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EDUCATIONAL ASSESSMENT AND EXAMINATIONS SERVICE
ETHIOPIAN SECONDARY SCHOOL LEAVING CERTIFICATE EXAMINATION (ESSLCE)
BIOLOGY, *TAHISAS 2014/15 (DECEMBER 2022)*

BOOKLET CODE: 143

SUBJECT CODE: 06

TIME ALLOWED: 2 HOURS

GENERAL DIRECTIONS

THIS BOOKLET CONTAINS BIOLOGY EXAMINATION. THE CODE FOR THIS SUBJECT IS 06 AND THE CODE FOR THIS PARTICULAR BOOKLET IS 143. PLEASE COPY THESE CODES ON YOUR ANSWER SHEET WHERE IT READSSUBJECT CODE AND BOOKLET CODE.

IN THIS EXAMINATION, THERE ARE A TOTAL OF **100 MULTIPLE CHOICE QUESTIONS**. CAREFULLY SELECT THE BEST ANSWER AND **BLACKEN** ONLY THE LETTER OF YOUR CHOICE ON THE SEPARATE ANSWER SHEET PROVIDED. FOLLOW THE INSTRUCTIONS ON THE ANSWER SHEET AND THE EXAMINATION PAPER CAREFULLY. USE ONLY **PENCIL** TO MARK YOUR ANSWERS. YOUR ANSWER MARK SHOULD BE **HEAVY** AND DARK, COVERING THE ANSWER SPACE COMPLETELY. PLEASE ERASE ALL UNNECESSARY MARKS COMPLETELY INCLUDING ANSWERS YOU HAVE CHANGED FROM YOUR ANSWER SHEET.

YOU ARE ALLOWED TO WORK ON THE EXAM FOR **2 HOURS**. WHEN TIME IS CALLED, YOU MUST IMMEDIATELY STOP WORKING, PUT YOUR PENCIL DOWN, AND WAIT FOR FUTURE INSTRUCTIONS.

ANY FORM OF CHEATING OR AN ATTEMPT TO CHEAT IN THE EXAMINATION WILL RESULT IN AN AUTOMATIC DISMISSAL FROM THE EXAMINATION HALL AND CANCELLATION OF YOUR SCORE(S).

PLEASE MAKE SURE THAT YOU HAVE WRITTEN ALL THE REQUIRED INFORMATION ON THE ANSWER SHEET BEFORE YOU START WORK ON THE EXAMINATION.

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A grade 9 student was given four test tubes labeled A, B, C and D which contained different blood samples and asked to determine the blood groups of each sample. She took antigens a and b and added them in each test tube simultaneously. After a few minutes she observed no agglutination in test tube A, some agglutination in B and C and very high agglutination in D. Based on the results, the student may conclude that

A. test tube A contains blood group B.
B. test tube D contains blood group O.
C. test tube C contains blood group AB.
D. test tube B contains blood group AB.

Which one of the following vaccine production method gets rid of all risks linked to using the actual microorganisms for the future? Production of vaccines from

A. surface antigen of microorganisms
B. weakened microorganisms
C. pathogenic microorganisms
D. live microorganisms

A patient with symptoms of anemia, weakness, and unexplained weight loss went to the hospital. The doctor examined him and prescribed anti-parasitic drug. The type of disease the patient has is most likely

A. typhoid.
B. tapeworm.
C. tuberculosis.
D. cholera.

How do enzymes lower the activation energy? By

A. creating permanent chemical bonds with the substrate at the active site
B. increasing the rate of collision between substrate molecules
C. shifting the equilibrium of a reaction in a reverse direction
D. forming a transition state through complimentary pairing with the substrate

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5. Which one of the following is correct with regard to the structure and function of the lymphatic system?
   A. Inguinal lymph nodes are located in the gut and they become enlarged if the intestine is infected.
   B. Cervical lymph nodes are located around the chest and they become enlarged if the reproductive organs are infected.
   C. Mesenteric lymph nodes are located in groin area and they become enlarged if legs are infected.
   D. Axillary lymph nodes are located under the armpit and they become enlarged if the arms are infected.

