



Provincial Department of Education -

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Third Term Test - Grade 13 - 2021

Index No :

Biology I

Two Hours Only

- ❖ Answer all questions.
- ❖ Write your Index number in the space provided in the answer sheet.
- ❖ When you select the response which you consider to be the best answer to a question, mark your response on the answer sheet according to the instructions given in it.

- 1) Select the correct statement regarding water.
 1. Provides the biological medium for most organisms
 2. Small non-polar angular molecule
 3. H- bonds between water molecules are highly fragile at liquid state
 4. Hydrogen atoms in water are positively charged
 5. Small insects can walk over the surface of water due to the presence of strong adhesive forces
- 2) Which of the following is correct regarding lipids?
 1. Not polymers, but are macromolecules
 2. All of them are composed of glycerol and fatty acids
 3. Vegetable oils are saturated fats
 4. Too much consumption *Cis* unsaturated fat leads to atherosclerosis
 5. A small fraction of them act as circulating signaling molecules within the body
- 3) Select the choice in which the part–function relationship with regards to the light microscope is correctly matched.
 1. Coarse focus- to focus the specimen under the low power only
 2. Objective lens – magnifying the specimen
 3. Fine focus – to focus only under high power
 4. High power – to observe more cells
 5. Stage – to keep the microscope stable
- 4) Given below are some cellular structures,

A- 70's ribosomes	C- Glyoxysomes
B- Lysosomes	D- True flagella/ cilia

Common to both plant and animal cells are,

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

5) Some of the events observed during meiosis are given below,

- a) Arrangement of synaptonemal complexes on the metaphase plate
- b) Pulling the chromatids towards the poles
- c) Creating the nuclear envelope enclosing the chromosomes with chromatids
- d) Crossing over between non-sister chromatids
- e) Deposition of single chromosomes on the metaphase plate

The correct order of the above events is,

1. e, d, b, a, c
2. d, a, c, e, b
3. d, e, b, d, c
4. b, a, c, d, e
5. a, d, c, e, b

6) Select the correct statement regarding enzymes.

1. Enzymes increase the reaction rate by increasing the activation energy
2. Allosteric enzymes are equipped with multiple active sites and the binning of one inhibitor molecule to one of the active sites will cause inhibition of the other active sites also
3. ATP acts as an allosteric activator in catabolic reactions while ADP act as an allosteric inhibitor
4. Substrate specificity of an enzyme is due to the similarity of the shape of the active site to the shape of the substrate
5. According to the induced-fit mechanism, an enzyme changes the shape of the active site to become complimentary with any of the incoming substrates

7) Select the correct statement regarding respiration.

1. Two molecules of CO₂ are released during glycolysis
2. The end product of glycolysis is entered into the mitochondria utilizing ATP
3. The first stable product of the citric acid cycle is a 3 carbon compound
4. Two molecules of FADH₂ are produced per one molecule of glucose during aerobic respiration
5. 26 molecules of ATP are produced per one molecule of glucose during the electron transport chain

- 8) Which one out of the following statements regarding the evolution of biodiversity is correct?
1. RNA acted as enzymes within the protocell, and also RNA had the capability of replication
 2. Lipids in the primordial soup added to the membrane, resulting in the growth of the protocell
 3. The origin of aerobic organisms led to the evolution of photosynthetic organisms
 4. The first land-dwelling organisms were mollusks as snails
 5. Mammals originated after the extinction of dinosaurs

- 9) Some of the characteristics of vascular plants are given below,

- A. Production of seeds
- B. Presence of tracheid and vessel elements in the xylem
- C. Seeds being located in carpels
- D. Being homosporous
- E. Production of pollen tube

Select the characters found only in angiosperms.

1. A only
 2. A and E only
 3. B and E only
 4. B and C only
 5. C only
- 10) Some characters of the classes of phylum Chordata are given below,

P – Operculum absent, cartilaginous skeleton present

Q- Thin wet skin present, nictitating membrane present

R – Color vision present, Shelled eggs present

Select the choice with appropriate examples,

	P	Q	R
1	Carp	Lizard	Frog
2	Ray	Craw	Crocodile
3	Toad	Shark	Turtle
4	Shark	<i>Ichthyophis</i>	Eagle
5	Bat	Frog	Lizard

- 11) Select the matching pair of fungal phylum – character.

