Taxila Central College – Horana

General Certificate of Education (Ad. Level) Examination, July 2026, Grade 13

Biology I	09 | E | I	Time – 2 hrs

01. A structural biological molecule that found in each living cell is,
    1. Cellulose
    2. Phospholipid
    3. Hemicellulose
    4. Collagen
    5. Chitin

02. The correct statement about microscopes is,
    1. Chromosomes of meristematic cells cannot be observed by the light microscope.
    2. The mirror makes light rays parallel and sent to the specimen.
    3. Reduction of wavelength of light is the reason for limitation of resolution power of light microscope.
    4. Staining of specimen is compulsory in observing bacteria by the light microscope.
    5. The beam of electron passing through the specimen involve in formation of an image in scanning electron microscope.

03. Choose the correct combination of subcellular component - function.

Subcellular component	Function
P. Golgi apparatus	A. Packaging and distribution of membrane lipids.
Q. SER	B. Production of transmission vesicles.
R. Lysosome	C. Carbohydrate metabolism.
S. SER	D. Transport residue materials out of cells.

    1. P - A, S - B, Q - C, R - D
    2. S – A, P – B, R – C, Q – D
    3. P – A, Q – B, S – C, Q – D
    4. P – A, S – B, Q – C, R – D
    5. Q – A, P – B, R – C, Q – D

04. What is the correct statement about enzymes?
    1. All the human enzymes have optimum temperature around 35 C^0 – 40 C^0
    2. The function of most of the reversible inhibitors can be reversed by increasing the substrate concentration.
    3. Drugs used against microbes bound to the enzymes reversibly.
    4. Coenzymes are inorganic components that bind to enzymes permanently or temporarily and to the catalytic function.
    5. In cooperativity a regulatory molecule binds to the active site of the enzyme and do the catalytic function.

05. The acceptable statement about Calvin cycle is,

1. The source of H , which is needed to reduce CO_2 is H_2O
2. 3 PGA is the precursor molecule of synthesizing carbohydrate. ✗
3. NADPH is consumed in the formation of 1 – 3 bisphosphoglycerate from 3PGA . ✗
4. ATP as well as NADPH is needed in, regeneration of RuBP ✗
5. Calvin cycle takes place trice, in synthesizing one glucose molecule.

06. During cellular respiration takes place in living cells,

1. 30 ATP molecules are produced in active cells. ✗
2. Only monosaccharides with 6 carbon atoms act as substrates in glycolysis. ✗
3. Pyruvate is reduced on cristae of mitochondria. ✗
4. Enzyme catalyzed reactions take place in the presence or absence of O_2
5. When considering a human skeletal muscle cell, 6 NADH molecules are produced in mitochondrial matrix, for one glucose molecule.

07. Lactic acid fermentation differs from alcoholic fermentation, because in lactic acid fermentation,

1. Carboxylation takes place
2. 2 ATP is synthesized in glycolysis.
3. Final hydrogen acceptor is pyruvate
4. Fermentation takes place in bacteria
5. Reduction takes place using NADH.

08. When considering the following characteristic features of kingdom Protista, what is/are the feature/ features shown by organisms having stored food laminarin?

a. Have chlorophyll d, as photosynthetic pigments.
b. Greenish red in colour.
c. Habitat, fresh water or marine water.
d. Plant like multicellular thallus. ✓

1. Only a and b
2. Only b and d
3. only a, b and d
4. Only c
5. Only d

09. The correct statement about organisms of Kingdom Plantae is,

1. Liverworts are included into bryophytes
2. Stem tissues of living plants resemble root tissues of the early vascular plants.
3. Spike mosses are homosporous and club mosses are heterosporous. ✗
4. Seeds of Gnetophyta look like seeds of angiosperms. ✗
5. Pollen grains of monocots are with one opening and pollen grains of dicot are with two openings. ✗

10. Among the following characteristic features of kingdom Animalia, what is/ are the feature / features fund in phylum Arthropoda and other invertebrate phyla?

a. Chitinous exoskeleton.
b. Heart with valves
c. Have Malpighian tubules
d. Excretory substance uric acid.

1. Only a, c and d.
2. Only b and d
3. Only d
4. Only b
5. None of the above

11. The feature found in *Nephrolepis* and not found in *Selaginella* is,

1. Have rhizoids in gametophyte
2. Dioecious gametophyte.
3. Have genetically non identical spores
4. Have photosynthetic gametophyte
5. Have cluster of sporangia.