6. This item is based on the following taxonomic hierarchy of honey bee.
   Kingdom: Animalia
   Phylum: Arthropoda
   Class: Insecta
   Order: Hymenoptera
   Family: Apidae
   Genus: *Apis*
   Species: *melifera*
   What is the scientific name of honey bee?
   A. *Hymenoptera apidae*
   B. *Apis melifera*
   C. *Melifera apis*
   D. *Apidae apis*

7. Which one of the following chemical reactions is correct about the mechanism of action of enzymes?
   A. Reactant A + reactant B + enzyme → intermediate → product AB + enzyme
   B. Reactant A + reactant B + enzyme → intermediate → product AB
   C. Reactant A + reactant B + enzyme → enzyme → intermediate + product AB
   D. Reactant A + reactant B + enzyme → product AB → intermediate + enzyme

If there are non-competitive inhibitors to bind with the allosteric site of 60% of enzyme molecules in a reaction, then the rate of the reaction will be
   A. 60% activated.
   B. 40% inhibited.
   C. dropped to 40% maximum.
   D. raised to 60 % maximum.

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9. Which one of the following statements best explains the effect of change in pH on the rate of an enzyme catalyzed reaction? The change in pH
   A. alters the three dimensional structure of the substrate molecule and prevents it from binding.
   B. decreases the rate of collision between the substrate and enzyme.
   C. affects the tertiary structure of the enzymes by hydrolyzing the peptide bonds.
   D. modifies the charge on some of the amino acids that form the active sites of the enzyme.

10. Who was the scientist that observed motile unicellular organisms in a drop of water for the first time?
   A. Alexander Fleming
   B. Rudolf Virchow
   C. Robert Hooke
   D. Anton van Leeuwenhoek

11. Which one of the following illustrates the traditional use of biotechnology?
   A. Development of vaccines by using non-virulent microorganisms at industrial scale
   B. Production of bio-fertilizers by using selected microorganisms
   C. Making yoghurt through fermentation by the action of wild bacteria
   D. Production of modern medicine through industrial extraction of antibiotic agents

12. This item is based on the following table which shows the functions of the different areas of the brain.

No	Fore brain	Mid brain	Hind brain
1	Vision	Memory	Hearing
2	Center of higher level of thought	Vision	Balance and orientation
3	Balance and orientation	Memory	Center of higher level of thought
4	Balance	Hearing	Memory

In the above table which row contains the correct brain area with its function?
   A. 3
   B. 1
   C. 4
   D. 2

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13. If a neuron transmits the nerve impulse faster than another neuron, this might be due to the effect of
A. axon.
B. cell body.
C. myelin sheath.
D. dendrite.

14. How does a simple reflex response differ from a conditioned reflex response?
A. The same stimulus evokes same response in simple reflex while different stimuli can evoke same response in conditioned reflex response.
B. Response to simple reflex is faster than response to conditioned reflex.
C. A simple reflex response is learnt while conditioned reflex response is a natural response by organisms to a new stimulus.
D. A simple reflex response is coordinated by the brain while conditioned reflex response is coordinated by the spinal cord.

15. The pupil of the eye regulates the amount of light entering the eye. This is possible because the size of the pupil is controlled by muscles of the
A. cornea.
B. iris.
C. sclera.
D. choroid.

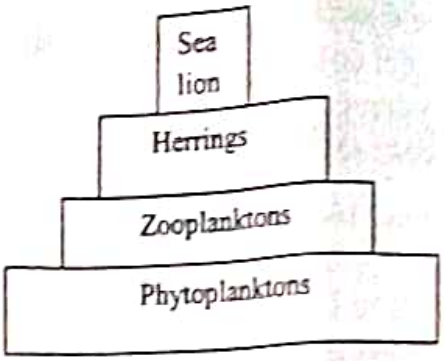
16. Which one is a true representation of the characteristic features of angiosperms?
A. They are land plants with simple vascular tissues.
B. They have small needle shaped leaves.
C. Their reproductive structures are found in cones.
D. They are plants with seeds enclosed in a fruit.

17. Planaria spp., tape worms, and liver flukes are members of kingdom animalia that belong to phylum
A. nematoda.
B. annelida.
C. porifera.
D. platyhelminthes.