1. Chytridiomycota - cellulose cell wall
2. Zygomycota – Flagellated zoospores

3. Ascomycota – Asexual ascospores
4. Basidiomycota – Sexual exospores
5. Zygomycota – Incomplete septa

12) Is a character of lateral meristems,

1. Their action replaces the epidermis
2. Produces tender leaves
3. Participates in the regeneration of broken leaves
4. Located underneath the epidermis
5. Increases the length of the plant body

13) Select the correct statement regarding the plant body.

1. There is a contrasting pith in the dicot primary root but not in the monocot root
2. Although there is a bundle sheath of sclerenchyma encircling the vascular bundles of the primary stem of monocot plants, in the dicot stem there is only a sclerenchyma cap outer to the vascular bundles.
3. In both monocot and dicot plants, lateral roots are produced by the cell division in the pericycle.
4. In monocots and the dicots, the xylem is located to the inwards and the phloem to the outwards, while the cambium lies sandwiched in between
5. The cortex of a dicot stem is thicker than itself in the root

14) Select the correct statement receding concept of water potential,

1. Water potential increases as the concentration increases
2. Plants can't have a negative water potential in any circumstance
3. At constant pressure, the solute potential is proportional to the water potential
4. A solution in a beaker has a pressure potential similar to the atmospheric pressure
5. Water potential increases with the increasing temperature

15) Select the correct statement regarding the movement of water within plants.

1. Entry of water to the apoplast uses metabolic energy and from there, water travels by passive transport
2. Movement of water via symplast stops at the endodermis and resumes at the pericycle
3. In the trans-membrane route, water travels across the membranes at the beginning and the end of it only
4. Cells of the endodermis release ions from their protoplasts to the cell walls
5. Symplast is responsible for the majority of water movement

16) Which of the following element absorbed as an anion result in chlorosis in tender leaves as a deficiency symptom?

1. S

2. Fe
3. Mn
4. Mg
5. N

17) Given below are some of the features observed in the life cycles of plants.

P – photosynthetic gametophyte

Q – Being dioecious

R – cilia/ flagella bearing gametes

S – heterospory

Select the correct combination.

1. *Pogonatum* - P,R,S
2. *Nephrolepis* – Q, R, S
3. *Selaginella* – P, Q, R
4. *Cycas* – Q, R, S
5. Shoe Flower plant – Q, R, S

18) Which of the following statement is correct regarding plant hormones?

1. Both Auxins and Gibberellins stimulate elongation of the stem
2. Absciscic acid, as well as ethylene, enhances senescence
3. Auxins promote leaf abscission in drought seasons
4. Auxins and cytokinins enhance apical dominance
5. Gibberellins inhibit seed germination

19) Given below are some statements regarding plant stresses.

- A. Stimulates synthesis and release of abscisic acid
- B. Increased levels of unsaturated phospholipids in the plasma membrane
- C. Increased levels of dissolved sugars in the cytoplasm
- D. Keeping the cytoplasm at a low water potential compared to the soil solution

Which of the above is related to cold stress?

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

20) Select the correct structure-function relationship regarding the digestive tract.

1. Stomach – conversion of pepsinogen to pepsin by pepsin
2. Duodenum – Secretion of gastrin
3. Duodenum – Mechanical digestion of food
4. Jejunum – Neutralization of chyme
5. Colon – Absorption of triglycerides

21) Select the correct statement regarding the human circulatory system.

1. Deoxygenated blood enters the pulmonary artery
2. The heart wall is comprised of 4 layers
3. Sometimes nerves are also involved in maintaining the basic rhythm of the heart
4. The blood pressure of humans is 80/120 mmHg
5. Rhythmic contractions in the walls of lymphatic vessels also involve in the circulation of lymph

22) Select the correct statement regarding the

1. Hairs present in the trachea filter air
2. Lowering of the larynx and the epiglottis happens as swallowing takes place
3. The inner surface of the alveoli are covered by a fluid called surfactant
4. Diaphragm contracts during exhalation
5. The main center for the control of respiration is located in pons varolii

23) Select the correct statement regarding immunity.

1. Usually, proteins and lipids act as antigens
2. A specific antigen contains only one epitope
3. In cell-mediated immunity, T lymphocytes directly kill antigenic cells
4. Helper T cells produce antibodies
5. Effector cells produced by the lymphocytes live longer; protecting against the relevant pathogens

24) Given below are some statements regarding the formation of urine in humans,

- A. Active secretion of K^+
- B. Passive resorption of water
- C. Passive resorption of HCO_3^-
- D. Active secretion of H^+ into the tubules

Select the events that take place at the distal convoluted tubule.

1. A and B only
2. B and C only

3. A and C only
4. B and D only
5. A B and C only

25) Select the correct statement regarding the human brain.

