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Department of Examination - Sabaragamuwa



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General Certificate of Education (Adv. Level) Examination.

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Biology I

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Two Hours.

13 ඡේතිය - දෙවන වාර පරීක්ෂණය 2022

Important:

- ❖ Answer all the questions.
- ❖ Write your Index Number in the space provided in the answer sheet.
- ❖ Instructions are given on the back of the answer sheet. Follow those carefully.
- ❖ In each of the questions 1 to 50, pick one of the alternatives from (1), (2), (3), (4), (5) which is correct or most appropriate and mark your response on the answer sheet with a cross (x) on the number of the correct option in accordance with the instructions given on the back of the answer sheet.

- 1) Which of the following statement is correct regarding properties of water and the example given.
 - 1) Cohesion - Water has a high surface tension
 - 2) Cohesion - Water and dissolved substances transport through xylem continuously.
 - 3) High specific heat – Function as thermal buffer in living systems.
 - 4) High heat of vapourization – Body surface of an organism maintained as cool surface.
 - 5) Polarity – Dissolving Lysozyme in water.
- 2) Select the statement with branched polysaccharides.
 - 1) Glycogen, Cellulose, Pectin
 - 2) Glycogen, Amylopectin, Hemicellulose
 - 3) Amylopectin, Cellulose, Amylose
 - 4) Amylose, Glycogen, Amylopectin
 - 5) Glycogen, Amylose, Hemicellulose
- 3) Which one of the following statement is correct regarding subcellular components?
 - 1) Nuclear lamina made up of protein filaments line the exterior side of the nuclear envelope.
 - 2) Steroids are synthesized by rough endoplasmic reticulum.
 - 3) Lysosomes are on the cis face of golgi apparatus.
 - 4) Fatty acids are converted to sugar by glyoxysomes.
 - 5) Centrioles are membrane bound components only in animal cells.
- 4) Which one of the following structures can not be observed by light microscope?
 - 1) Chromosomes of the prophase in mitosis.
 - 2) Sporangium of Zygomycota.
 - 3) Radial cellulose rings in guard cells.
 - 4) Collenchyma cells of Tridax primary stem.
 - 5) Free ribosomes of cytoplasm.
- 5) Which of the following statements is incorrect regarding prophase of meiosis I.
 - 1) Formation of synaptonemal complex.
 - 2) Homologous chromosomes slightly close to each other.
 - 3) Chromosomes begin to condense.
 - 4) Nucleolus begins to disappear.
 - 5) Formation of spindle

