the given heart diagram above, what is the function of the structure labeled "6"?
   A. Receives oxygenated blood from the lungs and pumps to right auricle.
   B. Receives deoxygenated blood from all the body and pumps to the lungs.
   C. Receives deoxygenated blood from all the body and pumps to right ventricle.
   D. Receives oxygenated blood from the lungs and pumps to left ventricle.

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11. If a person with "B" blood type is admitted to hospital for surgery, which blood type(s) can be possible to transfuse for a person if donation is required?
    A. B and O B. A and O C. AB and O D. A and B
12. What is a key reason why regular blood donation is encouraged in communities?
    A. It is a mandatory requirement for all citizens.
    B. Blood donation is primarily beneficial for the donors' personal health.
    C. It allows hospitals to charge higher fees for blood transfusions.
    D. It helps maintain a sufficient supply of blood for medical emergencies.
13. Which one of the following scientific name of a dog is correctly written?
    A. Canis familiaris C. *Canis familiaris*
    B. Canis Famiaris D. CANIS FAMILIARIS
14. A group of grade 9 student collected animals from the field and bring them to the laboratory for further study. During study session in the laboratory, they observed that majority of the specimens are animal with body divided into regular segments with structures and organs repeated along the body, closed blood circulatory system and used bristle-like structure (chaetae) for movement. Based on this observation which one of the following is the wright conclusion?
    A. Majority of these animals are member of phylum Mollusca.
    B. Majority of these animals are member of phylum Annelida.
    C. Majority of these animals are members of phylum Echinodermata.
    D. Majority of these animals are members of phylum Arthropoda.
15. Which one of the following lists constitute only abiotic components of an ecosystem?
    A. Water, Oxygen, Soil and Sunlight C. Decomposers, Sunlight, Soil and Oxygen
    B. Parasites, Predators, Sunlight and Soil D. Parasite, Disease, Predators and Food
16. A forensic scientist examines striations on a bullet collected at a crime scene to match it to a specific gun. Which tool/ process enable this detailed examination?
    A. Genetic makeup evaluation. C. Penicillin
    B. DNA fingerprinting process. D. The microscope
17. Which one of the following is TRUE about flowering plants?
    A. They all restricted to moist and shaded area. C. They all are non-vascular plants.
    B. They all have flower as a reproductive organ. D. Some have naked seed.
18. What is the most appropriate dispersal mechanism of seed with hairy or winged structure?
    A. Dispersed by wind or float in water. C. Dispersed by themselves.
    B. Ingested by birds and dispersed while defecation. D. Dispersed by human.
19. When a plant is exposed to unilateral light, what is the primary effect of auxins on the shoot?
    A. It evenly distributed in shoot leading to straight growth.
    B. It causes the shoot to bend away from the source of light.
    C. It has no effect on shoot directionality.
    D. It causes the shoot to bend towards the light.

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20. In a deep lake, during winter the surface water temperature drops below 4°C, causing ice to form. Which unique property of water allows aquatic life to survive beneath the frozen surface during the season?
    A. Ability to form hydrogen bonds.
    B. High cohesion and adhesion.
    C. Low density of solid water (ice).
    D. High specific heat capacity.
21. Which one of the following test is used to detect the presence of starch, reducing sugar and protein (presence of amino acids containing phenolic or indolic groups) in the food respectively?
