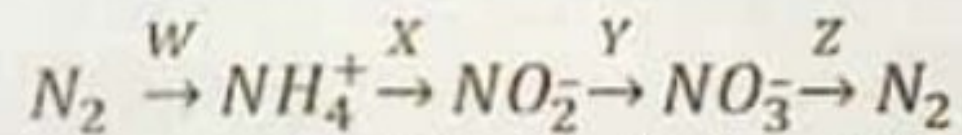


**NATIONAL EDUCATIONAL ASSESSMENT AND EXAMINATIONS
AGENCY (NEAEA)
ETHIOPIAN UNIVERSITY ENTRANCE EXAMINATION (EUEE)
BIOLOGY
MEGABIT 2012/13(MARCH 2020/21)**

BOOKLETCODE: 34
Number of Items: 100

SUBJECT CODE: 06
Time Allowed: 2 Hours

1. Which one of the following viruses is an RNA virus?
A. Herpes simplex
B. H1N1
C. Bacteriophage
D. HIV
2. Which one of the following statements is true regarding the need for recycling nutrients through an ecosystem?
A. It depletes the resources hence infinite resources become limited by the process.
B. It pollutes the environment hence waste products are accumulated during the process.
C. It is energy consuming process hence nutrients are constantly created and destroyed.
D. It is the key to saving the earth hence nutrients become available.
3. Answer this question based on the following steps of the nitrogen cycle.



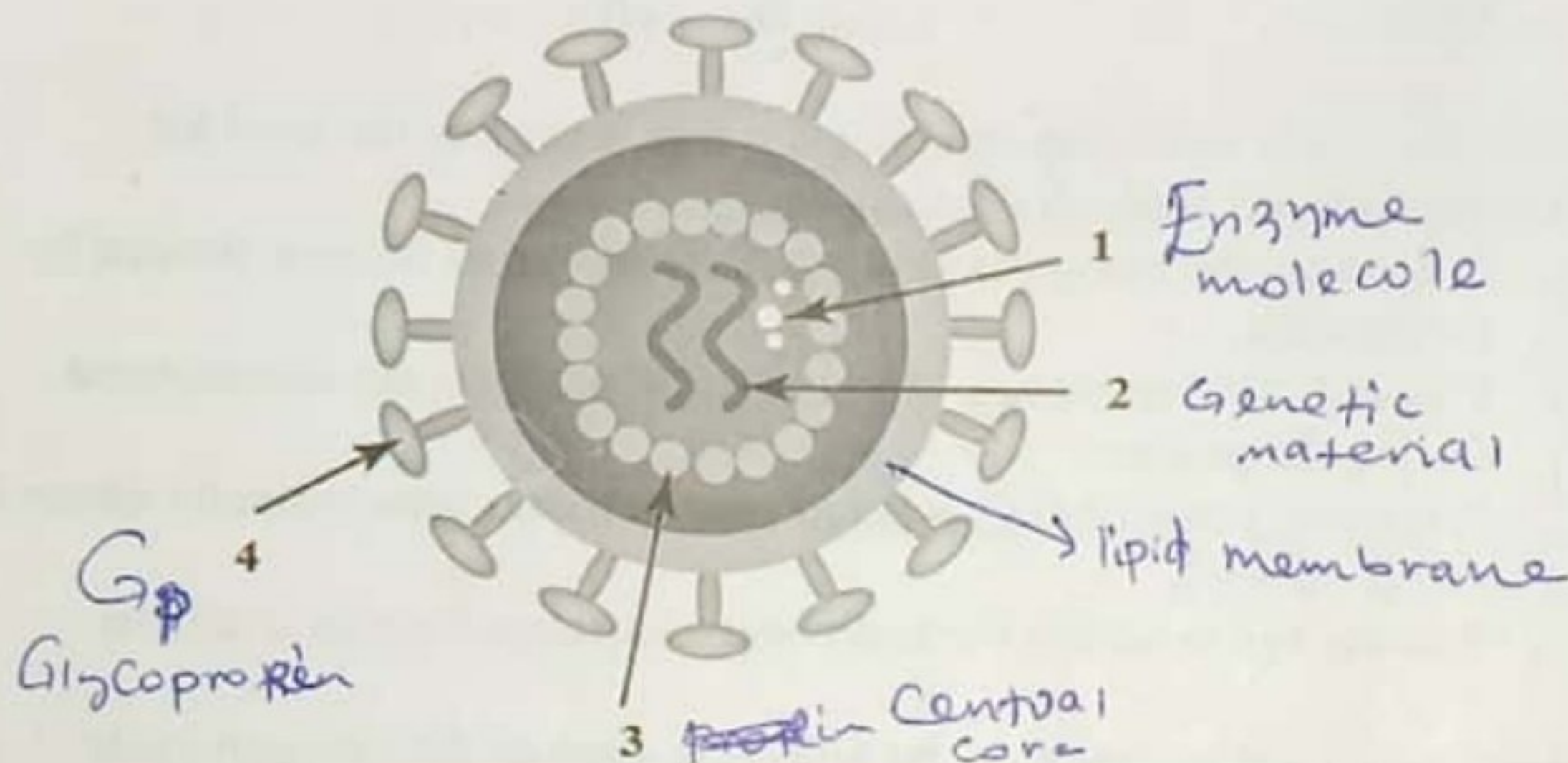
The bacteria that are represented by the letters W, X, Y and Z are, respectively

- A. *Klebsiella*, *Nitrobacter*, *Pseudomonas* and *Rhizobium*. ✗
B. *Rhizobium*, *Pseudomonas*, *Nitrobacter* and *Nitrosomonas*.
C. *Azotobacter*, *Nitrosomonas*, *Nitrobacter* and *Pseudomonas*.
D. *Thiobacillus*, *Nitrosomonas*, *Nitrobacter* and *Pseudomonas*.