18. Which one of the following pairs of animals and their adaptation strategy is correctly matched?
A. Polar bear - small size and large surface area to volume ratio
B. Arctic whales - small size and large surface area to volume ratio
C. Fennec fox - small ears and thick fur
D. Arctic Fox -large sized and thick fur

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19. This item is based on the following pyramid of energy.



Which of the following is true about the above pyramid of energy?

A. Equal amount of energy is available at each trophic level.
B. The amount of energy decreases as we go upwards.
C. Phytoplanktons obtain the least amount of energy.
D. More energy is available for sea lion than the rest.

20. The tumble weed plants in the deserts of North America breaks off at the roots and are blown away when their seeds ripe. This is a plant adaptation for

A. getting minerals.
B. spreading seeds.
C. water conservation.
D. losing excess water.

21. What happens when high concentration of follicle stimulating hormone is released during menstrual cycle?

A. Release of egg into the Fallopian tube
B. Maturation of egg in the ovary
C. Disintegration of the lining of uterus
D. Reduction of oestrogen concentration

22. Which one is the correct statement concerning how different birth control methods work?

A. Female condom kills sperm cells before reaching the egg.
B. Male condom avoids contact between sperm and egg.
C. Natural method uses spermicidal chemical to kill sperm cells.
D. Intrauterine device avoids contact between sperm and egg.

23. Which of the following is a physiological method of temperature regulation in animals?

A. Wallowing
B. Panting
C. Hibernation
D. Aestivation

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30. Three fresh potato tubers with a size of 3 cm long were cut into equal sized bars and were put in three different tubes labeled as A, B and C. Tube A contains 30% sucrose solution; tube B contains 20% sucrose solution and tube C contains 10% sucrose solution. The percentage change in length was calculated after 30 minutes. Which one of the following is the expected result of each bar's length?

A. Bar B > bar C > bar A
B. Bar C > bar A > bar B
C. Bar A>bar B >bar C
D. Bar C>bar B> bar A

31. The effect of auxin in plants is

A. stimulating both main and side shoots.
B. suppressing the main shoot and stimulation of side shoots.
C. stimulating the main shoot and suppression of side shoots.
D. suppressing both main and side shoots.

32. In an experiment conducted to demonstrate the process of germination in dicot and monocot plants, one of the seedlings curved and latter straightens carrying the cotyledon out of the soil. What do you call this type of germination and to which group of plants did the seed belong to respectively?

A. Hypogeal and monocot
B. Epigeal and dicot
C. Hypocotyl and monocot
D. Epigeal and monocot

33. The main characteristics of renewable resources is that they are

A. living and irreplaceable.
B. living and reusable.
C. non-living and reusable.
D. non-living and irreplaceable.

34. Which one of the following is the method of conserving biodiversity?

A. Interbreeding wild and domestic animals
B. Replacing indigenous plants with exotic ones
C. Setting up national parks
D. Cultivating genetically modified organisms

35. A student mixed unidentified food solution with sodium hydroxide and then added few drops of 1% Copper (II) sulfate solution to the test solution. After few minutes, the solution developed purple colour. The biological molecule in the unknown food solution was

A. glucose.
B. fat.
C. disaccharide.
D. protein.

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36. This item is based on the following list of wildlife in Ethiopian national parks.

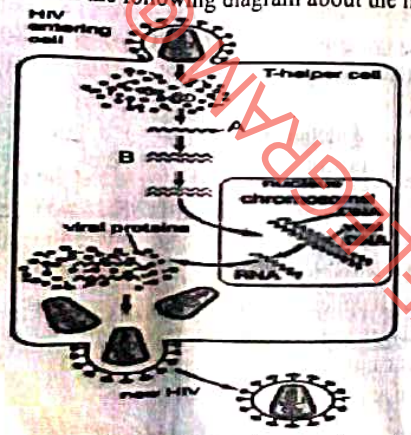
Roan antelope, Greater flamingo, Ethiopian wolf, Beisa oryx

The above listed wildlife species are found in which national parks respectively?