12. What is the correct statement about meristematic tissues?

1. Cell division occurs continuously.
2. Produce new cells both sides, outwards and inwards in the shoot apex.
3. Vascular cambium of a dicot root locates exterior in the pericycle
4. Vascular cambium and the cells produced by it belong to the bark of a plant in which secondary growth occurred.
5. Some meristems form, base of the stems and leaves.

13. Functions and deficiency symptoms shown by both Mo and Ni are,

a. Nitrogen metabolism
b. Chlorosis in older leaves
c, Death of shoot and root tip
d. Fixation of nitrogen
e. Crinkled leaves.
f. Reduce internode length

1. a and e
2. a and b
3. d and e
4. d and b
5. a and f

14. The correct statement about reproduction of seed plants is,

1. Water is not needed for the fertilization of every seed plant.
2. Only one ovule present in a single megasporophyll.
3. When releasing the pollen grain it has a male gametophyte containing gametes.
4. After the fertilization 3n endosperm is produced by female gametophyte of open seeded plants.
5. Gametes are produced by mitosis.

15. Which of the following plant growth substances promote roots and root hair formation and promotes and formation of lateral and adventitious roots, respectively?

1. Cytokinins , Auxin
2. Auxin , Gibberellins
3. Ethylene , Auxin
4. Gibberellins , Cytokinins
5. Ethylene , Gibberellins

16. The correct statement about photo receptors is ;

1. Flowering is controlled by far red : red light wavelength ratios.
2. When increases the proportion of far red : red light, it stimulates vertical growth.
3. Seed germination is inhibited by 660 nm wavelength of light.
4. Cryptochromes provide the plant with information about the quality of light
5. Light wavelength 730 nm increase percentage of seed germination.

17. An induced structural defence mechanism is ;

1. The structure of the epidermal cell walls and thickness.
2. Formation of cork and abscission layers.
3. Production of toxic compounds.
4. Amount and quality of wax and cuticle.
5. Formation of trichomes.

18. What is the correct statement about animal tissues?

1. Fiber cells are abundant in dense connective tissue.
2. Chondrocytes secrete chondroitin sulphate and collagen fibers.
3. Osteoblasts in bone tissure, maintain the bone tissue.
4. Sarcomere is the basic structural unit of the nervous tissue
5. Sarcomere is absent in the cardiac muscle cell.

19. Which is the correct answer with main function of the minerals in the human body and their deficiency symptoms?

Mineral	Function	Deficiency symptoms
a. *Ca*	p. help maintain in acid base balance	w. Impaired immunity
b. *K*	q. Nerve function	x. Heart failure
c. *Na*	r. Act as enzyme cofactor	y. muscle cramps
d. *Fe*	s. Form bones and teeth	z. Poor growth

1. a - q - y
2. c - p - x
3. d - r - w
4. b - s - x
5. a - p - z

20. What is the correct statement about a person with 1.6 m height and 56 kg weight?

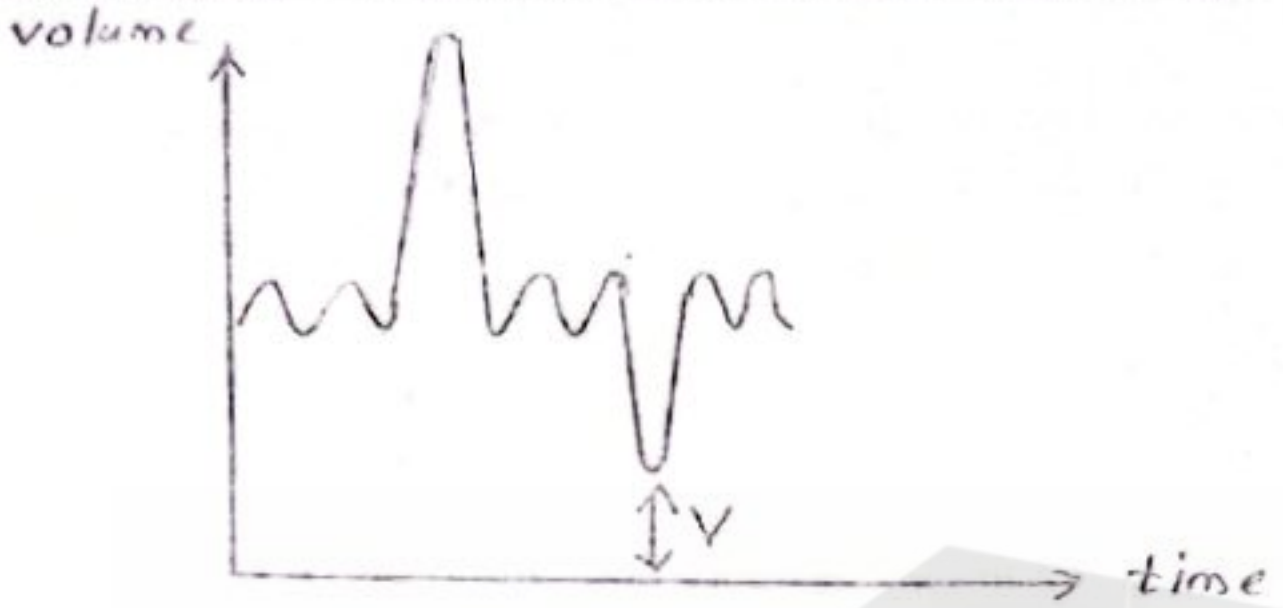
A. Lack one or more essential nutrients.
B. If his mass is reduced up to 40kg , malnutrition can arise.
C. The amount of energy released by the person is very low.
D. Cardiovascular diseases may occur to this person.