D. Thiobacillus, Nitrosomonas, Nitrobacter
Klebsiella / Azotobacter reduce $N_2(gas)$ to NH_4^+

4. What is the impact of humans on the sulphur cycle? Production of
- A. sulphur dioxide through combustion of fossil fuels
 - B. sulphate through weathering and oxidation of rocks
 - C. hydrogen sulphide through oxidation of sulphur
 - D. sulphur through decomposition of dead matter

5. As succession progresses, the bare land turns out to be productive due to the fact that the
- A. environment becomes less stable.
 - B. abiotic conditions remain unchanged.
 - C. species diversity and richness falls.
 - ☒ D. amount and depth of the soil increases.
6. Consider the following diagram of HIV virus.



What does number 1 represents?

- A. Central core
 - B. Antigen
 - C. Genetic material
 - ☒ D. Enzyme molecule
7. What is the economic impact of AIDS?
- A. Encourage savings for medical treatment
 - ☒ B. Seriously affects the taxable population
 - C. Increase the resources for public expenditure
 - D. Enhance the life expectancy and GDP
8. A geographical area with specific climate, soil type, plants and animals with similar adaptations is _____.
- ☒ A. biome
 - B. niche
 - C. ecosystem
 - D. habitat



BOOKLET CODE: 34

Eco

3

SUBJECT CODE: 06

9. As the energy from the sun enters the ecosystem in the form of light, one of the following happens to it. It
- A. goes on increasing along the trophic levels from primary producers to decomposers.
- B. remains much of the time the same but increases as it reaches decomposers. *no*
- C. goes on decreasing along the trophic levels from primary producers to decomposers.
- D. depends on the type of trophic level and changes at each trophic level irregularly.



10. Suppose a self-fertilizing organism has AaBb genotype, how many different types of gametes would it produce if there is no linkage?

A. 16
B. 8
C. 12
D. 4

11. What is the chemical composition of bacterial cell wall?

A. Starch
B. Capsule
C. Cellulose
D. Peptidoglycan

12. In his biology practical section, a biology student applied a Gram stain to two groups of bacteria named X and Y. At the end, he observed that bacteria X stained purple while bacteria Y stained pink. Which of the following could be the correct conclusion of his experiment? Bacteria

X
purple
Gram's
+ve
no outer
membrane.

Y
pink
Gram's
-ve
less
peptidoglycan but have outer membrane (lipopolysaccharide & protein)

A. X and Y are both Gram negative.
B. Y are Gram positive and X are Gram negative.
C. X are Gram positive and Y are Gram negative.
D. Y and X are both Gram positive.

13. As compared to infectious diseases, functional diseases

A. can spread through the bites of insects.
B. are passed from person to person through reservoirs.
C. are caused by pathogenic micro-organisms.
D. can result from malfunction of organs.

functional disease :- disease with out being any obvious
damage or physical sign of disease

14. Which one of the following products does **NOT** need the role of bacteria?

- A. Vaccine
 B. Ethanol
 C. Insulin
 D. Enzymes

The other all requires bacteria in Genetic Engineering.

15. Bacteria are used in the production of vinegar to

- A. oxidise alcohol to ethanoic acid.
 B. supply oxygen for the fermenter.
 C. produce alcohol in beer.
 D. dilute ethanoic acid into vinegar.

Acetobacter is used to Oxidise the alcohol to Ethanoic Acid.

16. Among the parts of the cell, which organelles are bounded with double membrane?

- A. Nucleus, mitochondria and chloroplast
 B. Lysosome, vacuole and nucleus
 C. Golgi body, chloroplast and lysosome
 D. Vacuole, endoplasmic reticulum and ribosome

17. Why are cells that secrete hormones and enzymes rich in rough endoplasmic reticulum? Because they produce more

- A. ATP.
 B. proteins.
 C. lipids.
 D. carbohydrates.

18. What is the role of cholesterol in the cell membrane? To

- A. make the membrane selectively permeable
 B. serve as signals to other membrane of cells
 C. anchor integral proteins with the membrane
 D. maintain the membrane fluidity

→ reduce the fluidity of the membrane

19. If potato cells are immersed in a hypertonic solution, they will

- A. lose water and become turgid.
 B. gain water and become larger.
 C. lose water and plasmolysed.
 D. gain water and haemolysed.

Hypertonic = having lower water potential than water (more negative)

Hypotonic = having higher water potential than cell (less negative)

Isotonic = equal

20. Which molecule of the plasma membrane contains carbohydrate chains and allows identification of the cell by the immune system?

- A. Channel proteins
 B. Glycoproteins
 C. Integral proteins
 D. Peripheral proteins

Integral proteins
 - channel proteins
 - carrier
 - peripheral proteins

21. Red-green colour blindness is due to X-linked gene and determined by the recessive alleles. Which one of the following is true about this condition?
- A. Expressed in both sexes equally if the parents are carriers.
 - B. Females inherit one allele from each parent and become affected.
 - C. It affects males due to alleles inherited from the father.
 - D. It is much more common in females.