- 6) Which of the following is correct regarding regulation mechanism of enzymatic activity in cells.
 - 1) Most enzymes regulated by allosteric regulation are made from two or more subunits.
 - 2) ATP function as allosteric activator.
 - 3) Allosteric regulatory site often located where subunits join.
 - 4) When an activator binds with the regulatory site, it stabilizes the inactive form of enzyme.
 - 5) Feedback inhibition does not influence the wasting of chemical resources of a metabolic pathway.
- 7) Which of the following is incorrect regarding photosynthetic pigments.
 - 1) Chlorophyll b absorb light having wave length 400nm – 500nm.
 - 2) Chlorophyll b is the major light capturing pigment.
 - 3) Absorption and dissipation of excessive light energy is done by xanthophyll.
 - 4) Photosynthetic pigments can absorb visible light.
 - 5) Chlorophyll is more effective for blue and red light.
- 8) Select the incorrect statement regarding light reaction of photosynthesis.
 - 1) Electrons from PS I reduce NADP^+ .
 - 2) Excited electrons from PSII neutralize PSI.
 - 3) Water is hydrolyzed in PSII within the internal space of thylakoid.
 - 4) NADPH is produced in cyclic electron flow.
 - 5) At the end of the light reaction ATP and NADPH is produced.
- 9) Which one of the following is correct regarding anaerobic respiration?
 - 1) Only two types of fermentation can be seen among living organisms.
 - 2) Carboxylation occurs in ethyl alcohol fermentation.
 - 3) Final hydrogen acceptor is 2C organic compound in ethyl alcohol fermentation.
 - 4) ATP is produced by oxidative phosphorylation in lactic acid fermentation and ethyl alcohol fermentation.
 - 5) Many bacteria carry out ethyl alcohol fermentation and the most common bacteria is yeast.
- 10) Select the incorrect statement regarding photosynthesis.
 - 1) Chlorophyll may bleach in high light intensities.
 - 2) CO_2 is the main limiting factor for the process of photosynthesis in normal conditions.
 - 3) CO_2 fixation is done in mesophyll cells and bundle sheath cells of C_4 plant leaves.
 - 4) Oxalo acetate is the first product of CO_2 fixation in Maize plant.
 - 5) PEP carboxylase enzyme is more efficient than Rubisco for fixing CO_2 .
- 11) Which of the following is incorrect regarding aerobic respiration.
 - 1) Two NADH molecules are produced during pyruvate oxidation.
 - 2) Oxalo acetic acid is regenerated by citric acid in Krebs cycle.
 - 3) Two molecules of pyruvate with two carbon atoms are produced during glycolysis.
 - 4) Reduced co enzyme is oxidized in electron transport chain.
 - 5) Total number of ATP produced by one molecule of glucose is 32 in liver cells.
- 12) Some characteristics of kingdom Protista are as follows.
 - A) Contractile vacuoles present but food vacuoles are absent.
 - B) Chloroplasts are present.
 - C) Golden brown in colour.
 - D) Have mega nucleus and micro nucleus.

Which of the following indicates in correct order?

- 1) *Paramecium, Euglena, Gelidium, Amoeba*
- 2) *Euglena, Amoeba, Sargassum, Paramecium,*
- 3) *Amoeba, Gelidium, Diatoms, Euglena*
- 4) *Euglena, Ulva, Diatoms, Paramecium*
- 5) *Euglena, Paramecium, Ulva, Sargassum, Diatoms*

13) Which of the following can be used to identify Hydra from sea star?

- 1) Show penta radial symmetry.
- 2) An acellular layer of mesoglea present in body cell layer.
- 3) Presence of tube feet.
- 4) Lives only in marine water.
- 5) Sexual reproduction only.

14) When meristems differentiate for a certain function, some changes of plant cells may occur. Which of the following is correct regarding the place of change?

- | | | |
|---------------|---------------------------|---------------|
| (A) Cytoplasm | (B) Middle lamella | (C) Cell wall |
| (D) Organells | (E) Inter cellular space. | |

- 1) Only A
- 2) Only A and B
- 3) Only A,C,D
- 4) Only C,D,E
- 5) Only D,E

15) Which of the following is incorrect regarding the primary structure of plant root?

- 1) Inner most layer of the cortex is endodermis.
- 2) Root cortex mainly stores carbohydrates.
- 3) Pericycle involves in the formation of lateral roots.
- 4) Pericycle in monocot roots is meristematic.
- 5) Xylem of a dicot root is star shaped.

16) Which of the following statement is incorrect regarding transportation of water by appoplastic route.

- 1) Water can be entered to apoplast after passing endodermal cells of root.
- 2) In appolastic route water moves along primary and secondary cell wall spaces and inter cellular spaces.
- 3) Water moves along interior of the xylem is apoplastic route.
- 4) Water moves more rapidly through apoplastic route than transmembrane route.
- 5) Water moves by bulk flow through appoplastic route.

17) Which of the following statement is in a propriate regarding secondary growth?

- 1) Vessel elements are produced from initials that elongated parallel to the axis of stem or root.
- 2) Cork cambium is produced from the dividing cells of pericycle in the root.
- 3) Main components of bark are periderm and secondary phloem.
- 4) Secondary growth occurs in stems and roots of all gymnosperm plants.
- 5) Secondary vascular tissue is produced by the action of vascular cambium.

18) Which of the following is incorrect regarding photo receptors of plants?