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

21. Choose the correct statement about circulatory systems of animals.

1. Oxygen rich blood is pumped to every body tissues and organs by the single ventricle of fish.
2. Blood is pumped into the spaces which surround body tissues through the circulatory vessels by the heart of insects. ✗
3. A heart with three chambers found in all reptiles and amphibians. ✗
4. Only one heart is found in closed circulatory systems. ✗
5. Arteries transport O_2 rich blood and veins transport O_2 poor blood. ✗

22.



In the above graph of lung volumes and capacities, what is the correct statement about respiratory volumes V ?

1. That is Functional residual capacity
2. It's average value is 1800 ml.
3. It shows the air in the system of branching conducting tubes.
4. It involves continuous exchange of gas in lungs.
5. This volume of air is included in vital capacity.

23. Which of the following may occur due to reduction of blood pressure and volume?

1. Stimulation of osmotic receptors in hypothalamus. ✗
2. The hypothalamus controls the sensation of thirst.
3. Stimulation of posterior pituitary gland.
4. Stimulate medulla of the Adrenal gland. ✗
5. Increasing excretion of K^+ from distal tubule.

24. A condition occurs due to alkaline nature of urine is .

1. Bladder and kidney stones.
2. Kidney failure
3. Chronic kidney disease
4. Diabetes
5. High blood pressure

25. What is the correct sequence of structures of the brain doing following functions?

a. Control voluntary muscle contraction.
b. Controls involuntary reflexes.
c. Coordinates auditory and visual reflexes.
d. Coordinates voluntary muscular movements.

1. Cerebrum , Medulla oblongata, Medulla oblongata, Cerebellum
2. Cerebellum , Pons varolii , Mid brain , Cerebrum
3. Cerebrum , Medulla oblongata, Mid brain , Cerebellum
4. Cerebellum, Medulla oblongata, Mid brain , Cerebrum
5. Cerebellum, Mid brain , Medulla oblongata, Cerebrum.

26. The correct statement about autonomic nervous system is ,

1. Spinal nerves stimulate gallbladder
2. The neurotransmitter epinephrine is secreted by sympathetic nerves system ✗
3. Sympathetic nerves involve stimulating adrenal cortex. ✗
4. Sympathetic nerves release only from thoracic and lumbar regions.
5. Sympathetic system promotes self-maintenance functions ✗

27. The correct statements about maintaining resting membrane potential of a neuron is,

a. Na^+ concentration exterior the neuron is high and K^+ absent. ✗
b. More K^+ channels open than Na^+ channels. ✓
c. Net out flow of Na^+ occur. ·
d. Two K^+ out of the cell for every three Na^+ that it transports in ✗

1. Only a and b
2. Only a, b and c
3. Only a , c and e
4. Only b
5. Only b , c and e

28. What is the correct statements about human hormones and the function?

a. Growth hormone - Regulate metabolism ✓
b. Thyroid hormone – Regulate digestive and reproductive function ✓
c. Calcitonin - ~~Stimulate~~ Inhibit e calcium reabsorption from the kidney tubules. ✗
d. Aldosterone – Regulate blood volume and blood pressure.

1. Only a, b and c
2. Only b, c and d
3. Only b and c
4. Only a, c and d
5. All the above

29. What is the correct statement about hormonal control of the female reproductive system?

1. Follicle growth is stimulated by LH with the aid of FSH ✗
2. Hypothalamus is inhibited due to low level of estradiol. ✗
3. Anterior pituitary is stimulated due to higher level of estradiol
4. Ovulation occurs with the LH surge. ✗
5. LH stimulates the formation of corpus luteum and due to hormones secreted by corpus luteum LH secretion reduces to a very low level.

