



53rd NATIONAL SCIENCE OLYMPIAD

LIFE SCIENCE

2 MARCH 2017

12:00 – 15:00

INSTRUCTIONS

Please read the instructions carefully before answering the questions

This is a multiple choice paper. Please answer all the questions on the answer sheet provided. Each question is followed by answers marked A, B, C and D. **Only one answer is correct.** Choose the most correct answer and shade the corresponding circle on the answer sheet completely using an HB pencil.

NB! The answer sheets are marked electronically – do NOT make any other dots or marks on the answer sheet. Select only one answer for each question or your answer will be discarded. **Ensure that you shade your selection clearly.**

Note that the question numbers 1 – 100 on the answer sheet moves from top to bottom in several columns. Ensure that the number of your selection on the answer sheet corresponds with the number of the question in your examination paper. Should you make a mistake, please erase the incorrect answer completely.

The use of **non-programmable** electronic calculators is permitted.

To Avoid Disqualification - You are required to complete **all** the information requested on the answer sheet. Please complete the information in script as well as shade the corresponding blocks. If the corresponding blocks are NOT shaded appropriately, your results will be returned without a name and you will be disqualified.

Do NOT fold the answer sheets.

Three hours are allowed to answer the questions

The NRF|SAASTA Education Unit wishes you the best of luck

National Science Olympiad Life Science 2017

1. When we investigate traits, what does it mean to say that a characteristic of a species is inheritable?

- A. The trait will evolve.
- B. The trait can be passed onto offspring.
- C. The trait will be beneficial to the species.
- D. The trait will not differ in the population.

2. Metabolic rate in animals:

- A. can measured by taking their temperature.
- B. is the measure and rate of oxygen consumption.
- C. is the measure and rate of glucose consumption.
- D. is the measure and rate of waste.

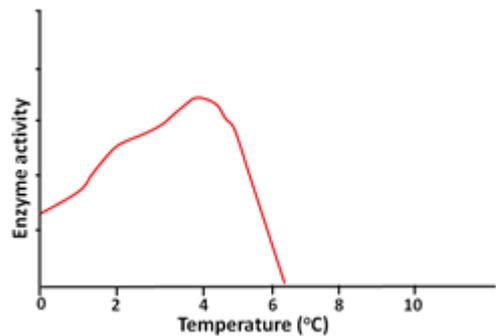
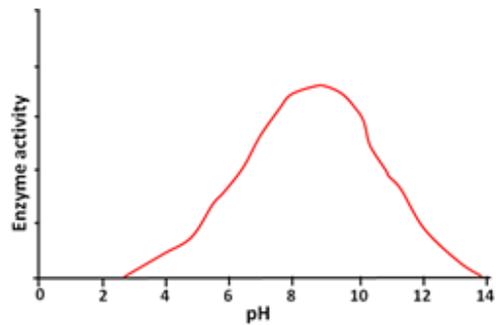
3. Which of the following is **NOT** applicable to the process of Glycolysis

- A. An anaerobic process.
- B. Takes place in the cytoplasm.
- C. Forms part of fermentation.
- D. Progressed after the citric acid cycle.

4. Which of the following is **NOT** correct about fermentation?

- A. Only two ATP molecules are formed.
- B. Takes place in the cytoplasm.
- C. Process starts with glucose.
- D. NADH gives off electrons to electron transport chain.

5. Which of these interpretations describe the most favourable enzyme activity in the graphs above?



These enzymes:

- A. works greatest at a temperature of 38.5°C and a pH of 9.
- B. works greatest at a temperature of 38.5°C and a pH of 7
- C. activity are not affected by changes in temperature and pH.
- D. works greatest at a temperature range above 40°C and a pH range above 10.