22. Which one of the following statements is true about a chromosome? It is
- ☒ A. made up of DNA which is tightly coiled many times around histones.
 - B. clearly visible in the nucleus when the cell is not dividing.
 - C. divided into two equal sections by the centromere.
 - D. loosely organized throughout the nucleus when the cell is dividing.

23. What is the complementary strand for a DNA strand having the following sequence of bases?

5' - AGGTTACTGAGCT - 3'
3' - TCC AATGACTCGA - 5'

- A. 3' - UCCAAUGACUCGA - 5'
 - B. 5' - UCCAAUGACUCGA - 3'
 - ☒ C. 3' - TCCAATGACTCGA - 5'
 - D. 5' - TCCAATGACTCGA - 3'
24. Consider the following disordered events of transcription.
- 2 I. RNA polymerase crosses a stop sequence in the gene.
 - 3 II. RNA polymerase reads the antisense DNA strand and builds mRNA.
 - 4 III. mRNA molecule detaches from DNA and the DNA rejoin.
 - 1 IV. RNA polymerase binds to the promoter which signals the DNA to unwind.

Which one is the correct sequence of events during transcription?

- A. I → IV → II → III
- ☒ B. IV → I → II → III
- C. IV → II → I → III
- D. I → IV → III → II

25. Which of the following bases are the triplets of codes in the mRNA that cease translation and the ribosome folds the polypeptide into its final structure?

- ☒ A. UAA, UAG and UGA
- ☒ B. TAA, TAG and TGA
- C. ATT, ATC and ACT
- D. CCC, UUA and GUU

26. By which levels of precipitation, temperature and type of plants is the Taiga biome characterized, respectively? *Adequate Cool poor rocky soil, Conifer plant*
- A. Almost none, cold and succulents
 - ☒ B. Adequate, cool year round and conifers
 - C. Humid, always warm and ferns
 - D. Dry, cold and lichens
27. In which biome are epiphytes common? *(TRF)*
- ☒ A. Tundra forest
 - B. Tropical rainforest
 - C. Temperate forest
 - D. Thorn forest
28. What makes Ethiopia rich in biodiversity which deserves a global attention?
- A. Uniformity of high lands and low lands
 - B. Similar terrestrial and aquatic biomes
 - ☒ C. Variation in topography and vegetation
 - D. Narrow range in altitude and climate
29. Why maintaining habitats is the key and fundamental aspect to conserve biodiversity? Because
- A. preserving habitats leads to decreased species richness and abundance.
 - B. replacing natural habitats by artificial ones increases food security.
 - C. disturbance of habitats makes the population well adapted.
 - ☒ D. destruction of habitats is the leading cause of extinction.
30. Among the following statements, which one is correct about mutations?
- Mutations
- A. are changes in genetic composition of a population.
 - B. that occur in sex cells are completely harmless.
 - ☒ C. are accidents that occur spontaneously and randomly during DNA replication.
 - D. that occur in somatic cells can pass on to the next generation.
31. If the particular triplet of bases in the sense strand of DNA is AGT, then the corresponding codon for the transcribed mRNA will be UCA.
- A. UCA
 - B. AGU
 - C. ACU
 - D. UGA

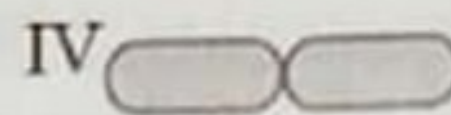
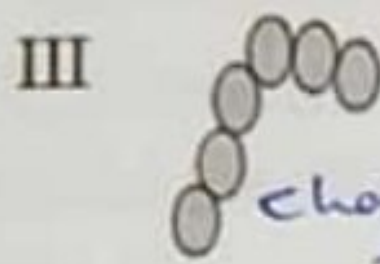
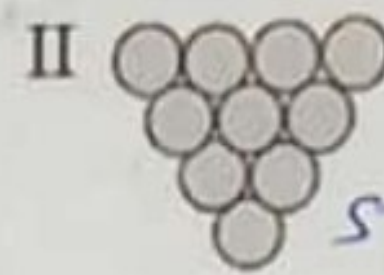
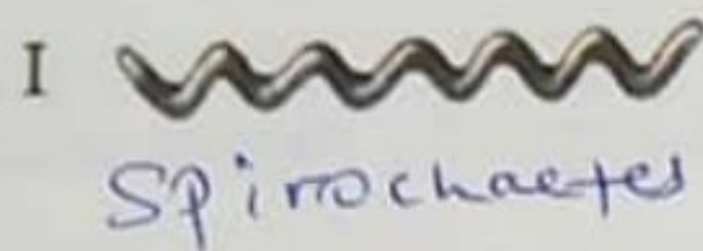
32. The table below ^{bln member of the same} compares the two types of ^{bln diff spp.} competition.

No	Intra-specific competition	Inter-specific competition
1	Competition between different species	Competition between members of the same species
2	Occurs between individuals with different adaptation	Occurs between individuals with similar adaptation
3	Occurs for all types of requirements	Occurs for specific requirement
4	Directly affects the population size	Either both or one species can be suppressed

In the above table, which rows contain **WRONGLY** stated statements with respect to the types of competition?