30. The correct statement about human appendicular skeleton is ,

1. As the thumb is more flexible than the other fingers, it permits power grip. ✗
2. A longitudinal arch and two transverse arches present in the human leg. ✗
3. Each of the upper limb and the lower limb is made up of 30 bones.
4. Femur, patella and tibia, take part in making the knee joint. ✓
5. Facet for articulation with clavicle present in the anterior surface of scapula.

31. A population with 1000 flowers contain 400 recessive alleles. The genotypic percentage of heterozygotes in that population is.

1. 64%
2. 16%
3. 32%
4. 8%
5. 20%

27. The correct statement about plant breeding methods is,
1. Aggregation of super genes by hybridization is important in agriculture.
2. Recombinant DNA technology is used in changing genotypes, in artificial selection.
3. Genetic fitness of a population reduces due to inbreeding.
4. In genetic variation UV rays can be used to change genetic composition.
5. Fertile offspring are not produced in interspecific breeding.

33. Which of the following techniques is not needed to make a recombinant DNA molecule?
1. Isolation of DNA from different sources.
2. Cloning recombinant DNA
3. Restriction digestion of isolated DNA with restriction enzymes.
4. Separation of DNA fragments by gel electrophoresis
5. Joining the DNA fragments from multiple sources using DNA ligase.

34. The correct statement about polymerase chain reaction is,
1. The primer use is an RNA sequence.
2. DNA helicase is needed in denaturation of DNA double helix.
3. To copy both the strands, two primers, each binding to either of the two strands at 3′ end are used.
4. The primer will bind to the complementary sequence of the denatured template DNA at 95C°
5. The annealing temperature and primer extension temperature are similar.

35. What is the acceptable statement about the following food web?

1. Two secondary consumers are shown in the above food web.
2. Maximum trophic levels shown by above food web is 5.
3. Crocodile and mouse are in the same trophic level.
4. In the maximum efficient food chain, crocodile is in the second trophic level.
5. Frog is a tertiary consumer.

36. Four plants and four ecosystems, found in Sri Lanka are given below. Choose the answer with correct combination

Plant	Ecosystem
A. Heeressa	P. Savanna
B. Iluk	Q. Tropical thorn scrubs
C. Gal weralu	R. Tropical montane forests
D. Pangiri mana	S. Patana

1. A – Q, B – S, C – R, D – P
2. A – P, B – R, C – Q, D – S
3. A – Q, B – P, C – R, D – S
4. A – R, B – S, C – P, D – Q
5. A – P, B – Q, C – R, D – S

37. What is the answer with correct combination of method of sterilization and the way of damaging microorganisms?

Method of sterilization	Way of damaging microorganism
a. Dry heat sterilization	p. kill by oxidation
b. Moist heat sterilization	q. Burned to ash
c. Incineration	r. Denaturation of protein
d. UV radiation	s. Damaging DNA

1. a – p, b – r, c – q, d – s
2. a – s, b – r, c – q, d – p
3. a – q, b – p, c – q, d – s
4. a – p, b – r, c – s, d – q
5. a – s, b – r, c – p, d – q

38. A free living nitrogen fixing bacteria is,
1. *Anabaena*
2. *Rhizobium*
3. *Nostoc*
4. *Azotobacter*
5. *Azolla*

39. What is the correct statement about normal microbiota of human body?
1. Under certain conditions, some microbiota cause infections.
2. Internal tissues of healthy human body are free of microorganism.
3. *Escherichia coli* colonizes the intestine of the newborn first.
4. Majority of micro-organism colonize on the skin and few colonize on the inner surfaces intestinal tract genitourinary tract etc.
5. *Escherichia coli* in large intestine synthesizes vitamin K and vitamin E

40. The correct statement about the problems arise in a home aquarium is,
1. Water turning in to green frequently due to receiving few amount of light.
2. Brown encrustations on plants on aquarium décor occur due to too much light
3. Blue green algal 'mats' on water due to high light intensity.
4. Orgonic pollutants accumulate due to inadequate filtration or aeration.
5. Only reducing intensity of light and duration of light can minimize growth of green algae.

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

If only (A), (B) and (D) are correct ..... (1)
If only (A), (C) and (D) are correct ..... (2)
If only (A) and (B) are correct ..... (3)
If only (C) and (D) are correct ..... (4)
If any other response or combination of responses is correct ..... (5)

Directions summarised				
(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. The correct answer / answers about an onion root apex cell in metaphase is,
    A. Centrioles reach the opposite poles. ✓
    B. Kinetochore attaches the sister chromatids of each chromosome at their centromere from both poles. ✓
    C. Homologous chromosome pairs arrange at metaphase plate. ✗
    D. Nucleoli disappeared ✗
    D. Sister chromatids of homologous chromosomes are genetically identical. ✗ (3).