6. Which of the following best describes a cross between a man who is homozygous dominant for freckles but heterozygous for finger length and a woman who is recessive for both traits? (F = freckles, f = no freckles, S = short fingers, s = long fingers)

- A. FfSs X FfSs
- B. FFSs X ffSs
- C. Fs X fs
- D. FFSs X ffss

7. Which of the following is **NOT** an example of a lipid?

- A. Phospholipids
- B. Steroid
- C. Polysaccharide

- D. Saturated fats
8. Which of the following is **NOT** a pathway of energy transformation?
- A nail drops, changing potential energy into kinetic energy.
 - The sun's rays shines onto a prism and splits into different wavelengths.
 - The glycolytic pathway is an energy flowing pathway in most prokaryotes and eukaryotes.
 - The human body converts chemical energy into mechanical energy in order to move around.
9. In a muscular tissue system, all three types of muscles share:
- walls that are striated.
 - have voluntary control.
 - the ability to contract.
 - involuntary control.
10. Homeostasis:
- is important to life .
 - is a state of internal balance.
 - keeps the maintenance of the internal conditions of the body.
 - is all of the above.
11. Which of these combinations of statements is **NOT** correct?
- Controls decisions, emotions and character = cerebrum
 - Controls motor and sensory centres = Thalamus
 - Controls body temperature and hormone release = hypothalamus
 - Controls movement and balance = cerebellum
12. Which of these system(s) take control when you read your favourite book on a sofa?
- Sympathetic
 - Parasympathetic

- Neither take control
- Both take control

13. The electrochemical gradient in a neuron allows the movement of K^+ across the cell membrane when it's at rest. This gradient is created by:
- ligand-gated K^+ channels.
 - voltage-gated K^+ channels.
 - Na^+/K^+ -ATPase.
 - voltage-gated Na^+/K^+ channels.
14. The annual tree rings are the:
- middle nodes in a stump.
 - rows of vascular bundles in a monocot stump.
 - rows of xylem in a woody stump.
 - phloem rows in a woody stump.

Questions 15 to 18 refer to the sequence of a mRNA codon, which is UAC.

15. Which of these would be the corresponding anti-codon on a tRNA?
- | | |
|--------|--------|
| A. AUA | B. ATG |
| C. AUT | D. AUG |
16. During translation, complimentary codons and anti-codons are held together by:
- phosphodiester bonds.
 - peptide bonds.
 - ester bonds.
 - hydrogen bonds.
17. The corresponding DNA sequence to the mRNA codon above would be?
- | | |
|--------|--------|
| A. ATT | B. ATG |
| C. TTA | D. CTC |
18. Which of the following assists with protein synthesis during translation?

- A. lysosomes. B. ribosomes.
C. enzymes. D. vesicles.
19. Absorption of most nutrients occur in the:
- A. oesophagus. B. colon.
C. small intestine. D. stomach.
20. The part of a leaf where photosynthesis takes place, is the:
- A. epidermis. B. mesophyll.
C. epidermal layer. D. stomata cells.
21. Light rays enter the human eye through the:
- A. sclera, cornea, choroid, lens, cornea.
B. pupil, fovea centralis, aqueous humour, lens.
C. cornea, pupil, lens, vitreous humour, retina
D. retina, sclera, choroid, humours.
22. The function of the nephron in the kidney is controlled by the inhibition of antidiuretic hormones (ADH). Its presence:
- A. increases water permeability of the descending limb of the loop of Henle.
B. decreases water permeability of the descending limb of the loop of Henle.
C. increases water permeability of the collecting duct system.
D. decreases water permeability of the collecting duct system.
23. In an animal population, individuals have repeated reproductive episodes. This population can live a long time, but the population experiences severe weather conditions and crashes. Which of the following can explain the type of selection of this population?
- A. A combination of both k-selection and r-selection
B. K-selection only
C. R-selection only
D. Altruistic
24. In a single-loop circulatory pathway, blood in the gills of fish is oxygenated. Which of the following explain what happens to blood after passing through gills?
- A. Blood pressure remain stable throughout the system.
B. Blood pressure starts to drop and its flow begins to reduced.
C. The oxygen supply in blood is directly to the heart.
D. The oxygen supply in blood is separated from deoxygenated blood.
25. What can be expected regarding the development of a foetus during the second trimester of a mother's pregnancy? The foetus in the mother's uterus is experiencing:
- A. eye's opening.
B. bones that are fully develop.
C. heartbeats.
D. both A and B is correct.
26. Why can't the alleles associated with haploid living organisms not be dominant or recessive?
- A. Dominance and recessive express alleles of the same gene in the same individual and so allele interaction.
B. Alleles in haploid organisms are singular and always dominant.
C. Alleles in haploid organisms exist only in mitochondrial DNA.
D. Haploid organisms are only bacteria, and these alleles are different from eukaryotes.
27. Which of these is **NOT** applicable to a DNA nucleotide but to a RNA nucleotide?
- A. The sugar ribose
B. A nitrogenous base
C. A phosphate molecule
D. None of these
28. Gregor Mendel investigated genes and traits that were situated on different chromosomes or