- 1) Blue light photo recceptors – Light induced opening of stomata.
- 2) Phytochrome – Seed germination.
- 3) Blue light photo receptors – Light induced slowing of hypocotyl elongation that occurs when a seed lining breaks ground.
- 4) Phytochrome – Shade avoidance.

5) Blue light photoreceptor – Photo tropism.

19) Which of the following statement is inappropriate regarding structure of the plant leaf?

- 1) In dicot leaves stomata are mainly found in the lower epidermis.
- 2) Two layers of palisade mesophylls always present.
- 3) The vascular tissue of the leaf is continuous with vascular tissue of the stem.
- 4) Each vein is protected by a bundle sheath cells.
- 5) Spongy mesophyll cells have less chloroplasts.

20) Which of the following is incorrect regarding concept of water potential?

- 1) Water potential is related to potential energy of water molecules.
- 2) Water potential is influenced by solute concentration and applies pressure.
- 3) Increase of solute concentration has a positive effect on water potential.
- 4) Water potential of pure water is zero under standard conditions.
- 5) When turgor pressure increases, the water potential of cell also increases.

21) Which of the following is incorrect response regarding digestive system?

- 1) Smooth muscles located in the upper most part of the esophagus function during swallowing.
- 2) Tongue is composed of skeletal muscles.
- 3) Enzymes are secreted in to the lumen as an inactive enzymes.
- 4) Fructose is absorbed by facilitated diffusion.
- 5) Chylomicrons are water soluble globules.

22) Which of the following statement is correct regarding blood circulatory system.

- 1) Hear does not respond to Adrenalin.
- 2) Blood pressure remains constant while sleeping.
- 3) Fasting is a reason for Hypotension.
- 4) Heamocyanin is present in blood of Annelids.
- 5) The dissolved ions in the blood plasma important only for buffer.

23) Which of the following remain in capillaries of glomerulus after ultra filtration of normal healthy adult?

- 1) Amino acids
- 2) Creatinine
- 3) Plasma Protein
- 4) Minerals and salts
- 5) Urea

24) Given below are normal body volume and normal surface area of well grown adult animals of five species.

Species	A	B	C	D	E
Normal body volume (m^3)	12	13	08	10	15
Normal body surface area (m^2)	28	20	15	19	30

Which one of the above species use body surface for exchanging respiratory gasses?

- 1) A
- 2) B
- 3) C
- 4) D
- 5) E

- 25) Which of the following statement is correct regarding brain.
- 1) One ventricle is in mid brain.
 - 2) The outer most layer of meninges is pia matter.
 - 3) The ventricles are filled with cerebrospinal fluid.
 - 4) The mid brain gives rise to pons varolus.
 - 5) In vertebrates the brain develops from the hollow dorsal nerve cord.
- 26) The process not happened just after consumption of food by a healthy person.
- 1) Stimulate transportation of glucose into cells.
 - 2) Stimulate consumption of glucose inside of the cells.
 - 3) Increase releasing glucose into blood
 - 4) Stimulate conversion of glucose into fatty acid.
 - 5) Stimulate storing glycogen in skeletal muscle tissue.
- 27) Select correct statement about focussing a clear image on the retina.
- 1) Always form an inverted image on retina.
 - 2) Should refract the light rays.
 - 3) Black and white vision is provided by stimulating cone cells in retina.
 - 4) Change the size of the pupil when focusing light.
 - 5) Accommodation is important for producing a clear image on the retina.
- 28) Select incorrect statement about structure and function of human brain.
- 1) Sensory area – Receive sensory information about smell.
 - 2) Thalamus – Main input centre of sensory information.
 - 3) Hypothalamus – producing posterior pituitary hormones.
 - 4) Association area – Integration of complex mental functions.
 - 5) Medulla oblongata – control voluntary reflexes.
- 29) Incorrect statement about spermatogenesis is,
- 1) Starts at puberty and occurs throughout life.
 - 2) Sperms become mature in epididymis and motile in Vas deferens.
 - 3) Testosterone which is secreted by Leydig cells promotes spermatogenesis.
 - 4) Each primary spermatocyte gives rise to four spermatids through meiosis.
 - 5) Sertoli cells extend from the wall of the seminiferous tubules nourish the cells in different stages of spermatogenesis
- 30) Select incorrect structure – function combination about embryonic membranes
- 1) Yolk sac – Source of primordial germ cells.
 - 2) Allantois – Serves as an early site for blood formation.
 - 3) Amnion – Associate with the development of the urinary bladder.
 - 4) Chorion – Protect embryo from immune responses.
 - 5) Placenta – Produce Progesterone.
- 31) Select accurate statement about human upper limb.
- 1) Femur is the longest, heaviest and strongest bone of the body.
 - 2) Radius is longer than ulna.
 - 3) Head of the radius articulate with ulna.
 - 4) Wrist joint is made up of closely fitted seven bones.
 - 5) The distal end of the humerus articulate only with ulna.