1. Corpus callosum is composed of white matter
2. Two of the ventricles are located in the forebrain while the mid brain and hindbrain contains one ventricle in each of them
3. The hindbrain contains the cerebellum, Pons varolii, and medulla oblongata
4. Hypothalamus is located above and in front of the thalamus and above and in front of the pituitary
5. The Corpus callosum belongs to the midbrain

26) When a nerve impulse travels across a synapse,

1. The action potential causes the polarization of the presynaptic membrane
2. Ca^{2+} diffuse into the terminal end causing it to depolarize
3. Vesicles containing neurotransmitters bind with the postsynaptic membrane and releases neurotransmitters into the synaptic cleft
4. Depolarization of the postsynaptic membrane causes it to reach the action potential
5. Some gasses can act as neurotransmitters

27) Select the correct combination of Hormone – target location,

	Hormone	Target location
1	Prolactin releasing hormone	Mammary glands
2	Luteinizing hormone	Testes
3	Oxytocin	Ovaries
4	Cortisol	Adrenal gland
5	Thymosin	Thyroid gland

28) Select the correct statement regarding the development of the zygote and the embryo.

1. Morula which results from the division of the zygote reaches the uterus in 3-4 days after fertilization
2. A blastocyst is formed 10 days after fertilization
3. The umbilical cord is formed by the fusion of the trophoblast of the embryo and the endometrium of the mother
4. Implanted embryo does not send hormones to the mother
5. Implantation takes place 12 days after fertilization

29) Select the correct statement regarding the human skeletal system.

1. The zygomatic arch is formed by the union of part of the temporal bone and part of the maxilla
2. Ethmoid bone, lachrymal bone, and nasal bone together makes the floor eye orbit
3. Sphenoid bone, Ethmoid bone, maxilla, and the nasal bone contain sinuses
4. The Coronoid process of the mandible articulates with the temporal bone
5. Occipital condyles articulate with the atlas to create a hinge joint

30) Select the correct statement,

1. Widow's peak is a human Mendelian character determined by a recessive allele
2. Both homozygous and heterozygous genotypes in incomplete dominance display similar phenotypes
3. ABO blood grouping in humans is an example of polygenic inheritance
4. Linked genes are located close to each other on the same chromosome
5. Hardy Weinberg equilibrium is valid when random mating does not take place

31) Which statement is correct regarding mutations,

1. X-ray and Infrared are examples of mutagenic physical agents
2. Substitution of a pair of nucleotides of an exon of a gene may cause no change in the amino acid sequence
3. The effect of a mutation is always damaging or neutral
4. Missense mutations cause premature termination of protein synthesis
5. If insertion does not take place close to the start or stop codon, the polypeptide may become nonfunctional

32) In DNA isolation,

1. In the first step of DNA isolation from bacteria, bacterial cell walls are digested using lipase
2. DNase is added in the second step
3. SDS prevents the action of enzymes on released DNA
4. DNA is dissolved in cold ethanol
5. Full length of DNA can't be isolated from eukaryotic cells

33) Select the correct combination,

Eco –system	Plant
1. Savanna -	Nelli
2. Marshes -	Kadol
3. Low land rain forests -	Keena
4. Tropical montane forests -	Heressa
5. Dry mixed ever green forests -	Aralu

34) Select the answer with the correct example that matches the given threat level according to the IUCN classification.

Threat level	Example
1. Extinct	<i>Crudia zeylanica</i>
2. Critically endangered	Elephant
3. Extinct in the wild	DO- Do
4. Endemic to Sri Lanka	<i>Garcinia zeylanica</i>
5. Flagship species of Sri Lanka	Lion

35) Which of the below given, contribute most to increased global temperature?

1. NO₂
2. CFC
3. Black carbon
4. IR
5. SO₂

36) Select the correct statement regarding sterilization.

1. Exposing for 1 hour to steam of 121C0 at 15 lbs/inch is sufficient to kill all microbes and their spores
2. During incineration, microorganisms are burnt to ash
3. Glassware can be sterilized by keeping at 170 C0 for 15min in a dry air oven
4. Microbes are absent in pasteurized milk
5. Membrane filters have slits ranging from 0.01mm – 0.45mm

37) Names of a few pathogens have been given below,

- A. Rubella virus
- B. *Neisseria meningitides*
- C. *Clostridium tetani*
- D. Hepatitis A virus