far away from each other on the same chromosome, and crossing over normally takes place among them. Which of the following experimental outcomes allowed him the understanding of independent assortment?

- A. Dihybrid crosses would not have resulted a 9:3:3:1 ratios of F2 generation.
- B. Plants with unexpected phenotypes led to the finding of recombination.
- C. Experiments led to the understanding of chromosome separation during meiosis.
- D. Results meant that the alleles were dominant or recessive, and produced 3:1 ratio of F1 generation.

29. A cell placed in a hypotonic solution will result in:

- A. solutes exiting the cell to equal concentrations on either sides of the cell membranes.
- B. water exiting the cell in the direction of a lower solute concentration.
- C. water entering the cell in the direction of a higher solute concentration.
- D. solutes exiting and water entering the cell.

30. Viruses found in host organisms are provided with:

- A. nucleoproteins.
- B. ATP.
- C. ribosomes.
- D. all of these.

31. Which of the following statements about kidney function is incorrect?

- A. Uses counter-current multiplication, so no energy required to generate the osmotic gradient.
- B. The loop of Henle descending limb is very permeable to water.
- C. The loop of Henle ascending limb is very permeable to sodium.
- D. The loop of Henle has permeability properties.

32. In some instances, the transport of molecules requires energy expenditure to transport sodium

ions across a cell membrane. Which of these explain this process?

- A. Passive transport
- B. Active transport
- C. Facilitated diffusion
- D. ATP hydrolysis

33. In Figure 1, which of these combination(s) depict a peptide bond?

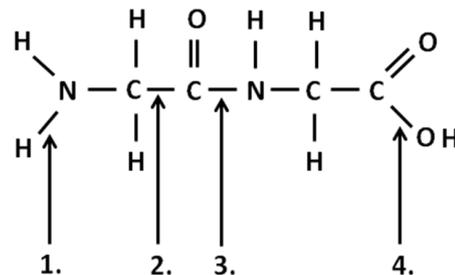


Figure 1

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

34. Ferns are different from mosses because:

- A. spores acts as dispersal mechanisms.
- B. the life cycle of gametophyte is independent of the sporophyte.
- C. the sperm is not flagellated.
- D. seeds are used as a dispersal mechanism.

35. Non-disjunction will result in gametes:

- A. having normal number of chromosomes.
- B. separating during metaphase II.
- C. having one less than the normal number of chromosomes.
- D. separating during prophase II.

36. When glucose is not enough in body cells, your body cells can use alternative energy sources. Which of the following statements can explain sources of energy cells can use?

- A. Fatty acids as an substitute for energy source
- B. Glycerol as an substitute for energy source
- C. Amino acids as an substitute for energy source
- D. All of the above