- A. Row 1 and 2
 B. Row 2 and 3
 C. Row 2 and 4
 D. Row 1 and 3
33. What is the theory that states disease is caused by microorganisms?
 A. Endosymbiotic theory
 B. Germ theory
 C. Spontaneous generation
 D. Biogenesis theory
34. In the bare bottom of a newly formed pond a biologist observed emergence of new algae. The form of succession he observed can be best described as
 A. secondary succession.
 B. primary succession.
 C. early succession.
 D. late succession.
35. The extent to which variability exists among living organisms, with in species and even between ecosystems is known as
 A. bioaccumulation.
 B. biodiversity.
 C. biosphere.
 D. biomass.
36. The chromosomal mutation that results Down's syndrome is ^{extra chro. on no 21}
 A. chromosome non-disjunction.
 B. chromosome translocation.
 C. inversion.
 D. duplication.

37. When a piece of one chromosome is transferred to another non-homologous chromosome, such kind of mutation is called
 A. duplication. C. translocation.
 B. insertion. D. inversion.
38. Consider the following diagram of the shapes of bacteria.



Which of the following shapes of bacteria belongs to spirochaetes?

- A. II C. I
 B. IV D. III

39. Which of the following diseases have water as their reservoir?

Human A. Trachoma and diphtheria C. Pneumonia and tuberculosis - Air
 B. Salmonella and malaria D. Amoeba and cholera - water
Animal

40. The following table compares viruses with free-living cells.

No	Feature	Viruses	Free-living cells
1	Size <u>0.01 - 0.1 μm</u>	10-100 μm	10-100 μm
2	Nucleus	Absent	Present ✓
3	DNA or RNA	Present	Present
4	Mitochondria	Present ✗	Present ✗

Which rows of the above table contain the correct comparison?

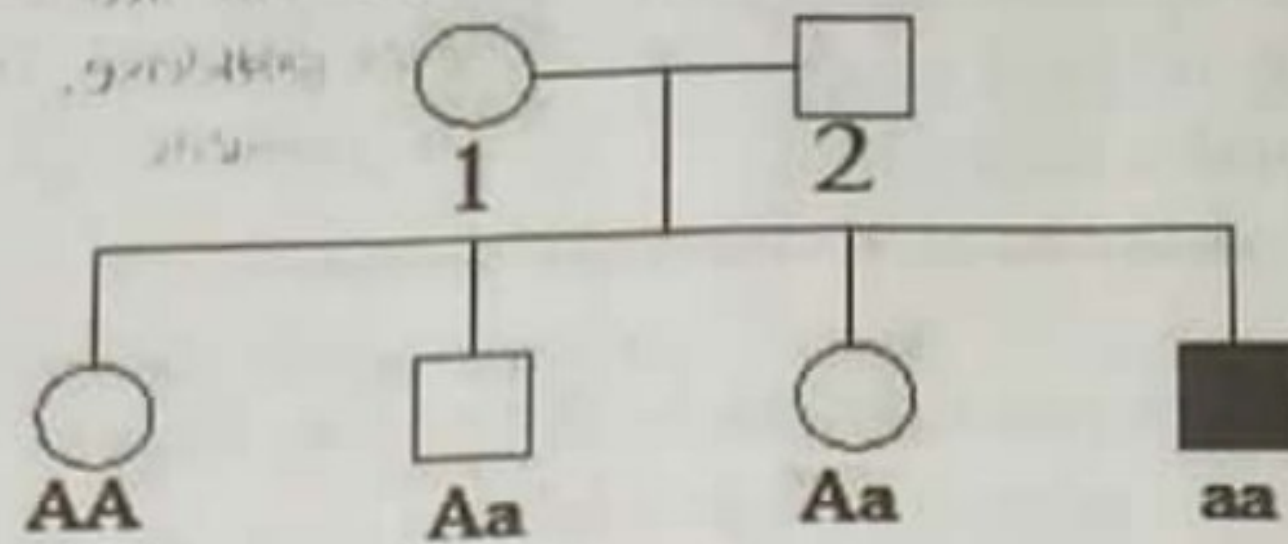
- A. 3 and 4 D. 1 and 4
 B. 1 and 2 D. 2 and 3

41. The nucleotides that build up the DNA molecule contain the following bases EXCEPT

- A. cytosine. C. guanine.
B. uracil. D. adenine.

42. Which one of the following is the significance of biodiversity?
- A. Reducing the level of material wealth
 - ☒ B. Increasing security of food supply
 - C. Worsening of social relationships
 - D. Increasing vulnerability to environmental stress
43. The carrying capacity of a population can be defined as the
- A. maximum population growth rate in a habitat.
 - B. average population size supported by its habitat.
 - C. minimum population size supported by its habitat.
 - ☒ D. maximum population size supported by its habitat.
44. If pea plants with round yellow heterozygous seeds are self-fertilized and produced 4800 seeds, how many round green seeds will be produced? (Hint: round yellow seed is dominant).
- A. 300
 - ☒ B. 900
 - C. 2700
 - D. 4800
- Handwritten notes for Q44: 9:3:3:1 ratio. Calculation: $\frac{3}{16} \times 4800 = 900$*
45. A grade 12 student extracted an insulin gene from insulin producing cells of the pancreases and plasmid from bacteria. Then he transferred the insulin gene into the plasmid and the hybrid plasmid was put back into bacteria for insulin production. What enzyme did the student used to join the insulin gene and bacterial plasmid?
- A. RNA polymerase
 - ☒ B. DNA ligase
 - C. DNA helicase
 - D. ATP synthase
46. What will happen to the population size if the rate of natality is less than the rate of mortality?
- A. Fluctuate
 - ☒ B. Decrease
 - C. Unchanged
 - D. Increase
47. Which one of the following statements is correct about the stages of population growth rate curve?
- A. Toxic excretory products accumulate in log phase.
 - B. Organisms adapted to the environment in lag phase.
 - C. Natality exceeds mortality in stationary phase.
 - ☒ D. Nutrients exhausted in decline phase.