- 32) Select accurate combinations of antigen presenting cells in adaptive immunity
- 1) T lymphocytes, Natural killer cells, mast cells.
 - 2) Macrophages, Neutrophil, Helper T cells.
 - 3) Dendritic cells, macrophages, B lymphocytes.
 - 4) Cytotoxic, T cells, mast cells, B lymphocytes.
 - 5) Dendritic cells, Natural killer cells plasma cells.
- 33) Select incorrect statement about the mechanism of blood clotting.
- 1) Platelets in the blood adhere to the collagen fibers in the connective tissue.
 - 2) Platelets become sticky due to released substance by them.
 - 3) Vitamin K is important for blood clotting.
 - 4) Heparin prevent clotting blood.
 - 5) Pro thrombin in blood plasma convert in to thrombin. This converts fibrinogen in to fibrin.
- 34) Select correct statement about DNA library.
- 1) Genomic library has a microbial culture.
 - 2) DNA cloned in different vectors.
 - 3) Reverse transcriptase enzyme is needed when forming DNA library.
 - 4) DNA library can be formed by transcriptomes.
 - 5) cDNA library does not reflect the pattern of expression of genes.
- 35) Select incorrect statement about non Mendelian inheritance.
- 1) Incomplete dominance – Phenomenon of dominant allele masking the recessive phenotype.
 - 2) Poly allelism – Presence of multiple alleles for a single genetic locus.
 - 3) Co dominance – Different alleles in same locus express in an equal manner.
 - 4) Polygenic inheritance – More genes participate to express single character.
 - 5) Epistasis – To express single character, participation of many genes in different loci.
- 36) Incorrect statement about mutation is,
- 1) Substitution always happen in pair of nucleotides.
 - 2) Removal of one or more nucleotide pairs during insertions.
 - 3) Removal of one or more nucleotide pairs during deletion.
 - 4) Frame shift mutations can happen with substitution.
 - 5) Substitution is not only reason for missense mutations.
- 37) Select non accurate combination about DNA isolation.
- 1) Inhibition of DNA ase – Adding chemicals with chelating agents.
 - 2) Dissociation of nucleoprotein complexes – Using proteolytic enzymes.
 - 3) Removal of RNA – Limited treatment with RNA ase.
 - 4) Breaking cells – Adding phenol.
 - 5) Precipitation of DNA – Adding cold ethanol.
- 38) Select a reptile concern as relict species.
- 1) Turtles
 - 2) *Ichthyophis*
 - 3) *Loris*
 - 4) Snake head
 - 5) *Indian pitta*

39) Select parameters effect for classification of climatic zones in Sri Lanka.

- 1) Rainfall.
- 2) Rainfall, Temperature and Sun light.
- 3) Rainfall, Temperature and Altitude.
- 4) Rainfall, Temperature and Main plant species.
- 5) Rainfall and Temperature.

40) Select answer with indigenous species, endemic species and migratory species in order.