37. When the absorption spectrum of chlorophyll coincides closely with the action spectrum for photosynthesis, it is most likely that:
- the two photosystems I and II, absorb different wavelengths of light.
 - the wavelengths of light energy are absorbed by chlorophyll which trigger the light-capturing reactions.
 - the wavelengths of light energy are absorbed by carotenoids and passed on to chlorophyll.
 - the tempo of photosynthesis depends on the amount of light energy it received.
38. When one species mimics another species, it is believed that the mimic sometimes:
- lacks the defence of the model.
 - possesses the defence of the model.
 - is brightly coloured.
 - all of these are correct.
39. The cells of a certain plant species can tolerate extremely high solute potentials. This is because:
- the plant's transpiration rates will tend to be extremely low.
 - the plant can compete for water effectively and live in dry soils.
 - the plant will grow most effectively in soils that are saturated with water year round.
 - the plant leaves will wilt easily.
40. In a mark and recapture experiment, a zoologist marks forty mice in a reserve. Over four weeks, traps caught two hundred mice and of these captured individuals, only eighty were marked. What is the estimated population size of mice?
- | | |
|--------|--------|
| A. 80 | B. 200 |
| C. 400 | D. 100 |
41. Choose the correct statement concerning the following food chain pathway:
- GRASS → RABBIT → WILD CAT → LION**
- The predator population is much greater in biomass than the prey population.
 - The prey population is much greater in biomass than the predator population.
 - The food chain could be considered as herbivorous.
 - The predator population returns chemical substances and energy to the prey population.
42. A botanist discovered the bacterial species *Rhizobium* among the roots of plants, and noticed that *Rhizobium* obtain sugars from the plant; while the plant acquires fixed nitrogen. Which of the following can explain this type of relationship?
- | | |
|---------------|-----------------|
| A. Mutualism | B. Competition |
| C. Parasitism | D. Commensalism |
43. In DNA, if the sequence of bases on one strand is AAG, TAC, ATT the corresponding bases on the complementary strand are...
- TTC, ATG, TAA
 - TAC, AGG, TAA
 - TTC, ATG, TTA
 - TTC, AGG, TCA
44. The hominid *Homo erectus* (upright man):
- did not have the ability to craft intricate tools.
 - was smaller than earlier hominids.
 - evolved in East Africa and migrated to many parts of the world.
 - have been around for the last 200,000 years.
45. Water movement from plant roots to leaves happen by:
- air pressure flow.
 - high solute concentrations.
 - the pumping strength of the xylem
 - the cohesion-tension forces between water molecules
46. Oxygen from the air enters the nostrils towards the lungs of humans. This is because:

- A. pressure in the lungs is higher than the atmospheric pressure.
- B. pressure in the lungs is lower than the atmospheric pressure.
- C. the gradient established by breathing allows air to be forced into the lungs.
- D. the remaining air in the lungs results in a pressure gradient of oxygen.

47. The graph in Figure 2 is called an oxygen-haemoglobin equilibrium curve. This graph illustrates attachment and dissociation of oxygen and haemoglobin in blood, resulting in a S-shaped curve.

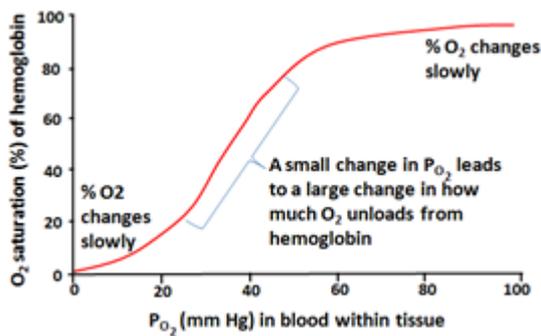


Figure 2

The steep area of the graph thereby shows:

- A. that O_2 rapidly combines with haemoglobin as the pressure of oxygen in blood increases.
 - B. that O_2 cannot combine with haemoglobin as pressure of oxygen in blood increases.
 - C. above 40mmHg, O_2 content is flat and not changing with very little changes in pressure of oxygen.
 - D. that increase in partial pressure of oxygen in blood over 100mmHg will allow more O_2 to the blood.
48. Oxygen diffuses from blood to body cells much faster in response to:
- A. thickness of the capillaries.
 - B. size particles diffusing through capillaries.
 - C. a decrease in the PO_2 of body cells.
 - D. an increase in the PO_2 of body cells.
49. Which of these organelles release oxygen?
- A. Golgi apparatus
 - B. Ribosomes
 - C. Chloroplast
 - D. Both the Smooth and Rough ER.
50. Groups of cells with the same level of organisation are similar in structure and function. This level of organisation is:
- A. a tissue.
 - B. an organ.
 - C. an organ system.
 - D. an organism.
51. Which of these is NOT a function of the pancreas in humans?
- A. Regulate blood sugar.
 - B. Produces hormones insulin.
 - C. Produces enzymes needed for digestion.
 - D. Filters and processes blood.
52. Which of the following combinations is improperly matched with its function:
- A. Endocrine system/produces hormones.
 - B. Digestive system/converts food to nutrients.
 - C. Circulatory system/maintains homeostasis.
 - D. All of the above matches are correct.
53. Connective tissues and the:
- A. density of cells corresponds with tissue function.
 - B. surface area corresponds with tissue function.
 - C. origin of the tissue corresponds with tissue function.
 - D. extracellular matrix corresponds with the tissue function.
54. An all important advantage of homeothermic animals over poikilothermic animals of the same size, is that:
- A. they don't need to eat a lot and so require much less food.
 - B. they can store energy in cold weather by hibernating.
 - C. they can be very active in cold weather for long periods.

- D. they have faster metabolic rates and their cells grow quickly.
55. CAM photosynthesis is a carbon fixation pathway that:
- is common among all photosynthetic plants.
 - prevail in semi arid plants, and so facilitate the closure of their stomata during daytime.
 - prevail in cold environments at high altitudes.
 - prevail in tropical plants that are found along coastal areas.
56. Which of these would not be a formed element in blood?
- Erythrocytes transport O_2 and CO_2 to tissues.
 - Eosinophils involve in disease fighting.
 - Fibrinogen helps with blood clots.
 - Platelets stops bleeding and helps with blood clots.
57. Obese individuals are often diagnosed with high levels of the hormone leptin. Which of the following statements can explain the role of leptin in these individuals?
- Leptin is the hunger hormone.
 - An increase in gastric acid secretion allows the stomach to prepare for food intake and so more leptin.
 - Weight gain stimulate the production of more leptin.
 - Weight gain individuals sleep longer.
58. The electron transport chain in the mitochondria is similar to Photosystem II. Which of the following examples can be used to explain this relationship?
- high energy released from electrons pump protons to generate a gradient to synthesise ATP through ATP synthase.
 - high energy are trapped in the reduction of NAD^+ to $NADH_2$.
 - high energy are trapped in the oxidation of FAD to $FADH_2$.
- D None of these.
59. A skeletal muscle:
- occur in the lining of blood vessels.
 - is found in the lining of the digestive tract.
 - occur in the retina of the eye.
 - is striated in their appearance.
60. Nematodes have a tube-within-a-tube body plan structure. The inner cavity is:
- an ectoderm.
 - the coelom.
 - a mesoderm.
 - the gut.
61. Sponges belongs to the Phylum:
- Cnidarians.
 - Porifera.
 - Ctenophora.
 - Echinodermata.
62. Which of these pathways of organelles is in the correct order for protein packaging?
- Smooth ER, Rough ER, transport vesicle, Golgi.
 - Rough ER, transport vesicle, Smooth ER, Golgi
 - Rough ER, Golgi, Lysosome
 - Smooth ER, Golgi, transport vesicle, Rough ER
63. Which of these functional groups are found on all amino acids?
- Carbonyl and carboxyl groups.
 - Aldehyde and carbonyl groups.
 - Amino and hydroxyl groups
 - Amino and carboxyl groups
64. Which of the following can explain the reason why guard cells initiate the closure of stomata opening during drought conditions?
- potassium salts
 - abscisic acid
 - humidity
 - air temperature
65. Which component does not partake in the nitrogen cycle?