A. Awash, Abijatta-Shalla Lakes, Gambella, Bale Mountains
B. Bale Mountains, Awash, Gambella, Abijatta-Shalla Lakes
C. Abijatta-Shalla Lakes, Awash, Bale Mountains, Gambella
D. Gambella, Abijatta-Shalla Lakes, Bale Mountains, Awash

37. Hydrolysis of the biological molecule maltose results in the formation of
A. two α-galactose molecules.
B. an α-glucose and an α-fructose molecule.
C. two α-glucose molecules.
D. an α-glucose and an α-galactose molecule.

38. This item is based on the following diagram about the life cycle of HIV.



What would happen if the enzyme that converts molecule 'A' to molecule 'B' is denatured? The
A. viral DNA important for production of viral RNA will not be synthesized.
B. viral RNA integrates itself into the host DNA and interferes with its normal functions.
C. DNA integrated into the host DNA cannot make mRNA molecules.
D. rate of reproduction of the virus decreases as few protein coats are synthesized.

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39. All of the following are functions of proteins EXCEPT
A. serving as structural unit of plasma membrane.
B. controlling buoyancy.
C. serving as component of the immune system.
D. controlling metabolism.

40. Enzymes are biological molecules that
A. are used up in biochemical reactions.
B. are made from fibrous proteins.
C. only work in certain conditions.
D. alter reactants in non-specific way.

41. A biochemist used an enzyme to join two molecules by successful formation of new bonds. The class of the enzyme used by the biochemist could be best described as
A. isomerase.
B. hydrolase.
C. oxidoreductase.
D. ligase.

42. The volume of oxygen produced when a yeast cell decomposes H_2O_2 can be determined by
A. petri dish.
B. measuring cylinder.
C. balance.
D. centrifuge.

43. Suppose an experiment was conducted to test the effect of manure on growth of a carrot plant. A total of 15 carrot seeds were supplied with manure and another 15 were left to grow with no manure application. What is the control of this experiment?
A. Seeds supplied with manure
B. Seeds left to grow with no manure
C. The manure and all the seeds
D. The manure

44. Biologists try to deal with the problem of the impact of global warming on crop production by
A. producing drugs for degenerative diseases.
B. production of monoclonal antibodies.
C. developing crop varieties which never need light.
D. developing heat tolerant crop varieties.

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45. An ideal viscosity makes water a
A. good transport medium.
B. main respiratory substrate.
C. product in many chemical reactions.
D. place for other reactions to take place.

46. The slow heating up and cooling down of water property is mainly attributed to its
A. high specific heat capacity.
B. low boiling point.
C. low latent heat of vaporization.
D. high surface tension.

47. This item is based on the table below which shows the percentage composition of inhaled and exhaled air.

Gases	Inhaled air	Exhaled air
Nitrogen	About 80%	About 80%
Oxygen	X	16%
Carbon dioxide	0.04%	Y

In the above table, the respective values of X and Y are
A. 16% and 4%.
B. 21% and 4%.
C. 4% and 16%.
D. 4% and 21%.

48. How does a high altitude affect breathing in humans? By
A. reducing the surface area of the alveoli
B. increasing the percentage of oxygen in the lungs.
C. increasing breathing rate
D. reducing the number of RBCs

49. A doctor detected that blood is flowing in the wrong direction inside the heart of a patient. This could be due to a problem of
A. atrium.
B. left ventricle.
C. right ventricle.
D. valves.

50. Which of the following correctly explains blood vessels and their functions?
A. Veins have valves because they are subject to powerful pumping of blood by the heart.
B. All arteries carry deoxygenated blood except pulmonary artery.
C. Arteries have thick wall because they return blood to the heart.
D. Capillaries have very thin wall and large surface area because they are sites of exchange.

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51. Among the following statements which one is correct about the function of the heart?
   A. The right and left sides of the heart fill and empty at the same time.
   B. The left ventricle contracts and forces deoxygenated blood to the lungs.
   C. When the heart muscles relax, the heart fills with blood and develop systolic pressure.
   D. When the heart muscles contract, it forces the blood out of the heart and develop diastolic pressure.

