සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved]

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இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம்
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கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2012 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2012

නව නිර්දේශය
புதிய பாடத்திட்டம்
New Syllabus

ජීව විද්‍යාව I
உயிரியல் I
Biology I

09 E I

පැය දෙකයි
இரண்டு மணித்தியாலங்கள்
Two hours

Instructions:

(i) *Answer **all** questions.*
(ii) *Write your **Index Number** in the space provided in the answer sheet.*
(iii) *Instructions are given on the back of the answer sheet. Follow those carefully.*
(iv) *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** (×) on the number of the correct option in accordance with the instructions given on the back of the answer sheet.*

1. Which one of the following contains sulphur?
(1) DNA (2) Lipids (3) Proteins (4) Chitin (5) Inulin

2. Which one of the following **cannot** be seen under a light microscope?
(1) Starch grains (2) Yeast cells (3) Plasmids (4) Chloroplasts (5) Stomata

3. Which one of the following is **the incorrect** combination regarding carbohydrates?
(1) Transport in plants - Sucrose
(2) Transport in humans - Glucose
(3) Food storage in plants - Cellulose
(4) Constituent of ATP - Ribose
(5) Constituent of fungal cell walls - Chitin

4. Competitive inhibitors stop an enzyme activity by
(1) changing the shape of the enzyme.
(2) combining with the substrate.
(3) blocking the active site of the enzyme.
(4) combining with the products of the reaction.
(5) disrupting peptide bonds of the enzyme.

5. Which of the following acts as the final electron acceptor in ethanol fermentation?
(1) Acetaldehyde (2) Pyruvate
(3) Acetyl coenzyme-A (4) Molecular oxygen
(5) Glucose

6. Which of the following statements on the characteristics of kingdom Plantae is correct?
(1) Cell walls contain peptidoglycan and cellulose.
(2) Most of the lipids in the cell membrane are unbranched.
(3) Glycogen and starch are the main storage food items.
(4) Starting codon for protein synthesis is formyl methionine.
(5) Some locomotory structures present in other kingdoms are found.

7. Phylum Chrysophyta differs from other phyla of kingdom Protista due to which of the following characteristics?
(1) Absence of flagella in vegetative cells.
(2) Presence of mannitol as one of the storage products.
(3) Presence of chemoautotrophs in addition to photoautotrophs.
(4) Absence of cholorophyll-b as a photosynthetic pigment.
(5) Presence of silica in the cell wall.

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8. A child shows the following symptoms of vitamin deficiency.
(a) Fatigue (b) Anaemia (c) Delay in wound healing
Which of the following indicates the vitamins he is deficient of?
(1) Pantothenic acid, folic acid and ascorbic acid
(2) Thiamin, niacin and riboflavin
(3) Riboflavin, vitamin B_{12} and biotin
(4) Vitamin A, vitamin D and vitamin C
(5) Vitamin B_2, vitamin E and vitamin K

9. Which of the following statements regarding cigarette smoke is correct?
(1) Long term exposure to it retards the activity of the germinal layer of the epithelium of the respiratory tract.
(2) It stimulates the goblet cells and ciliated cells in the epithelium of the respiratory tract increasing their activity.
(3) It increases the rate of heart beat and oxygen transportation through blood.
(4) It dilates peripheral blood vessels and increases the blood supply to skin.
(5) It contributes to the release of a large amount of lytic enzymes from lung tissue.

10. Which one of the following leucocytes can secrete heparin?
(1) Neutrophils (2) Basophils (3) Eosinophils
(4) Monocytes (5) Lymphocytes

11. Which of the following statements regarding human lymphatic system is **incorrect**?
(1) This system collects most of the interstitial fluid.
(2) It is connectd with the blood circulatory system.
(3) Peyer's patches are part of the lymphatic system.
(4) It is involved with immune responses.
(5) Like veins, lymph vessels lack valves.

12. Which of the following statements is **incorrect** regarding water potential?
(1) Water potential of vacuolar solution in root hair cell is higher than that of soil solution.
(2) Pure water has the highest water potential.
(3) Ascent of sap in the xylem takes place along a decreasing gradient of water potential.
(4) Cells of halophytic plants normally has a lower water potential.
(5) When transpiration takes place the water potential of outside air is lower than that of air inside the plant leaf.