- A. Ammonia
B. Proteins
C. Cell respiration
D. Nitrates and nitrites
66. Populations composed of predominantly young individuals will grow at a rapid rate in the future. Which statement is **CORRECT**?
- A. It means that mortality rates will be low.
B. It means there will be zero Immigration and emigration.
C. It indicates that the population will have a skewed age distribution curve.
D. It means that most individuals will start to reproduce at an early age
67. Which of the following cells are not involved in the inflammatory response (inflammation)?
- A. Cytotoxic T cells B. Neutrophils
C. Mast cells D. Macrophages
68. Which of the following statements about breathing is not involved in inhalation?
- A. Rib cage moves up and enlarge the chest.
B. Diaphragm contracts and moves downwards.
C. The pressure in lungs decreases and outside air flow in into lungs.
D. The lungs increase in size because outside air flow into lungs.
69. Why is the accuracy of meiosis affected by insertion and deletion mutations that can affect DNA repair?
- A. The proteins involved in the mending of the DNA strand breaks are involved during crossing over.
B. The proteins involved in DNA repair are also involved in homologous chromosome alignment
C. DNA repair only occurs when chromosomes separate in meiosis
D. Proteins are not necessary for DNA repair
70. What is the reason why only specific genes are expressed in specific types of cells in eukaryotes?
- A. Independent cell types contain distinct genes
B. Independent cell types have similar genes but distinct enhancers.
C. Independent cell types have similar genes but different activators.
D. Independent cell types have distinctive transcription regulators.
71. Worms are able to move in the simplest ways. How do they make use of their hydrostatic skeleton to facilitate their movement?
- A. Muscles contraction forces internal liquid outwards, which generate movement.
B. The external body structure is composed of chitin and assist with movement.
C. The internal body structure is divided into an axial and appendicular skeleton that assist with movement.
D. Their inner cavity is filled with water, which provide the weight of the skeleton
72. The smallest form of blood vessels are:
- A. alveoli. B. arteries.
C. veins. D. capillaries.
73. Carbon monoxide emissions from exhausts and cigarette smoke can lead to suffocation because:
- A. CO₂ has a greater affinity for heme groups of haemoglobin compared to oxygen.
B. O₂ has a greater affinity for heme groups of haemoglobin compared to C O₂.
C. CO₂ has a greater tendency to bind to O₂.
D. None of these.
74. In humans, the pituitary gland secretes hormones that take part in regulating:
- A. reproductive functioning in human sex organs.
B. heart rate and metabolism.
C. body temperate.
D. blood pressure.
75. Which of these organelles assist with intracellular digestion?

- A. Lysosomes B. Peroxisome
C. Golgi D. Vesicles
76. Why do different hair cells within the human ear respond to different frequencies of sound?
- A. Cochlear duct is packed in the inner cochlea cavity.
B. Basilar membrane differ in stiffness and respond in different locations to distinct frequencies.
C. The vestibular membranes allows the traveling of fluids.
D. Because claudius cells provide support to the organ of corti within the cochlea
77. Which of the following factors does not have an effect on blood flow in arteries?
- A. Mitral and tricuspid
B. Aortic and pulmonary
C. Muscle contraction
D. Blood pressure
78. In a sample population, 29% characteristics are homozygous dominant, 50% is heterozygous and 21% is homozygous recessive. Assume that the population is in Hardy-Weinberg equilibrium. Which of the following is the percentage of homozygous recessive in the next generation?
- A. 29% B. 21%
C. 50% D. 60%
79. In what way are decomposers like producers?
- A. Both produce oxygen for other forms of life.
B. Both require nutrient molecules and energy.
C. Both produce organic nutrients for other members of ecosystems.
D. Both are present only on land.
80. The cross between two plants, BbSs x bbss will result in:
- A. all the offspring short with orange fruit
B. 75% (3/4) short with orange fruit
C. 50% (1/2) short with orange fruit
D. 25% (1/4) short with orange fruit
81. Nitrogen fixation is the process in which _____ is converted into _____.
- A. nitrates, nitrite
B. nitric oxide; nitrate
C. nitrites, nitrogen oxides
D. nitrogen gas; ammonia
82. Earth's largest pool of phosphorus occur:
- A. in the hydrosphere.
B. in sedimentary rocks.
C. in plants.
D. in living life forms.
83. What is a plasmid?
- A. An organelle eukaryotes.
B. A DNA strand found in bacteria and protozoans.
C. A type of virus with an RNA multiplication genome.
D. A type of virus with a capsule of DNA.
84. Which of these determine the gender of a baby?
- A. Y chromosome in a sperm cell.
B. The duration between ovulation and copulation.
C. Length of the fallopian tubes.
D. The duration of the pregnancy.
85. Which of these is a density independent factor that have an effect on population growth?
- A. Food.
B. Disease.
C. Severe weather conditions.
D. Predation.
86. A type of disease caused by trypanosomes is:
- A. Ebola.