48. Consider the following pedigree of albinism.



What will be the possible genotypes of the parents?

- A. aa, AA C. Aa, aa
B. Aa, Aa D. AA, Aa
49. In which phase of meiosis does pairing of chromosomes and exchange of segments take place?
A. Anaphase II C. Prophase II
B. Anaphase I D. Prophase I *Glucose is reduced to sugar (yellow) over*
50. During meiosis, crossing over is important to increase variation of gametes with regard to alleles that are
A. recessive and homozygote.
B. linked and not assorted independently.
C. dominant and heterozygote.
D. independently segregated.
51. Which organic molecules in our body have functions as antigens and antibodies of the immune system?
A. Nucleic acids C. Carbohydrates
B. Lipids D. Proteins
52. If α -glucose reacts with fructose molecule in a condensation reaction, what will be the chemical formula of the disaccharide formed in this reaction?
A. $C_{10}H_{20}O_{10}$ C. $C_6H_{12}O_6$
B. $C_{12}H_{22}O_{11}$ D. $C_{12}H_{24}O_{12}$
53. In a structure of amylose molecule that contains one hundred α -glucose monomers, how many α -1, 4-glycosidic bonds are formed?
A. 50 C. 99
B. 200 D. 100

54. In grade 11 laboratory class, the teacher gave the students a sample of food and asked them to investigate the presence of glucose. What kind of test and result will enable the students to confirm the presence of glucose?
- Benedict's test and orange colour
 - Biuret test and purple colour
 - Emulsion test and milky white colour
 - Iodine test and blue black colour
55. A group of grade 12 students carried out four biochemical tests to investigate the composition of four different food samples. The results with the respective types of tests are shown in the table below.

Type of test	Results			
	Sample A	Sample B	Sample C	Sample D
Iodine test	Positive	Positive	Positive	Positive
Benedict's test	Positive	Negative	Positive	Negative
Emulsion test	Negative	Positive	Negative	Positive
Biuret test	Negative	Positive	Positive	Positive

Which food samples contained both lipid and protein?

- Sample B and C
- Sample A and C
- Sample A and D
- Sample B and D

56. Identify the correct statement about enzymes. They
- are globular proteins with a multiple shaped active site.
 - function by affecting the nature of the product.
 - form an intermediate complex which dissociates into the product and free enzyme.
 - function as organic catalysts by irreversibly combining with the substrate.
57. Which one of the following options contains only a group of organic biochemical molecules?
- Fatty acid, glycine, DNA, maltose and triglyceride
 - Lactic acid, hydrochloric acid, sucrose, water and ATP
 - Ribose, methane, fatty acid, lactose and sodium chloride
 - ATP, deoxyribose, sulfuric acid, lactic acid and amino acid

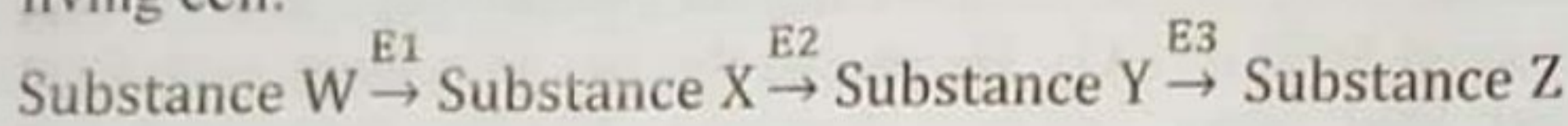
58. Unbalanced hydrogen bonding at the surface of the water is responsible for high
- A. density of water in its liquid form.
 - B. specific heat capacity of water.
 - ☒ C. surface tension of water.
 - D. latent heat of vaporization of water.
59. Which part of phospholipids is considered as hydrophobic region?
- A. Carboxyl group
 - B. Glycerol head
 - C. Phosphate group (water loving) *hydrophilic*
 - ☒ D. Hydrocarbon tails (water hating) *hydrophobic*
60. Identify the organic molecule which is correctly paired with its function.
- A. Triglycerides - respiratory substrate
 - B. Cellulose - component of cell membrane
 - C. Glycogen - formation of microfibrils
 - ☒ D. Phospholipids - control metabolism
61. Which one of the following options contains the main steps of scientific method in their correct order?
- A. Doing background research → Formulating hypothesis → Asking question → Testing the hypothesis → Analyzing the result → Reporting the result
 - B. Asking question → Doing background research → Formulating hypothesis → Testing the hypothesis → Analyzing the result → Reporting the result
 - C. Doing background research → Asking question → Testing the hypothesis → Formulating hypothesis → Analyzing the result → Reporting the result
 - ☒ D. Asking question → Formulating hypothesis → Doing background research → Testing the hypothesis → Analyzing the result → Reporting the result
62. A change in temperature can affect the rate of enzyme controlled reaction by
- A. changing the shape of substrate and enzyme molecules.
 - B. decreasing the turnover rate of enzymes.
 - ☒ C. increasing or decreasing the probability of collision.
 - D. altering the charge of amino acids that form the active site.