52. During meiosis what are the two significant processes that bring new arrangements?
   A. Segregation and karyokinesis
   B. Crossing over and independent assortment
   C. Oogenesis and cytokinesis
   D. Spermatogenesis and synapsis

53. Which of the following molecules make up a chromosome?
   A. RNA and amino acids
   B. RNA and glycogen
   C. DNA and protein
   D. DNA and RNA

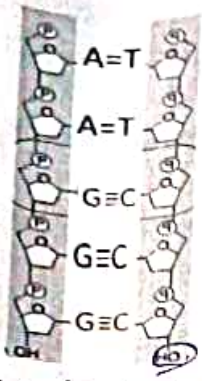
54. To classify bacteria by Gram staining technique, which one is used as a counter stain?
   A. Safranin
   B. Acetocarmine
   C. Crystal violet
   D. Iodine

55. When DNA replication starts the
   A. helicase enzyme assembles free nucleotides into a new strand.
   B. hydrogen bonds between the nucleotides of two strands break.
   C. phosphodiester bonds between the adjacent nucleotides break.
   D. polymerase enzyme separates the double strands into a single strand.

56. Which one of the following processes is correct about translation?
   A. Peptide bonds form between the mRNA codons and tRNA anticodons at the ribosomes.
   B. Translation ends when the tRNA complementary to a stop codon brings the last amino acid.
   C. mRNA moves along the ribosome to bring amino acids.
   D. tRNA molecules with complementary anticodons bring amino acids to the ribosomes.

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57. This item is based on the following diagram that depicts base pairing between the two strands of DNA.



How do you modify this molecule to make it the appropriate structure of DNA? By

A. connecting the hydroxyl groups 'OH' on the strands by hydrogen bonds
B. changing the base pair by pairing A with G and C with T
C. changing the number of bonds between A and T to triple bond
D. turning one of the strands upside down and connecting the bases as they are

58. Which one of the following is an example of learned behavior?

A. Blinking
B. Nest-building
C. Habituation
D. Imprinting

59. During the evolution of each hominid species, the cranial capacity of

A. *Homo sapiens* was larger than *Homo neanderthalensis*.
B. *Home hablis* was larger than *Australopithecus*.
C. *Homo erectus* was larger than *Homo sapiens*.
D. *Homo neanderthalensis* was smaller than *Homo hablis*.

60. Which one of the following statements is an example of innate behavior?

A. Dogs producing the same unconditional response to a bell ringing
B. Young herring gull obtaining food by pecking mother's beak
C. Mice obtaining food by pressing the lever in Skinner box
D. Prairie dogs giving alarm in response to predators approaching them

61. How do animals obtain solution for a problem through insight learning? By

A. trial and error that are occurring mentally
B. obtaining a training that involves food reward
C. modifying innate response through conditioning
D. being positively reinforced by the stimuli

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62. What is a courtship behavior? It is an activity that results in
A. obtaining food from an environment.
B. mating and reproduction.
C. co-operation in caring for the offspring.
D. defending a territory.

63. Which one of the following Ethiopian institutions is involved in the preservation of plants, animals and microorganisms?
A. The Institute of Biodiversity Conservation
B. Addis Ababa University Biology Department
C. Ethiopian Institute of Agricultural Research
D. Aklilu Lemma Institute of Pathobiology

64. As swallowed food reaches in the small intestine, bile is squirted onto the food. This is important to
A. acidify the semi-digested food in the stomach.
B. digest protein contents of the food.
C. emulsify fats present in the food.
D. break down starch to maltose.

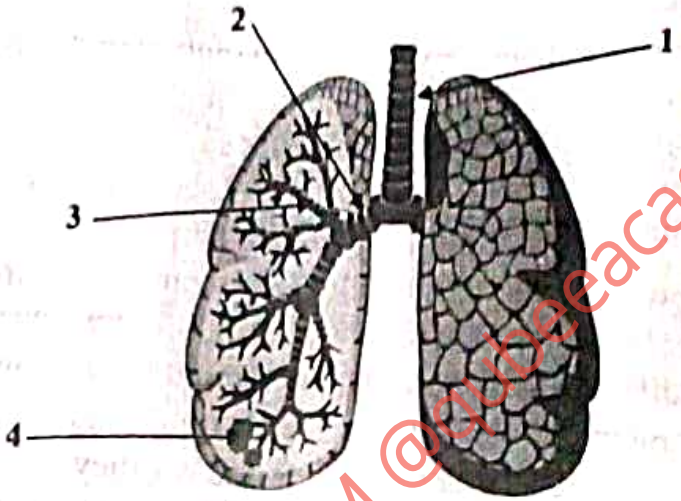
65. The final products of lipid digestion are absorbed into blood stream through the
A. lacteal.
B. villi.
C. hepatic portal vein.
D. renal vein.