- B. Malaria.
C. African sleeping sickness.
D. Cholera.
87. Cone bearing or coniferous forests are found in areas with:
A. tropical rains.
B. high temperatures.
C. cool winters and warm summers.
D. hot and dry conditions.
88. During meiosis, sister chromatids separate during:
A. Prophase I. B. Prophase II.
C. Anaphase I. D. Anaphase II.
89. Which of the following is **NOT** a function of parenchyma cells?
A. Facilitating osmosis.
B. Storage of nutrients needed for plant growth.
C. Assist with the process of photosynthesis.
D. Maintains water potential in plants.
90. Cancer develops when:
A. the cell cycle is unable pass the G1 checkpoint.
B. Control of the cell cycle stops working.
C. Cells can no longer enter the cell cycle.
D. Programmed cell death occurred.
91. The ability of the kidney to reabsorb bicarbonate can be inhibited by a drug. This will lead to the excretion of bicarbonate into urine. The affect of the drug can make your blood become:
A. acidic.
B. acidic then alkaline.
C. alkaline.
D. alkaline then acidic.
92. The entry point for a virus can be through:
A. receptor-mediated endocytosis.
B. pinocytosis.
C. phagocytosis.
D. exocytosis.
93. The coding segment for protein synthesis on a modified mRNA strand is called:
A. introns. B. exons.
C. codons. D. primers.
94. Blood plasma consists mostly of:
A. oxygen. B. water.
C. proteins. D. carbon dioxide.
95. Competitive exclusion principle states that:
A. species that compete for the very same resources cannot steadily coexist.
B. species that compete for a different resources cannot steadily coexist.
C. the growth curve of a population will increase exponentially over time with limited resources.
D. interactions between members of the same population will not compete for the same resource.
96. Which of these statements about peroxisomes is **CORRECT**?
A. Involved in lipid metabolism and produce hydrogen peroxide.
B. Contains digestive enzymes and breaks down substances into smaller molecules.
C. Actively involved in packaging of protein synthesis.
D. A cellular storage organelle.
97. During a blood pressure measurement, ventricular contraction is called:
A. systole.
B. diastole.
C. cardiac cycle.
D. intervening pause.

98. Which of the following groupings of statements about an autosomal recessive disorder is **CORRECT**?

1. *It will reveal an unaffected phenotype in heterozygotes.*
2. *It will be carried over to all offspring from homozygous parents.*
3. *It will be carried over from unaffected parents to all offspring.*
4. *It cannot be carried on any of the sex chromosomes.*

- A. 1, 2, 3 and 4
B. 1, 2 and 4
C. 2, 3 and 4
D. 1 and 4 only

99. Which of the following combinations of statements about the lac operon in the bacterium *E. coli* is **CORRECT** when lactose is absent?

1. *Repressor protein binds to the operator site and blocks the promoter site.*
2. *The shape of the repressor protein changes and can no longer bind to the operator site.*
3. *RNA polymerase is blocked by the repressor protein.*
4. *No transcription will occur for three the structural genes needed to catabolise lactose.*

- A. 1, 2, 3 and 4
B. 1, 3 and 4
C. 2, 3 and 4
D. 1 and 4 only

100. Which of the following combinations of statements about the PCR is correct?

1. *It's a technique to generate multiple copies of a particular DNA segment.*
2. *Primers are used to match a DNA fragment.*
3. *Taq polymerase is the enzyme required in PCR because of the heating and*

cooling of samples.

4. *The experiment of the PCR is similar to DNA replication.*

- A. 1, 2, 3 and 4
B. 1, 3 and 4
C. 2, 3 and 4
D. 1 and 4 only

The End