- 1) Snake head/*Loris tardigradus*/Indian fly catcher
- 2) *Garcinia questica*/ Blue magpie /*Lingula*
- 3) *Loris tardigradus*/ Snake head/ Indian pitta
- 4) Tilapia /Indian pitta / *Garcinia questica*
- 5) Blue magpie / Tilapia /Snake head

For each of the questions 41-50 one or more of the responses is/ are correct. Decide which of the response / responses is / sre correct and then select correct number.

1	2	3	4	5
A,B,D correct	A,C,D, correct	A,B correct	C,D correct	Any other response or combination of responses correct.

41) Incorrect statement/s regarding lung ventilation is/ are,

- A) Volume of the thoracic cavity increases during inspiration due to relaxation of diaphragm and rib muscles.
- B) It increases the volume of lungs by smoothy slide pasting the visceral and parietal pleurae.
- C) Inspiration is an active process while expiration is a inactive process.
- D) Air pushed out from the lungs due to the high pressure inside the lungs during expiration.
- E) During inspiration air pulled in to the lungs which is a negative preasure breathing.

42) Incorrect statement/s regarding salt stress in plant.

- A) An excess of salt in soil increases the water potential of soil.
- B) Due to the salt stress it increases the water potential gradient from soil to root.
- C) Most of the mangrove plants have developed salt glands, which secrete excess salt out of the plants across leaf surface.
- D) During this stress condition plant root absorb more water.
- E) Salt stress is an abiotic stress condition to plant.

43) Correct statement regarding feeding mechanisms of animal.

- A) One of the example for commensalism is human and vitamin K producing bacteria in intestine.
- B) Humming bird is a substrate feeder.
- C) Bulk feeders can have tentacles to capture their prey.
- D) Maggot is a substrate feeder.
- E) There are traps to capture their prey in fluid feeder.

44) Function carried out by Aldosterone is/ are,

- A) Increases reabsorption of sodium.
- B) Decreases excretion of potassium.
- C) Increases reabsorption of water.

- D) Increases excretion of potassium.
- E) Decreases reabsorption of sodium.

45) Relevant statement/s regarding hormone is/ are,

- A) Growth hormones only act as trophic hormone.
- B) Aldestrone induces the reabsorption via kidney tubule.
- C) PTH induces the reabsorption of calcium via kidney tubule.
- D) FSH induces the spermatogenesis.
- E) Loss of weight is a character of hypothyroidism.

46) Which of the following is/ are incorrect regarding human skull?

- A) There are 8 cranial bone.
- B) There are sinuses in some cranial bone and facial bone.
- C) Skull bone provide protection to brain as well as to olfactory organs.
- D) Zygomatic process, mastoid process and styloid process are three process of temporal bone.
- E) There is socket for the attachment of teeth in temporal bone and mandible.

47) Incorrect statement/s regarding breeding technique.

- A) Plants or animals of different breeds are mated with each other is known as outbreeding.
- B) Inbreeding increases homozygosis.
- C) Continuous breeding can reduce the genetic diseases.
- D) Out breeding is a reason for super genes.
- E) Hybrid breeding increases the hybrid vigor.

48) Which of the following is/ are incorrect combination?

- A) Genetically modified *E. coli* – Human Insulin.
- B) Genetically modified yeast – Hepatitis B vaccine.
- C) Genetically modified *E. coli* - VIII factor.
- D) Gene therapy – Treatment for leukaemia
- E) Sterile insect technology - *Aedes aegypti*.

49) Which of the following are over consumption in Sri Lanka?

- A) Sea Cucumber
- B) Kothalahimbutu
- C) Kaluwara
- D) Tuna
- E) Etha

50) Which of the following is/ are correct regarding convention and protocols related to environment?

- A) Basel convention controls the trans boundary movement of hazardous wastes.
- B) According to the national environmental act it prohibited the recycling of plastic.
- C) Montreal protocol helps in food security.
- D) Kyoto protocol involves in the reduction of emission of greenhouse gas.
- E) United Nations framework convention on climate change is MARPOL protocol.