66. Suppose grade nine students want to observe a prepared slide of stained human cheek cells under a microscope. They set up the microscope with the lowest power lens and clip the prepared slide in to place on the stage. Which of the following is the next step that the students should follow?
A. Rotate the nosepiece and make the higher magnification lens to click into place
B. Look through the eye piece lens and adjust the iris diaphragm until the light is bright
C. Move the objective lens down slowly by using iris diaphragm under the stage
D. Change the objective lens from lowest to medium magnification by using course focusing knob

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67. Which one of the following is the reservoir for tetanus?
A. Mosquito
B. Food
C. Soil
D. Air

68. Consider the following diagram showing structure of the lung.



In the above diagram, the parts indicated by 1, 2, 3 and 4 respectively show
A. trachea, bronchiole, alveoli, bronchus.
B. trachea, alveoli, bronchus, bronchiole.
C. trachea, bronchus, bronchiole, alveoli.
D. trachea, bronchiole, bronchus, alveoli.

69. Which one of the following statements is correct about mutation by substitution? It occurs when
A. an extra base is added to the nucleotide sequence.
B. a segment reverses its orientation.
C. a base in a nucleotide sequence is replaced by another.
D. a segment of bases is omitted in the nucleotide sequence.

70. Stanley Miller conducted his famous spark discharge experiment to get evidence about the biochemical theory of the origin of life. In this experiment, he synthesized simple amino acids from
A. ammonia, methane, carbon dioxide, oxygen.
B. hydrogen, water, oxygen, calcium.
C. methane, ammonia, oxygen, nitrate.
D. hydrogen, methane, ammonia, water.

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71. Which one of the following is an example of paleontological evidence of evolution?
A. Embryonic development stages
B. Fossilized impression of an organism
C. Morphology of different structures
D. Amino acid sequence of haemoglobin

72. How might Lamarck explain the evolution of hooves in horses?
A. As horses walked over the rough ground, their feet become tougher and tougher until the toes fused together to form a hoof. This acquired trait was then passed on to subsequent generation.
B. The genes for hooves were incorporated into the genes of horses when some horses bred with other animals that already had hooves.
C. Horses have always had hooves. There was no time in the past at which the ancestor horses did not have hooves.
D. Some horses were born with larger middle toes, and outcompete those horses without this trait, and so they reproduced more. Eventually, this led to the development of a hoof.

73. Which one of the following statements is correct about directional selection? Individuals at
A. both ends of the range of values are the least well adapted.
B. the middle of a range of values have adaptive advantage over the others.
C. one extreme are disadvantaged compared to those at the other extreme.
D. both ends are well adapted compared to individuals at the middle.

74. One of the following events of photosynthesis takes place in the thylakoid lumen.
A. Calvin cycle
B. Carboxylation
C. Photolysis
D. Fixation of CO_2

75. Which one of the following molecules are the components of ATP?
A. Ribose sugar, thymine and phosphates
B. Deoxyribose sugar, guanine and phosphates
C. Deoxyribose sugar, adenine and phosphates
D. Ribose sugar, adenine and phosphates

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76. Which one of the following statements is correct about reactions of the Krebs cycle?
A. The first product of the Krebs cycle is oxaloacetate molecule.
B. Krebs cycle happens on the inner membrane of mitochondria.
C. Each Krebs cycle has two decarboxylation reactions.
D. A total of 6 ATP molecules are produced per Krebs cycle.

77. How many moles of ATP can be used up, if two moles of glucose is burned?
A. 12
B. 16
C. 4
D. 8

78. What happens during the Cori cycle?
A. Lactate and ATP are produced in the cell.
B. Glucose is partially broken down in muscle cells.
C. Pyruvate is converted into lactate in the muscle.
D. Lactate is used to regenerate glucose in the liver.