63. Francesco Redi disproves the belief that rotting meat produces flies. He used wide mouth jars containing meat. He left some jars open to the air and others were covered with a piece of gauze. What do you think might have been Redi's most plausible hypothesis?
- A. Flies could be produced through spontaneous generation.
 - B. Flies could be produced from rotting meat.
 - ☒ C. Flies would be formed in the covered jars.
 - D. Only flies could produce more flies.
64. Suppose a grade 12 student wants to investigate the need of CO_2 for photosynthesis. He destarched plant A and B then he placed plant A in a bell jar which has no CO_2 in the surrounding air, while plant B in a bell jar which has normal level of CO_2 . He placed the jars in a place with light for 12 hours and kept other variables constant. Finally, he tested for the presence of starch. Less starch was produced by plant A than plant B. What are the dependent and independent variables of this experiment, respectively?
- ☒ A. Amount of starch, presence or absence of CO_2
 - B. Presence or absence of CO_2 , amount of starch
 - C. Amount of starch, presence of light
 - D. Presence of light, amount of starch
65. Helen was conducting iodine test for starch. She took two different food samples and placed one of the samples in test tube A and the other in test tube B. She added a few drops of iodine solution to both test tubes. Finally, she observed blue - black colour in test tube B, but the sample in test tube A remained unchanged. If Helen wants to write the report of this experiment, she should write
- ☒ A. the sample in test tube B was starch containing as her conclusion.
 - B. the general test for starch is iodine test as her result.
 - C. the importance of starch in the procedure part.
 - D. her name in the acknowledgement part.
66. A field biologist can measure the slope of an area by using
- A. scalpels.
 - B. data logger.
 - ☒ C. theodolite.
 - D. flow meter.

67. If the amount of enzyme is kept constant and the substrate concentration is gradually increased, what will happen to the rate of the reaction? The reaction velocity

- A. increases further as the substrate concentration increases further.
- B. remains unchanged; hence it isn't influenced by substrate concentration.
- ☒ C. decreases first but increases after the active sites are occupied with the substrate.
- D. increases until all the available enzyme active sites become saturated.

68. The following reaction shows enzyme controlled metabolic pathway in a living cell.



What will happen if the concentration of substance Z increases beyond the cell's requirement?

- A. E_3 will convert substance Y into another substance rather than substance
- B. E_1 and E_2 will be inactive until substance Z equals to the normal concentration.
- ☒ C. The reaction will take place in the reverse direction.
- ☒ D. Substance Z will inhibit E_1 and switch off the pathway. Z.

69. How is the process of end-product inhibition triggered? By

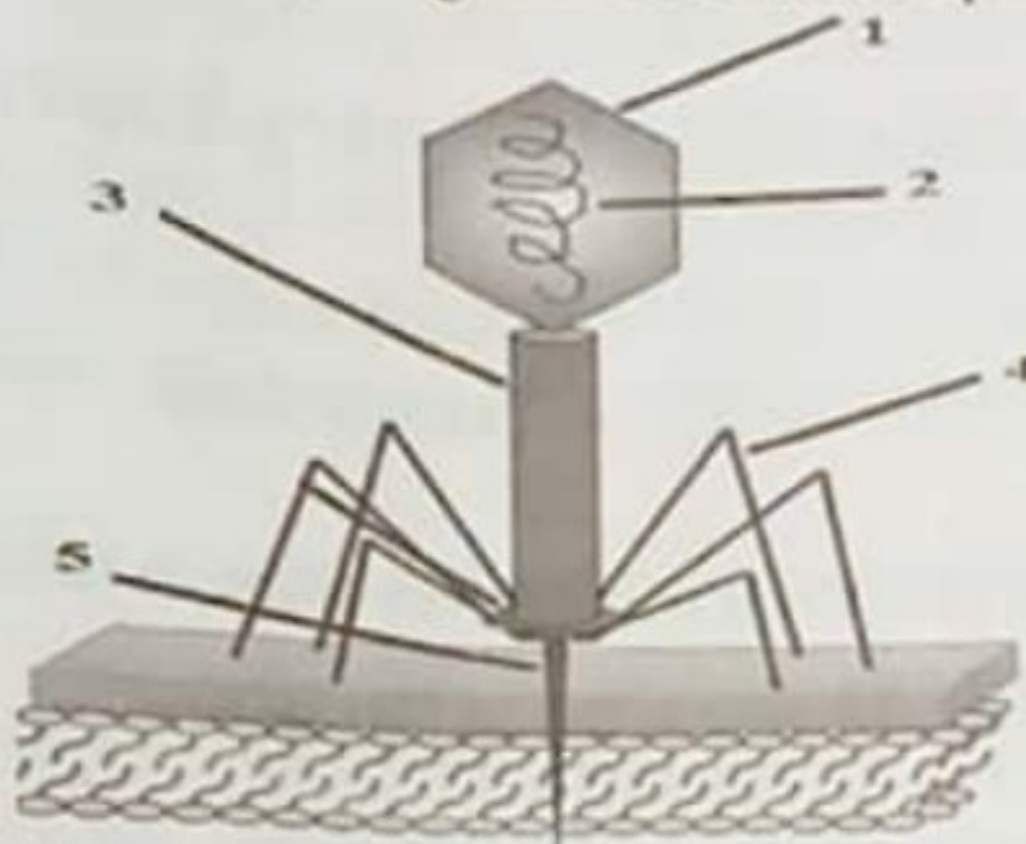
- ☒ A. excess production of the last product.
- B. change of the active site of the enzymes
- C. low concentration of the first product
- D. inhibition of the last enzyme

70. Identify the WRONG statement about the modern cell theory.

- A. Cell is the basic unit of organization of all organisms.
- ☒ B. All cells have basically different chemical composition. X
- C. Cells arise only from other pre-existing cells by division.
- D. The process of metabolism and heredity occur within cells.