Organisms that damage the nervous system are,

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

38) Microorganisms are used in various industries. One such correct example is,

Industry	Microorganism
1. Production of vitamins	<i>Streptococcus</i>
2. Extraction of metals	<i>Pseudomonas</i>
3. Single cell proteins	<i>Gluconobacter</i>
4. Alcoholic beverages	<i>Aspergillus niger</i>
5. Production of vinegar	<i>Saccharomyces cerevisiae</i>

39) One of the primary treatment steps in the purification of water is,

1. Collection and removal of sludge
2. Vigorous mechanical aeration
3. Allowing wastewater to trickle through a rocky material
4. Sedimentation by adding alum
5. Disinfection by adding chlorine /ozone

40) Select the daily activities that should be followed in maintaining a home aquarium

1. Stirring up the bottom medium gently
2. Siphoning out the scraped algae and debris
3. Replacing half of the water
4. Scraping out of algae from the glass surface
5. Paying attention to the health condition of the fishes

Use the following table to select the answers for the question from 41 to 50.

1	2	3	4	5
A, B, and D correct	A, C, and D correct	A and B correct	C and D correct	Any other answer or a combination correct

41) Some biochemical reactions taking place inside cells are given below. Select the reactions relevant to cellular respiration.

- A. $\text{Pyruvate} + \text{CoA} + \text{NAD}^+ \longrightarrow \text{Acetyl CoA} + \text{CO}_2 + \text{NADH}$
- B. $\text{Glucose} + 2\text{ADP} + 2\text{NAD}^+ \longrightarrow \text{Pyruvate} + 2\text{ATP} + 2\text{NADH}$
- C. $\text{RuBP} + \text{CO}_2 \longrightarrow 2\text{x3PGA}$
- D. $\text{Oxaloacetate} + \text{Acetyl CoA} \longrightarrow \text{Citrate} + \text{CoA}$
- E. $\text{Phosphoenolpyruvate} + \text{HCO}_3^- \longrightarrow \text{Oxaloacetate}$

42) Select the matching statements

- A. Carbohydrates – Spares proteins
- B. Proteins – Used in the synthesis of some hormones
- C. Lipids - Used in the synthesis of some hormones
- D. Mg – Component of hemoglobin
- E. Vit B – Act as an antioxidant

43) Select the correct statement/s regarding circulatory systems.

- A. In grasshoppers, dorsally blood flows towards the anterior direction while ventrally blood flows towards the posterior direction.
- B. The first closed circulatory systems appear in nematodes
- C. In single circulation, the heart bears two chambers
- D. Most reptiles have three-chambered hearts
- E. Birds have three-chambered hearts

44) Select the correct statement/s regarding immunity.

- A. Both innate immunity and acquired immunity can be seen in all animals.
- B. Various chemicals present in mucus membranes act as chemical barriers.
- C. Lysozyme can destroy the cell walls of some bacteria.
- D. Natural killer cells are a component of innate immunity.
- E. Interferons are secreted by cells infected by bacteria and kill bacteria.

45) Not a function of the medulla oblongata,

- A. Thermoregulation
- B. Connecting the central nervous system with sensory and motor neurons
- C. Coordination in running
- D. Controlling coughing and sneezing
- E. Maintaining balance and posture

46) Select the correct combination/s of structure and function.

Structure	Function
A. Sertoli cells	Secretion of inhibin
B. Leydig cells	Secretion of androgens
C. Epididymis	Helps in maturation of sperms
D. Seminal vesicles	Storage of sperms

47) Uses of DNA sequencing,

- A. Paternity testing
- B. Identifying criminals
- C. Diagnosis of cancers
- D. Figuring evolutionary relationships
- E. Identifying allergens

48) In a non –evolving population,

- A. Mutations do not occur
- B. Selective mating should happen
- C. Immigrations and emigrations should not happen
- D. Natural selection does not take place
- E. Population size should be small

49) Select the correct statement,

- A. *Cycas* of Sri Lanka is conserved under the convention on biological diversity
- B. Sustainable utilization of the components of biological diversity is done under Ramsar convention
- C. Trans-boundary movement of hospital waste is controlled under the Basel convention
- D. Strict natural reserves and jungle corridors are conducted under Fauna and flora protection ordinance
- E. Reduction of emission greenhouse gases to match the targets is done under the Montreal protocol

50) Select the correct statements regarding microorganisms.

- A. In chemoautotrophic bacteria the source of carbon is inorganic
- B. Cyanobacteria are photoautotrophic organisms
- C. All fungi are saprotrophs
- D. Most mycoplasmata are parasitic on humans and other animals
- E. In mycoplasmata, the cell walls are composed of proteins and polysaccharides