13. Which one of the following statements regarding human hypothalamus is **incorrect**?
(1) It is derived from the embryonic fore-brain.
(2) It releases trophic hormones.
(3) It contains the thermoregulatory centre.
(4) It regulates hunger and thirst.
(5) It acts as a relay centre in brain.

14. Which of the following statements regarding the autonomic nervous system of man is **incorrect**?
(1) It plays an important role in homoeostasis.
(2) Its sympathetic activity predominates in emergency and stress situations.
(3) In the parasympathetic system, preganglionic fibres are short.
(4) Sympathetic stimulation causes bronchodilation.
(5) Parasympathetic stimulation increases peristalsis and secretions of small intestine.

15. Which of the following hormones is least likely to be associated with stress conditions?
(1) ACTH (2) Cortisol (3) Thyroxine
(4) Aldosterone (5) Noradrenaline

16. Which one of the following statements regarding receptors is **incorrect**?
(1) They function as transducers.
(2) In some receptors, continuous stimulation diminishes the response.
(3) They are always connected to the nervous system.
(4) Free nerve endings in human skin function as specific thermoreceptors.
(5) Merkel's discs are mechanoreceptors.

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17. Which of the following statements regarding excretion is **incorrect**?
(1) It is an essential process for life.
(2) Production of ammonia as an excretory product does not require energy.
(3) Carbon loss is high when uric acid is produced as an excretory product.
(4) First product of nitrogenous excretion in mammals is urea.
(5) Water conservation is highest when uric acid is produced as an excretory product.

18. Which one of the following is **not** an end-product of nitrogenous excretion?
(1) Ammonia (2) Urea (3) Creatinine
(4) Uric acid (5) Bile pigments

19. Which of the following statements regarding sarcomere of a skeletal muscle fibre is **incorrect**?
(1) It is the functional unit of muscle contraction.
(2) It is the area between two adjacent Z-lines.
(3) The I-band contains only thin filaments.
(4) A-band is shortened during muscle contraction.
(5) During muscle contraction H-zone is reduced.

20. Which of the following statements regarding both bone and cartilage is **incorrect**?
(1) Both are specialized connective tissues.
(2) Both contain lacunae.
(3) Both provide support and aid movements at joints.
(4) Both contain blood vessels.
(5) Matrix of both contain collagen.

21. Which of the following statements regarding movements in plants is **not** correct?
(1) Nyctinastic movements are associated with changes in turgor of parenchymatous cells.
(2) Movement of gametes of higher plants are tactic movements.
(3) Wrapping of plant tendrils around a support is a thigmotropic movement.
(4) In geotropic movements cytokinins play a major role.
(5) Opening and closing of a flower is a nastic movement.

22. Which of the following statements regarding human milk is correct?
(1) Its synthesis and release is regulated by prolactin.
(2) It is sweet due to sucrose.
(3) Its composition changes from feed to feed.
(4) It is rich in sodium and calcium ions.
(5) It can act as the sole food source to a newborn upto about 12 months.

23. Which of the following statements regarding capacitation of human sperms is **incorrect**?
(1) During capacitation some glycoproteins of sperm plasma membrane are altered.
(2) Highly motile sperms release trypsin.
(3) Acrosome reaction occurs only in capacitated sperms.
(4) Capacitated sperms can bind to receptors in zona pellucida.
(5) Capacitation starts in the epididymis.

24. Which of the following statements regarding parturition in women is **incorrect**?
(1) It usually occurs 36 weeks after fertilization.
(2) It results from a series of strong rhythmic contractions of the smooth muscles of myometrium.
(3) The signal for parturition comes from the foetus.
(4) About a week before parturition progesterone triggers the formation of oxytocin receptors in myometrium.
(5) Uterine stretch receptors play an important role in oxytocin release at parturition.

25. Which of the following plant growth substances are transported through the xylem?
(1) Auxins and Cytokinins (2) Cytokinins and Abscisic acid
(3) Gibberellins and Abscisic acid (4) Ethylene and Cytokinins
(5) Auxins and Gibberellins

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26. Which of the following statements is **incorrect** regarding parthenocarpy?
(1) Parthenocarpy occurs naturally in certain species of plants.
(2) Parthenocarpy can be induced by some plant growth substances.
(3) In parthenocarpy fruits are formed from the ovary without fertilization of ovules.
(4) Parthenocarpy is commonly seen in fruits such as banana.
(5) Parthenocarpic fruits contain infertile seeds.