    A. Benedict's, Iodine and Xanthoproteic test.
    B. Iodine, Biuret test and Benedict's.
    C. Xanthoproteic, Benedict's and Biuret test.
    D. Iodine, Benedict's and Xanthoproteic test.
22. What is the primary purpose of mitosis in multicellular organisms?
    A. To produce gametes for sexual reproduction.
    B. To enable growth and replacement of dead cells.
    C. To increase genetic diversity among generation.
    D. To reduce chromosome number in daughter cells.
23. In meiotic cell division, the daughter cells produced are:
    A. identical to the parent cell in chromosome number.
    B. genetically identical to each other in chromosome number and kind.
    C. genetically different from parent cell and with each other.
    D. As twice as the genetic material of parent cell.
24. Which one of the following human teeth is correctly described?
    A. Incisors- chisel-shaped teeth specialized for cutting
    B. Canine- sharp, dagger- shaped specialized for crushing.
    C. Molar- broader with cusps designed for tearing.
    D. Premolars- broad flattened specialized for tearing and cutting.
25. Which set of enzymes is active duodenum and small intestine and works optimally at similar pH range?
    A. Trypsin, Lipase, Maltase
    B. Lactase, Lipase, Rennin
    C. Pepsin, Lipase, Nuclease
    D. Pepsin, Amylase, Sucrase
26. How biconcave disc shapes of red blood cells contribute for efficient oxygen transportation?
    A. By providing more space inside for haemoglobin.
    B. By providing large surface area for gaseous diffusion.
    C. By enabling O2 and CO2 diffuse in and out rapidly.
    D. By enabling RBC to squeeze along the narrowest blood capillaries.
27. Why urinary tract infection is more experienced in female than in male? Because
    A. of lower urination frequency in females.
    B. female ureters is shorter than male.
    C. female urethras are shorter than male.
    D. in males urethras serve as reproductive organ.
28. Which one of the following cell of the immune system is found in tissues that are in contact with external environment such as skin and mucosal surface, that are used to capture antigen and present to T and B lymphocytes?
    A. Macrophage B. Lymphocyte C. Neutrophils D. Dendritic cell

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29. An energy pyramid shows that only 10% of energy is passed to the next trophic level. If plants captured 10,000J of energy, how much is available to tertiary consumer?
    A. 10J B. 10,000J C. 1,000J D. 100J
30. During nitrification process of nitrogen cycle, what is the role of genus *Nitrosomonas* bacteria?
    A. Conversion of atmospheric nitrogen to ammonia.
    B. Conversion of ammonia to nitrite.
    C. Conversion of nitrates back to atmospheric nitrogen.
    D. Conversion of nitrites to nitrates.
31. Which technology was developed by imitating the crack-resistant shellfish exoskeleton?
    A. Robotic arm. C. Ceramics
    B. Bulletproof vests. D. Sensor of electrical devices.
32. The practice of "Replacement" in animal research involves:
    A. Minimizing the number of animal used by sharing information.
    B. Cleaning experiments to reduce suffering of animals.
    C. Moving animals to better living conditions.
    D. Substituting animal experiments with techniques like cell culture.
33. When invertebrate animals are compered to vertebrates, invertebrate animals lacks:
    A. any kind of body symmetry. C. eukaryotic cell type
    B. mechanism to protect themselves D. back bone/vertebral column.
34. When rats and birds are compared based on male participation in parental care:
    A. male rats always build the nests, while male birds do not involve in any form of parental care.
    B. male rats do not participate in parental care, whereas some male birds participate in incubation and feeding.
    C. only female birds always care for young, while male rats take over nursing.
    D. both male rat and male birds are the primary caregivers for their offspring.
35. How could a leather manufacturer and a textile designer both benefit from insects in their respective production lines?
    A. The manufacturer uses tannic acids from wasp galls; the designer uses silk from silkworms.
    B. Both use shellac to stiffen fabrics and tan leather.
    C. The manufacturer uses bee wax; the designer uses grasshopper protein.
    D. Both use cochineal pigment for every stage of production.
36. During conditioning phase of classical conditioning, what must happen for learning to occur?
    A. The unconditioned response must be removed at this stage for animal to learn.
    B. The animal must be punished for the wrong behavior.
    C. The neutral stimulus must be paired with the unconditioned stimulus multiple time.
    D. The animal must show insight into the problem to come with better solution.
37. Why does a small animal like a rabbit lose heat more quickly than a large elephant?
    A. The rabbit has a smaller surface area-to volume ratio.
    B. The rabbit has a larger surface area-to-volume ratio.
    C. The elephant's large ears increase its internal volume.
    D. The rabbit's volume is greater than its surface area.

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38. Enzymes exhibit "substrate specificity." What does this property imply?