71. During the practice of genetic engineering, bacteria are important to
- A. breakdown the recombinant DNA molecule.
 - B. produce ligase enzymes.
 - C. provide plasmids.
 - D. produce restriction endonucleases.

72. Consider the following diagram of a bacteriophage.



In the above diagram, the viral capsid is represented by number_____.

- A. 1
 - B. 4
 - C. 5
 - D. 2
73. Which one of the following steps of HIV life cycle comes first?
- A. The HIV virion attached to the plasma membrane of the T-helper cells.
 - B. The reverse transcriptase converts RNA into DNA and incorporates into the DNA of the host cell.
 - C. The viral DNA is transcribed into RNA and produces viral proteins including reverse transcriptase.
 - D. The RNA, proteins and reverse transcriptase molecules assembled and bud out of the host cell to infect a new cell.
74. Which one of the following anti-retroviral drugs prevents the assembly of new virus particles?
- A. Non-nucleotide reverse transcriptase inhibitors
 - B. Nucleotide reverse transcriptase inhibitors
 - C. Protease inhibitors
 - D. Entry inhibitors

75. Which one of the following statements is correct about the reproductive cycles of lytic and lysogenic viruses?
- A. Lytic viruses are released by exocytosis.
 - B. Lysogenic viruses do not form a protein coat.
 - C. The DNA of lysogenic viruses duplicates as the host cell divides.
 - D. Only lytic viruses require the host DNA for their replication.
76. An enzyme which is designated as EC 2.7.1.2 can be grouped to which class of enzyme?
- A. ☒ Oxidoreductases
 - B. ☒ Ligases
 - C. ☒ Isomerases
 - D. ☒ Transferases
- 3 Hydrolyase
77. Using enzyme technology in industrial production helps to reduce global warming. This is because enzymes
- A. increase the heat required for reactants.
 - B. give high energy for industrial reactants.
 - C. absorb much carbon dioxide from the environment.
 - D. ☒ allow reactions to be carried out at much lower temperature.
78. How do enzymes lower the activation energy of substrate molecules according to the induced-fit model? By
- A. forming strongly bonded enzyme-substrate complex
 - B. ☒ creating a tension in the bonds of substrate molecules
 - C. providing extra energy for the conversion of reactants into a product
 - D. increasing the kinetic energy and probability of collision
79. If an enzyme depends on a cofactor for its activity, then the enzyme becomes active and functional when it is found in the form of
- A. ☒ holoenzyme.
 - B. ☒ coenzyme.
 - C. ☒ mineral ion.
 - D. ☒ apoenzyme.
80. Which one of the following enzymes requires copper ions for its catalytic activity?
- A. Alcohol dehydrogenase
 - B. ☒ Cytochrome oxidase
 - C. Flavin adenine dinucleotide
 - D. Nicotinamide adenine dinucleotide

81. Which stage of cellular respiration is correctly paired with its site?
A. Chemiosmosis - outer membrane ~~X~~ *inner*
☒ B. Krebs cycle - matrix ✓
C. Glycolysis - cristae ~~X~~ *cytoplasm*
D. Pyruvate oxidation - cytoplasm *cristae*
82. What happens during the process of ^{ETC} electron transport chain? Protons
A. diffuse down concentration gradient to reduce NAD.
☒ B. build up in the inter-membrane space than the matrix.
C. diffuse against concentration gradient through ATP synthase.
D. build up in the matrix than the inter-membrane space. ~~X~~
83. Identify the correct statement about the role of NAD and FAD during aerobic respiration. They
A. oxidize intermediate products of cellular respiration.
☒ B. are electron carriers that pump protons into inter-membrane space.
C. are the terminal electron acceptors of electron transport chain.
D. carry hydrogen atoms that will be split into protons and electrons.
84. Which of the following products are formed in anaerobic respiration of one glucose molecule in animal cells?
A. 2ethanol, 2NAD⁺, 2ATP C. 2lactate, 2CO₂, 2ATP
☒ B. 2lactate, 2NAD⁺, 2ATP D. 2ethanol, 2CO₂, 2ATP
85. Which one of the following options represents the correct catabolic pathway of the given respiratory substrates?
A. Nucleic acids → amino acids → nucleotides → acetyl-CoA → TCA
B. Proteins → ammonia → amino acid → pyruvate → TCA
☒ C. Lipids → fatty acids → acetyl-CoA → TCA
D. Polysaccharides → glucose → acetyl-CoA → pyruvate → TCA
86. One benefit of water related to its high specific heat capacity is its importance
A. for the transport of blood cells around the circulatory system.
B. to support the weight of some insects while they walk on it. *- surface tension*
C. to move particles inside the cell more easily. *→ visco*
☒ D. for the normal functioning of enzymes in living cells.