79. How does the non-nucleotide reverse transcriptase inhibitor affect the life cycle of HIV? By preventing
A. transcription of RNA to DNA
B. binding of HIV on the surface of T-cells
C. assembly of new virus particles
D. translation of viral protein on ribosome

80. Recycling of nutrients is important because
A. it avoids conversion of energy.
B. certain nutrients escape to other universes.
C. nutrients are limited in nature.
D. living cells need some nutrients in excess.

81. What is the name of the process by which plants absorb nitrates from the soil and use it as source of cellular components?
A. Assimilation
B. Ammonification
C. Nitrification
D. Denitrification

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82. Which one of the following comparison between primary and secondary succession is correct? In primary succession,

A. the species diversity gradually decreases due to environmental factors, but in secondary succession the species diversity increases.

B. the pioneer community starts from previously un-colonized area, but in secondary succession new succession starts from fire destroyed lands.

C. the total biomass of the community increases, but in secondary succession the biomass remains the same.

D. the number of ecological niches remains the same, but in secondary succession the number of ecological niches increases.

83. Which one of the following statements best describes the thorn forest? It is characterized by

A. dry summer and rainy winter.

B. hot temperature and coniferous trees.

C. fertile soil and humid air.

D. poor soil and deciduous trees.

84. Consider the following table which shows the number of organism of different species in an ecosystem.

Species	Number of organisms of each species			
	Area 1	Area 2	Area 3	Area 4
A	36	17	20	11
B	7	19	12	10
C	1	5	8	10
D	3	2	6	10
E	3	7	4	9

From the above table, which area has a less hostile environment?

A. Area 3
B. Area 1
C. Area 4
D. Area 2

85. Which one of the following molecules is the product of the light independent reaction of photosynthesis?

A. ATP
B. Oxygen
C. NADPH
D. Triose phosphate

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86. This item is based on the following table that compares intraspecific and interspecific competition.

No.	Intraspecific competition	Interspecific competition
1	Will not lead to reduction in resources	Will lead to reduction in resources
2	One species outcompetes the other	Rate of reduction in the population is the same
3	Competition is within individuals of a species	Competition is between individuals of two species
4	Competing organisms inhabit different habitats	Competing organisms inhabit the same habitat

Which row of the comparison in the above table is correct?

A. 3
B. 4
C. 1
D. 2

87. A student crossed two pea plants with the genotype of RRYY and rryy. The possible gametes that are produced by the offsprings of this cross will be

A. 2RY and 2ry.
B. 2Ry and 2ry.
C. RR, rr, YY and yy.
D. RY, Ry, rY and ry.

88. Which one of the following statements best describes anaphase I of meiosis?

A. Homologous chromosomes move to the opposite poles of the cell
B. Exchange of segments between the adjacent sister chromatids
C. Splitting of the centromere and separation of the sister chromatids
D. Formation of two haploid cells through formation of cleavage furrow

89. Eye lenses that are too strong make a person to be short sighted. What type of lens should be used to correct such defects? A lens that

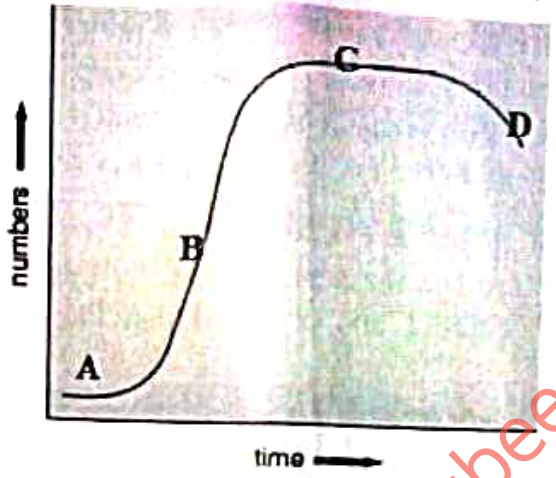
A. allows entrance of more light rays to the eyes.
B. magnifies the image formed on the retina of the eyes.
C. brings light rays together before they reach to the eyes.
D. spreads the light out before it gets in to the eyes.