    A. The enzyme can catalyze any chemical reaction in the cell.
    B. The enzyme is only active at specific temperature and pH.
    C. The enzyme's activity is restricted to a particular substrate.
    D. The enzyme can only function when it is firmly attached to a metal ion.
39. An allosteric enzyme changes its conformation up on binding an effector molecule, leading to altered activity. Which level of protein structure is primarily involved in this conformational change?
    A. Quaternary B. Primary C. Tertiary D. Quaternary
40. What is the structural difference between a simple protein and a holoenzyme?
    A. A simple protein is inactive, while a holoenzymes is active.
    B. There is no structural difference between the two and names are interchangeable.
    C. A simple protein contains metal ions, while a holoenzymes does not.
    D. A holoenzymes is a conjugated protein consisting of apoenzyme and cofactor.
41. A biochemist is studying an enzyme that functions optimally at a pH of 2. What would likely happen to the enzyme's activity if the pH were increased to 8?
    A. Its activity decreases due to denaturation. C. No effect on its activity.
    B. Its activity increases due to conformational change. D. Increased substrate affinity.
42. Enzymes are used in detergents to enhance cleaning efficiency. What is the primary benefit of using proteases in laundry detergents?
    A. To remove stains from fats. C. To soften water
    B. To break down protein stains D. To brighten colour
43. Suppose a researcher studying the process of DNA replication. If the activity of DNA ligase enzyme is inhibited, which part of the replication process would be most immediately disrupted?
    A. The unwinding of the double helix to form template strand.
    B. The synthesis of RNA primer that initiate the synthesis of new strand.
    C. The joining of DNA fragment into a continuous strand.
    D. The addition of the first nucleotide by DNA polymerase.
44. What are the two chromatids of a single replicated chromosomes connected by a centromere called?
    A. Homologous chromosomes C. Tetrads
    B. Non-sister chromatids D. Sister chromatids
45. If a cell is accumulating the building blocks of chromosomal DNA and has sufficient energy reserves to replicate each chromosome, which phase is it in?
    A. G1Phase B. S phase C. G2 phase D. M phase
46. A plant with inflated pods is crossed with a plant with constricted pods. All offspring have inflated pods. What can you conclude about the inflated pod parent?
    A. It is homozygous dominant. C. It is homozygous recessive.
    B. It is heterozygous. D. Nothing can be concluded.

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47. A pedigree analysis shows a trait appearing in every generation, and every affected individual has at least one affected parent. Both males and females are equally affected. What is the most likely mode of inheritance?
    A. Autosomal recessive.
    B. Autosomal dominant.
    C. X-linked recessive.
    D. Y- linked.
48. How many bones make up the human cranium?
    A. 14 B. 22 C. 26 D.8
49. A person nodding his head "Yes" is primarily utilizing which type of joint in his neck?
    A. Gliding joint
    B. Saddle joint
    C. Pivot joint
    D. Hinge joint
50. In analyzing the role of ATP in the muscle relaxation process, what will happen if ATP is no longer available?
    A. Relaxation fails because the link between actin and myosin cannot break.
    B. Calcium will be pumped back into the sarcoplasmic reticulum faster.
    C. The muscle will switch to an isometric contraction.
    D. The muscle will relax immediately.
51. Predict what would happen to the muscle contraction cycle if a drug effectively blocked all calcium ions from binding troponin?