87. A medical laboratory technologist at Black Lion Hospital placed a solution of stool in a centrifuge to separate the particles quickly for stool test. Which one of the following will happen when he spins the centrifuge at high speed?
- A. The solid particles of the stool will mix up highly and suspended freely.
 - B. The liquid particles will evaporate but the solid particles will remain in the centrifuge tube.
 - C. The solid particles of the stool will float on the top of the mixture.
 - ☒ D. The gravitational forces on the solid particles force the solid particles of the stool to the bottom of the tube.
88. The relevance and promise of biology as a field of science can be best explained by its application in
- A. oil and mineral production.
 - B. economic growth and urbanization.
 - ☒ C. agriculture and genetic engineering.
 - D. sport and culture.
89. Biologists played a role in the fight against AIDS because they developed
- A. a vaccine from people who have been repeatedly exposed to HIV but never developed AIDS.
 - B. a vaccine from a monkey that develops a very similar disease to AIDS which is caused by a very similar virus.
 - ☒ C. anti-retroviral drugs that target and aim to break different stages of the HIV life cycle.
 - D. anti-retroviral drugs that provide lasting immunity against reinfection by HIV.
90. Which one of the following statements shows willingness of participating in a community undertaking against HIV and AIDS? A person who
- A. discriminates HIV positive from HIV negative people
 - B. isolates himself from HIV infected people
 - ☒ C. takes volunteer counseling and testing
 - D. decides to abstain from any relation with the community

91. Where does the production of ATP and reduced NADP take place? (light independent rxn)
 A. Fluid matrix
 B. Stroma (No light independent)
 C. Cytoplasm
 D. Thylakoid membrane (light-dependent)
92. Suppose 60 divisions on the scale of an eyepiece graticule correspond to 20 small divisions on the stage micrometer. Each small division on the stage micrometer is $15\text{ }\mu\text{m}$. If 6 cells fit across 60 divisions of the eyepiece graticule, what will be the length of each cell?
 A. $5\text{ }\mu\text{m}$
 B. 0.05 mm
 C. 0.005 mm
 D. $500\text{ }\mu\text{m}$ *Calibrating!*
93. Which one of the following is NOT the function of cells?
 A. Energy flow
 B. Cellular respiration
 C. Repairing damaged cells through meiosis
 D. Unit of organization for living organisms

94. Consider the following table which compares prokaryotic and eukaryotic cells.

Features	Eukaryotic	Prokaryotic
Size	I ($10-100\text{ }\mu\text{m}$)	$1-10\text{ }\mu\text{m}$
Ribosomes	II (80S)	III (70S)
Cell wall	Made from cellulose (in some)	IV (<i>made from peptidoglycan</i>)

When comparing the two types of cells in the above table, the numbers I, II, III and IV represents, respectively

- A. $1-100\text{ }\mu\text{m}$, Small, Large, Made from chitin.
 B. $10-100\text{ }\mu\text{m}$, 80S , 70S , Made from peptidoglycan.
 C. $10-100\text{ }\mu\text{m}$, 70S , 80S , Made from peptidoglycan.
 D. $1-100\text{ }\mu\text{m}$, 70S , 80S , Made from chitin.
95. Cellular activities are carried out more efficiently in eukaryotic cells than prokaryotes and this can be explained by the
 A. presence of membrane bound organelles in eukaryotic cells.
 B. absence of cytoplasm in prokaryotic cells.
 C. presence of enzymes in eukaryotic cells.
 D. absence of DNA in prokaryotic cells.

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96. In the structural arrangement of cell membrane, the organic molecules which serve as the structural backbone and prevent uncontrolled movement of water soluble materials are
- A. lipid bilayers.
 - B. carbohydrates.
 - C. cholesterol.
 - D. peripheral proteins.

97. The biochemical mechanism by which chlorophyll absorbs light energy is efficient because *(all pigment molecules in the antenna complex absorb the same wavelength of light)*
- A. the molecules of the photosystems and ETCs are fixed in the membranes of thylakoid.
 - B. the different pigment molecules in the antenna complex absorb the same wavelength of light. *X*
 - C. the molecules of the photosystems and ETCs are floating around in a solution.
 - D. the same pigment molecules in the antenna complex absorb different wavelength of light.
- Both are not correct*

98. The leaves of C3 plants in the tropics close their stomata to minimize water loss, as a result concentration of CO₂ in the leaves falls. When the C3 plants face such problem, ribulose biphosphate reacts with oxygen and produce
- A. triose phosphate and sugar in the mitochondrion.
 - B. oxaloacetate and water in the peroxisome.
 - C. hydrogen peroxide and CO₂ in the mitochondrion.
 - D. glycerate phosphate and phosphoglycolate in the chloroplast.

99. Sorghum and wheat are C4 plants which are well adapted to photosynthesize efficiently in hot and bright days. Peas and carrots would not photosynthesize efficiently in such conditions because they are C3 plants. In which of the following features does those plants are similar? The
- A. presence of chloroplast in the bundle sheath cells
 - B. cells where carbon dioxide fixation takes place. *(both use Mesophyll cells)*
 - C. enzyme used to fix carbon dioxide
 - D. cells where the calvin cycle takes place
- Ribulose biphosphate + O₂ → Rubisco → Gp + Phosphoglycolate (take place in involved chloroplast, peroxisome & mitochondrion)*

100. Plants that follow CAM photosynthetic pathway carry out the two stages of photosynthesis at different times. Which of the following products are formed during the night?

- A. ATP and NADPH
- B. CO_2 and sugar
- C. Malate and sugar
- D. Oxaloacetate and malate

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