27. Which of the following statements regarding *Selaginella* is **incorrect**?
(1) Two types of sporangia are produced.
(2) A motile stage is present in the life cycle.
(3) Embryo has a dormant period.
(4) Sporangia are produced in a strobilus.
(5) Gametophyte is dioceous.

⊙ Questions 28 and 29 are based on the following terms used in molecular genetics.

1. Transcription 2. Transformation 3. Conjugation 4. Replication 5. Translation

28. Process in which RNA is produced using a DNA template is
(1) 1. (2) 2. (3) 3. (4) 4. (5) 5.

29. Process in which amino acids are assembled at a ribosome to form a polypeptide is
(1) 1. (2) 2. (3) 3. (4) 4. (5) 5.

30. In a variety of Pea, the tall plant is dominant (T) and the short plant is recessive (t). In the same variety, yellow coloured seed is dominant (Y) and the green coloured seed is recessive (y). A cross between two plants resulted in 296 tall plants with yellow seeds and 104 tall plants with green seeds. Which of the following is most likely to be the genotypes of the parent plants?
(1) TTYY × TTYY (2) TTyy × TTYy (3) TtYy × TtYy
(4) TtYy × TTYy (5) TtYY × Ttyy

31. In DNA replication, which of the following is catalysed by DNA polymerase?
(1) Unwinding of double helix.
(2) Breaking of sugar phosphate bonds of each strand.
(3) Addition of a phosphate group to the 3' carbon or 5' carbon of ribose.
(4) Addition of a nucleotide with a base complementary to the base in the template strand to the new DNA strand.
(5) Formation of double stranded DNA by intertwining the two nucleotide strands.

32. A true breeding white flowered plant is crossed with a true breeding red flowered plant of the same species. The resulting F_1 generation had all pink flowered plants. The F_2 offspring resulting from self crossing of F_1 offspring, produced red flowered plants, white flowered plants and pink flowered plants. Which one of the following interactions between alleles is the likely cause for the above?
(1) Incomplete dominance (2) Polyallelism (3) Linkage
(4) Epistasis (5) Polygenic inheritance

33. Which of the following **cannot** be attributed to global warming?
(1) Tsunami (2) Tropical storms
(3) Spreading of malaria (4) Changes in rainfall pattern
(5) Inundation of coastal lowlands

34. This question is based on the following statements regarding natural resources.
(a) All non-exhaustible resources are non-living.
(b) All recyclable resources are non-living.
(c) All renewable resources are living.
(d) All living resources are renewable.
(e) All non-living resources are recyclable.

Which of the above statements are correct?
(1) (a) and (b) only (2) (b) and (d) only
(3) (a), (b), (c) and (d) only (4) (a), (b) and (d) only
(5) (a), (b), (d) and (e) only

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35. Which of the following biochemical processes in the nitrogen cycle is carried out only by chemoautotrophic bacteria?
(1) Proteolysis (2) Nitrification (3) Denitrification
(4) Nitrogen fixation (5) Ammonification

36. Which of the following is **not** an application of bioremediation?
(1) Treatment of human disorders using products of genetically modified organisms.
(2) Decreasing organic waste content in aquatic environments.
(3) Removal of oil spills from aquatic environments.
(4) Removal of toxic metals from industrial waste.
(5) Accelerating the composting processes.

37. All people exposed to infectious microorganisms do not become ill because healthy human body has evolved many mechanisms to prevent and overcome the invasion and growth of such microorganisms. Which of the following is **not** such a mechanism?
(1) Skin acting as a physical barrier to microorganisms
(2) Tear and mucous secretions controlling the invasion of microorganisms
(3) Low pH of gastric juice destroying many microorganisms
(4) Inflammatory responses
(5) Antibiotics produced by normal microbiota in human body destroying invading microorganisms

38. Which of the following pathogenic organisms produce an endotoxin?
(1) *Clostridium botulinum* (2) *Salmonella typhi*
(3) *Vibrio cholerae* (4) *Corynebacterium diphtheriae*
(5) *Staphylococcus aureus*