    A. Myosin would bind to actin permanently.
    B. Tropomyosin would never shift to expose actin binding site.
    C. The muscle would undergo a continuous power stroke.
    D. Tropomyosin would never shift to expose actin binding sites.
52. What is the function of the prostate gland in males?
    A. It secretes mucus-rich fluids into the semen to protect sperm from acid of the vagina.
    B. It secretes an alkaline buffer into the semen to protect the sperm from acid in the urethra.
    C. It secretes fructose into the semen, which provides energy for sperm.
    D. It secretes testosterone hormone, that determine males secondary sexually characteristics.
53. Which one of the following sexually transmitted infection is INCORRECTLY matched with symptoms of the disease?
    A. Molluscum contagiosum: small round bumps on the skin.
    B. Genital Wart: flu-like symptoms, fever and rash.
    C. Trichomoniasis: thin, often foul-smell discharge from vagina.
    D. Hepatitis B: yellowing of skin and eye.
54. Which of the following best describes the difference between spermatogenesis and oogenesis?
    A. Spermatogenesis produces one functional gamete, while oogenesis produces four.
    B. Spermatogenesis occur in the somniferous tubules before birth, while oogenesis in the epididymis after birth
    C. Spermatogenesis results in four haploid sperm, while oogenesis results in one functional ovum and polar bodies.
    D. Both processes begin only after a person reaches sexual maturity.

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55. A couple is looking for permanent contraceptive method for the male partner. Which method could be their choice?
    A. Vasectomy
    B. Tubal ligation
    C. Use of a diaphragm
    D. Hormonal implant
56. Regarding the effect of drug uses, what is a common risk shared by Marijuana and Cocaine despite their different origins?
    A. Cause immediate J-shaped legs.
    B. Cause slurred speech.
    C. Primarily target the reproductive system of adolescent body.
    D. Negative impacts on the cardiovascular and breathing.
57. An organism that produces thousands of eggs but provides no parental care, resulting in high initial mortality, belongs to which survivorship curve?
    A. Type I
    B. Type II
    C. Type III
    D. Type IV
58. The primary difference between the J-shaped and S-shaped population growth curves is that the S-shaped curve accounts for:
    A. unlimited resources.
    B. environmental constraints and carrying capacity.
    C. a constant growth rate regardless of size.
    D. A lack of predators.
59. If a predator is suddenly removed from an ecosystem, what is the most likely initial hypothesis for the prey's growth curve?
    A. It will immediately level off at carrying capacity.
    B. The population will become uniform in dispersal.
    C. The death rate will exceed the birth rate.
    D. It will shift from logistic to exponential growth.
60. In the process of toxic bioaccumulation, why are top-level predators most affected?
    A. Toxins become more concentrated as they move up the food chain.
    B. They absorb toxins directly from the air in addition to what they gain with food.
    C. They have the fastest metabolism rate than the others in the food chain.
    D. They are the only ones that eat plants, where toxins more concentrated.
61. Food security is considered ensured only if enough food is available, individuals can afford it, and:
    A. there are no barriers to access food.
    B. the food is produced using organic method only
    C. the food is imported from multiple countries.
    D. every citizen owns a personal garden.
62. If a food scientist wants to create a meat substitute with a filamentous texture for human consumption, which organism is best suited for this application?
    A. *Methylophilus methylotrophus*
    B. *Fusarium venenatum*
    C. *Streptococcus cremoris*
    D. *Aspergillus niger*

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63. When the role of saccharomyces in bread making and alcohol production is compered, what is its role in bread making?
    A. Primarily produces ethyl alcohol to flavor the dough.
    B. It is used to kill wild bacteria present in the flour
    C. Respires anaerobically to maximize alcohol content
    D. Respires aerobically, making CO2 and water as the chief products.
64. Using the "back-slopping" method to produce a traditional food like Enjera, one would:
    A. distill the batter to increase the alcohol contents to 50%.
    B. use a Ti plasmid to introduce new genes into the teff flour
    C. add a small amount of a previous fermented batch into fresh ingredients.
    D. heat the dough to 90°C to reduce the level of organic substances before baking.
65. A public health officers is investigating a sudden outbreak of severe watery diarrhea in a village. Up on microscopic examination of a patient's stool sample, they identified a comma-shaped bacteria. Based on this morphology, which causative agent should they suspect?