42. The correct statement about phylum chordate is,
    A. In many chordate embryos, there are slits or clefts in pairs either side of pharynx opens to the outside of body. ✗
    B. In many terrestrial adults, muscular tail is reduced. ✗
    C. Nerve cord id located dorsal to the notochord. ✓
    D. Notochord is a flexible rod, and the nerve cord is a hollow tubular structure. ✓ (4)
    E. Ventral muscular heart present in every chordate. ✗

43. *Rhoeo* lower epidermal peels immersed in a sucrose solution immersed in a sucrose solution reached to equilibrium. What is the correct statement, if 50% of cells became plasmolyzed?
    A. Wate potential of cells equals to water potential of solution. ✓
    B. Solute potential of cells equals to solute potential of solution. ✓
    C. Increasing solute concentration further can change turgor pressure into a negative value. ✗
    D. Adding pure water into a solution, turgor pressure of cells changes in to a positive value. ✓
    E. If a tissue is reached to an equilibrium endosmosis or exosmosis not occur. ✗ (1).

44. What is the correct statement/ statements about antibodies is/are
    A. Antibody - antigen complexes can activate complement system. ✓
    B. Antibody - antigen, complexes can activate phagocytosis. ✓
    C Directly kill pathogens in fluids ✗
    D. When allergens attach to the antibodies specific to the allergen, which induce mast cells to release histamine. ✓
    E. kill body cells infected with pathogens by series pf complex reactions. ✗ (1).

45. The skull bones of humans with sinuses are,
    A. Sphenoid bone ✓
    B. Temporal bone
    C. Ethmoid bone ✓
    D. Frontal bone ✓
    E. Parietal bone

(2)

46. The correct statement/ statements from the following is / are,
    A. In gamete formation, gametogonia divide by mitosis. ✓
    B. In oogenesis meiosis complete before the birth. ✗
    C. hCG hormone is secreted by placenta and corpus luteum. ✗
    D. By injecting synthetic progesterone, which thickens cervical mucus, and it interferes with implantation ✓
    E. Spermatids produced during spermatogenesis move to vas deferens. ✗ (5).

47. The correct statement about polyploidy is,
    A, Plants can with stand higher ploidy levels than animals. ✓
    B. Polyploids activate well than their diploid counter parts. ✓
    C. Many amphibians and fish are polyploids.
    D. Though a greater number of chromosomes present in polyploids, genetic equilibrium is maintained. ✓
    E. Polyploidy does not take place due to abnormal segregation of chromosomes. ✗

48. The correct statement about acid rain is,
    A. Not considered as a serious global environmental issue. ✗
    B. pH value of acid rain is about 5.6 ✗
    C. Acid deposition includes snow, fog and dry particles that fall from the sky. ✓
    D. It causes to leach heavy metals such as mercury, lead ✓
    E. The main gas release during management of animal farms, cause for acid rains. ✗ (4).

49. Type of bacteria that cause diseases in nervous system of man are,
    A. *Streptococcus pneumoniae* ✗
    B. *Haemophilus influenzae*
    C. *Staphylococcus aureus*
    D. *Salmonella typhi* (5).
    E. *Clostridium tetani* ✓

50. A Warning sign/signs for dengue hemorrhagic fever is / are,
    A. Severe headache ✓
    B. Pain in muscles and joints ✓
    C. Persistent vomiting
    D. Enlargement of liver (3)
    E. Pain under the eyes.

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Part B – Essay

Answer four questions only.

1) a. Explain the cellular respiration process of Yeast in the absence of molecular oxygen.
   b. Explain DNA delivery systems.

2) a. Describe the terrestrial adaptations of reptiles over amphibians.
   b. Explain the toxigenicity of microorganisms.

3) Explain the factors affecting the transpiration of plants.

4) a. Explain the external and internal respiration of man.
   b. Explain the effects of hydrogen cyanide, carbon monoxide and nicotine for the functioning of human respiratory system.

5) a. Explain the osmoregulation of man.
   b. Explain common temporary birth control methods.

6) Short notes.
   a. Using of test cross to determine the genotype of a female with Widow's peak (Use the dominant allele as W and recessive allele as w)
   b. Chaparral biome
   c. Biological controlling methods of dengue vector and limitations