90. A traffic police cannot see license plate numbers close to him but can clearly see at distance. This eye defect is caused by

A. irregular eye shape.
B. asymmetrically curved cornea.
C. very weak lens.
D. very long eyeball.

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91. Answer this item based on the following graph of population growth.



Why does the population not increase at point A? Because
A. excretory products are accumulated and cause diseases.
B. the environment is incapable to support.
C. some organisms are not adapted to the environment.
D. nutrients of the environment are exhausted.

92. Which one of the following endocrine glands produces both enzymes and hormones?
A. Adrenal gland
B. Ovaries
C. Pancreas
D. Thyroid gland

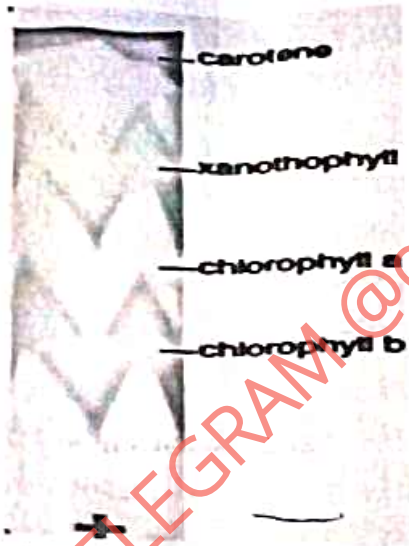
93. What is a photosynthetic unit? It is the
A. arrangement of molecules that carry out the light dependent reaction.
B. light harvesting molecules embedded in the stroma.
C. combination of enzymes that synthesize triose phosphates.
D. primary electron acceptor of photosystem I and II.

94. C4 plants grown in Ethiopia are characterized by
A. poor yield in areas with high light intensity.
B. low productivity in all parts of the country.
C. efficient photosynthesis in areas with high CO_2 concentration.
D. efficient photosynthesis in hot parts of the country.

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95. Which one of the following best describes photosynthesis in CAM plants?
A. CO_2 is incorporated into a three carbon molecule.
B. CO_2 is fixed into a molecule of ribulose bisphosphate.
C. CO_2 fixation and Calvin cycle are temporally separated.
D. CO_2 fixation and the Calvin cycle are spatially separated.

96. A biology student placed an extract mixture of chlorophyll a chlorophyll b, xanthophyll and carotene pigments on a filter paper. He applied a paper chromatography technique and observed that the pigments are separated as shown below.



The above result depicts that
A. chlorophyll a and b are more soluble than xanthophyll and carotene.
B. carotene is more soluble than other pigments.
C. xanthophyll is more soluble than carotene.
D. all the four pigments have equal solubility.

97. Which one of the following explains how balance is maintained by the inner ear?
A. Generation of impulses in the sensory hairs of semicircular canals and its interpretation by the brain maintains balance.
B. Generating impulses in the auditory nerve and sending it to the brain for interpretation maintains balance.
C. Vibration of the ear ossicles and its interpretation by the brain maintains balance.
D. Generation of impulses in the cochlea and sending it to the brain for interpretation maintains balance.

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98. What is the difference between exocrine and endocrine glands?
A. The secretions of exocrine glands travel through special tube-like structures.
B. Endocrine glands are found throughout the body but exocrine glands are localized at specific body parts.
C. Exocrine glands are ductless glands that produce hormones and release them into the blood.
D. The secretions of endocrine glands travel through special tube like structures.

99. One of the mechanisms that bacteria cause disease is by
A. invading tissues and causing physical damage.
B. inserting their genetic material into DNA of the host.
C. targeting lymphocytes and altering the immune system.
D. releasing extracellular enzymes from their hyphae.

100. The life cycle of lytic viruses differs from the lysogenic viruses in that, the lytic life cycle
A. causes the virus to enter a long latent state after injecting its DNA.
B. causes the host cell to burst and releases new viruses.
C. causes engulfing of the host cell and duplicating itself at the expense of the host DNA.
D. results in the formation of viral DNA which incorporated with the host DNA.

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THE END