    A. *Streptococcus pneumoniae*
    B. *Treponema pallidum*
    C. *Vibrio cholerae*
    D. *Bacillus anthracis*
66. If a scientist analyzing the protein synthesis process of a cell and find that the initiator tRNA carries regular Methionine instead of N-formylmethionine, which domain does this cell likely belong to?
    A. Archaea or Eukarya
    B. Only Eukarya
    C. Only bacteria
    D. Only Archaea
67. Evaluate the ecological significances of saprophytic fungi versus parasitic fungi. Which statement is most accurate regarding their role?
    A. Both are equally harmful to human interests and should be eliminated.
    B. Saprophytic fungi are more essential for global nutrient cycling because they are decomposers.
    C. Parasitic fungi are more important because they control the population of over-abundant plant species.
    D. Both have no role in nutrients cycle in the ecosystem.
68. In ciliates, the micronucleus is different from the macronucleus in that:
    A. the micronucleus handles digestion, while the macronucleus handles waste.
    B. both nuclei perform the same tasks but in different stages of the life cycle.
    C. the macronucleus is for sexual reproduction, and the micronucleus for daily life activities.
    D. the macronucleus controls every day function, while micronucleus for reproduction.
69. What is the major difference that viruses have with free living cells?
    A. Lack rigid cell wall outside of cell membrane.
    B. Lack genetic material of both DNA and RNA.
    C. Do not function outside of a living cell
    D. Reproduce only asexually.

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70. Which statement best distinguishes anabolism from catabolism?
    A. Anabolism involves the breakdown of complex molecules, while catabolism involves their synthesis.
    B. Anabolism is a constructive process that requires energy, whereas catabolism is a destructive process that releases it.
    C. Catabolism is an endergonic reaction, while anabolism is an exergonic reaction.
    D. Anabolism occurs primarily during cellular respiration, while catabolism during photosynthesis.
71. What is the structural relationship between thylakoids and grana?
    A. Grana are stacks of interconnected thylakoids within the stroma.
    B. Thylakoids are the tubes that connect different grana together.
    C. Grana are the outer membranes that surround individual thylakoids
    D. There is no structural relationship; they are different parts of the cell.
72. Predict the outcome if the porphyrin rings in chlorophyll molecules was structurally altered to be highly stable and resistant to losing electrons.
    A. Photosynthesis would speed up as the pigment would last longer
    B. The Calvin cycle would function independently of light-dependent products as long as CO_2 is sufficient.
    C. The plant would be able to absorb green light more effectively rather than reflected back.
    D. The light-dependent reaction would fail because energized electrons could not be easily passed to other molecules.
73. In C4 plants, what is the name of the first four-carbon compound produced during carbon fixation?
    A. Oxaloacetic acid
    B. Malic acid
    C. Aspartic acid
    D. Phosphoglycerate
74. In C4 plants, how does the spatial separation of reaction in mesophyll and bundle sheath cells benefit the plant?
    A. It allows the plant to perform the Calvin cycle only at night in the mesophyll cells
    B. It concentrates CO2 around Rubisco in the bundle sheath cells to minimize photorespiration.
    C. It prevents the light-dependent reactions from occurring in the sun.
    D. It allows the plant to store water in the bundle sheath for later use in the, mesophyll cell for Calvin cycle.
75. During an experiment to show oxygen production in pond weed photosynthesis, why is sodium hydrogen carbonate often added to the water?
    A. To act as a catalyst for splitting of water
    B. To make the water more transparent for light
    C. To kill any bacteria that might consume the oxygen.
    D. To provide an additional source of carbon dioxide.
76. Which of the following is the site for the Krebs cycle in eukaryotes?
    A. Cytosol
    B. Cristae
    C. Mitochondrial matrix
    D. Plasma membrane

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77. If a cell is performing glycolysis and starts with 10 molecules of glucose, how many net molecules of ATP will it produce through this stage?