39. Some hormones associated with reproduction of man, their sites of secretion and their functions are given below.

Hormone	Site of secretion	Function
I. Progesterone	i. Ovary	a. Stimulation of secretion of testosterone
II. LH	ii. Hypothalamus	b. Enlargement of breast
III. GnRH	iii. Corpus luteum	c. Stimulation of menstruation
IV. Oestrogen	iv. Anterior pituitary	d. Stimulation of secretion of inhibin

Which of the following correctly indicates the hormone, its site of secretion and function?
(1) III, ii, d (2) II, ii, d (3) I, iii, b (4) IV, i, c (5) II, iv, a

40. Some environmental issues, their causative factors and their impacts are given below.

Environmental issue	Causative factor	Impact
a. Global warming	Water vapour	Changes in distribution of vegetation
b. Acid rain	Oxides of nitrogen	Reduction in soil fertility
c. Increase in UV radiation	Chlorofluorocarbon	Reduction of crop yield
d. Ozone depletion	Methane	Increased incidences of cataract

Which of the above combinations is/are correct?
(1) b only (2) b and d only (3) a, b and d only
(4) a, b and c only (5) b, c and d only

⊙ **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.

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41. Which of the following is/are not found in all organisms?
(A) Cytoskeleton (B) Mitochondria (C) Ribosomes
(D) Presence of DNA outside the nucleus (E) RNA

42. Which of the following carbohydrates gives/give a positive reaction in Benedict's test?
(A) Lactose (B) Glucose (C) Sucrose
(D) Maltose (E) Ribose

43. Which of the following structures can be seen in all echinoderms?
(A) Central disc, spines, respiratory trees (B) Arms, pedicellaria, cloaca
(C) Radial nerves, coelom, gonadal ducts (D) Tube-feet, endoskeleton, water vascular system
(E) Anus, pinnules, eyespots

44. A chordate possesses the following features.
(a) External fertilization (b) Larval stages
(c) Oviparity (d) Eyelids
Other features that could be found in this animal are
(A) limbs, homoiothermy and cartilage.
(B) scales, dermal glands and tail.
(C) 3-chambered heart, middle ear and bony skeleton.
(D) teeth, 10 pairs of cranial nerves and lungs.
(E) nictitating membrane, external auditory meatus and hair.

45. Larvae of insect species A feeds only on the leaves of plant species B. Insect species C lays eggs only in the bodies of larvae of species A. The larvae of species C feeds on internal tissues of larvae of species A ultimately killing them. Bird species D feeds on species A and C.
Which of the following statements regarding above information is/are correct?
(A) Species A and species C have a symbiotic association.
(B) Mode of nutrition of species A is holozoic.
(C) Association between species C and D is commensalism.
(D) In this community, species D represents the 3rd trophic level.
(E) Mode of nutrition of larvae of species C is holozoic.

46. Which of the following statements regarding smooth muscle fibres is/are correct?
(A) They are long and branched. (B) They contain sarcomeres.
(C) They do not fatigue easily. (D) They are elastic.
(E) They are multinucleate.

47. Which of the following diseases can be inherited?
(A) Cystic fibrosis (B) Sickle cell anaemia (C) Tuberculosis
(D) AIDS (E) Poliomyelitis

48. Which of the following statements regarding ecosystems is/are **incorrect**?
(A) Spider population in Bundala national park ecosystem may be threatened due to illegal exportation.
(B) The amount of biomass of primary producers available for primary consumers in an ecosystem is indicated by Net Primary Productivity.
(C) Biosphere consists of a large number of ecosystems on earth which are interconnected with each other.
(D) Micro-organisms are essential for the flow of energy through an ecosystem.
(E) A recent survey showed that the wild elephant population in forest ecosystems in Sri Lanka has increased.

49. Select the group/groups which contains/contain an organism that differs from the other two when endemicity, indigenicity or flagshipness is considered.
(A) *Dipterocarpus zeylanicus, Garcinia quesita, Puntius nigrofasciatus*
(B) Indian flycatcher, Indian pitta, barn swallow
(C) *Loris tardigradus, Caryota urens, Ophicephalus striatus*
(D) *Oreochromis mossambicus, Chitala chitala, Ichthyophis glutinosus*
(E) Bengal tiger, Giant panda, blue magpie

50. Which of the following diseases is/are caused by bacteria?
(A) Typhoid (B) Poliomyelitis
(C) Leptospirosis (D) Botulism
(E) Rabies

* * *