    A. 10 ATP B. 20 ATP C. 40 ATP D. 360ATP
78. Why is the oxidation of one NADH molecule results in 3 ATP, while oxidation of FADH2 only results in 2 ATP?
    A. FADH2 is a larger molecule and moves slower through the inner mitochondrion where ETC takes place.
    B. NADH is produced in three different stage of cellular respiration (Glycolysis, Link reaction and Krebs cycle), while FADH2 only during Krebs cycle.
    C. NADH enters the ETC at complex I and contributes to more proton-pumping events than FADH2, which enters at complex II.
    D. Oxygen has a higher affinity for electrons from NADH than FADH2.
79. Which of the following scenarios best analyzes the genetic composition change described in the definition of evolution?
    A. A single rabbit changing its fur color to white during winter.
    B. A farmer selectively breeding the fastest horses over several generations
    C. An athlete developing larger muscles through intensive daily training.
    D. A population of bacteria becoming resistant to antibiotics after exposure.
80. Synthesize a reason why Neo-Darwinism is more scientifically robust than original Lamarckism.
    A. It removes the need for natural selection.
    B. It provides a measurable mechanism for how traits are actually stored and changed.
    C. It proves that life is eternal and has no beginning; it is inherent nature of the universe.
    D. It explains that giraffe necks grew because they wanted to reach leaves.
81. In applying "Comparative Anatomy" as evidence for evolution, why are the fins of a shark and a whale considered analogous?
    A. They both contain identical bone structures.
    B. They are both made of cartilaginous structure.
    C. They have the same origin but different in function.
    D. They have the same function but different evolutionary origins.
82. Which type of selection is operating if the average birth weight of human babies remains constant because very small and very large babies have lower survival rates?
    A. Directional selection C. Stabilizing selection
    B. Disruptive selection D. Artificial selection
83. Which fossil is considered the "nearest" to the common ancestor of humans and chimpanzees?
    A. Ardepithecus ramidus C. Homo erectus
    B. Australopithecus afarensis D. Homo Neanderthals
84. What is the cause of "Sickle cell anemia"?
    A. A frame shift mutation added a base to the haemoglobin gene.
    B. A substitution mutation replaced glutamic acid with valine.
    C. A chromosomal deletion removed the entire gene.
    D. Spontaneous generation created a new type of blood cell.

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85. Analyze the difference between “Inversion” and “Translocation” chromosomal mutations.
    A. Inversion moves a segment to a new chromosome; Translocation flips it.
    B. Inversion always results in Down syndrome while Translocation always beneficial.
    C. Inversion flips a segment within the same chromosome; Translocation moves it to a different chromosome.
    D. Both mutations only involve a single base.
86. Analyze the state of a population in “Hardy-Weinberg Equilibrium.”
    A. The population is rapidly evolving because no evolutionary forces are acting.
    B. The population is infinitely small because gene flow is acting.
    C. Everyone in the population is a clone because no evolutionary forces are acting.
    D. Allele and genotype frequencies remain constant because no evolutionary forces are acting.
87. Group of neuron cell bodies located specifically in the peripheral nervous system are called:
    A. Ganglia B. Nuclei C. Grey matter D. Nerve tracts
88. Contrast the movement of ions during depolarization versus repolarization.
    A. Na ions moves in during depolarization; K ions moves out during repolarization.
    B. Na ions moves out during depolarization; K ions moves in during repolarization.
    C. K ions moves out during depolarization; N ions moves in during repolarization.
    D. Both ions move into the cell during depolarization and out during repolarization.
89. How do the functions of sympathetic and parasympathetic divisions of the Autonomic Nervous system oppose each other?
    A. Sympathetic controls skeletal muscles; Parasympathetic controls smooth muscles.
    B. Sympathetic is voluntary; Parasympathetic is involuntary.
    C. Sympathetic only works in the brain; Parasympathetic only works in the spine.
    D. Sympathetic prepares for "fight or flight"; Parasympathetic promotes "rest and digest."
90. Why do reflex signals often only travel to the spinal cord instead of the brain first?
    A. It saves time, allowing for a faster reaction that is crucial for survival.
    B. No neurotransmitter chemical in reflex signal to communicate with the brain.
    C. The spinal cord is the only place with interneurons.
    D. The electrical signal is too weak to reach the brain.
91. Predict the likely long-term biological impacts on a person’s reward system if they repeatedly use nicotine to trigger dopamine release.
    A. The brain will eventually produce its own nicotine naturally.
    B. The person will become more sensitive to dopamine over time.
    C. The brain will crave the drug and require higher doses to achieve the same "good" feeling.
    D. The dopamine-producing cells will switch to producing adrenaline instead.
92. Which of the following is true regarding “thick skin”?
    A. It covers most of the body.
    B. It has no hair follicles or sebaceous glands
    C. It contains many hair follicles.
    D. It covers the eyelids.

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93. Which sequence correctly organizes the structure of inner ear based on their primary function?
    A. Hearing: Cochlea; Motion: Semicircular canals, Posture: Utriculus/Sacculus.
    B. Hearing: Pinna; Motion: Cochlea; Posture: Ossicles
    C. Hearing: Auditory nerve; Motion: Eustachian tube; Posture Ampulla
    D. Hearing: Oval window; Motion: Round window; Posture: Eardrum
94. If a person is in a very dim room, what will happen to their iris muscles?
    A. Circular muscles contract, radial muscles relax
    B. Radial muscles contract, circular muscles relax
    C. Both muscles contract
    D. Both muscles relax
95. How do the functions of the rods and cones differ based on light sensitivity?
    A. Rods detect color; cones detect black and white.
    B. Rods are found in the macula; cones are found in the optic disc.
    C. Rods function in dim light; cones function in bright light.
    D. Rods are less sensitive to light than cones.
96. How does the body integrate the functions of the thyroid and parathyroid glands to maintain calcium homeostasis?
    A. Both glands release PTH to maximize calcium levels at all times in the body regardless of age.
    B. The glands work together to ensure calcium is only excreted through sweat.
    C. The thyroid produces calcium, and the parathyroid stores it for later use.
    D. The thyroid releases calcitonin to lower blood calcium, while the parathyroid releases PTH to raise it.
97. What is the primary function of the Loop of Henlé?
    A. Ultrafiltration of large blood proteins.
    B. To concentrate urine and conserve water.
    C. To collect urine and lead it to the ureter.
    D. To detect changes in blood pH.
98. Why is carbon dioxide considered the greenhouse gas responsible for the greatest amount of arming, even though it absorbs less heat per molecules than methane?
    A. Because it is the only gas that reflect solar energy.
    B. Because it is the only gas produced by fossil fuel combustion
    C. Because it is more abundant and remain in the atmosphere for significantly longer duration.
    D. Because it acts as a glass wall while other gasses do not.
99. According to the safety tips for earthquakes, what is the best action to take if you are indoors during the shaking?
    A. Take cover under a sturdy table and hold on until the shaking stops.
    B. Run outside immediately to get away from the building.
    C. Use the elevator to reach the ground floor quickly.
    D. Stand near a window to watch for falling debris.
100. Analyze the objective of United Nations Framework Convention on Climate Change (UNFCCC). What is its primary target?
    A. To eliminate all use of fossil fuel by 2025
    B. To provide financial aid only to industrialized nations.
    C. To focus solely on planting 20 billion seedlings.
    D. To prevent dangerous human interference with the climate system by stabilizing GHG concentration.

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