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ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka
අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2011 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2011 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2011

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 is a disaccharide?
(1) Fructose (2) Maltose (3) Ribose
(4) Galactose (5) Glyceraldehyde

2. Which one of the following properties of water is most directly responsible for maintaining body temperature of warm blooded animals?
(1) High latent heat of fusion (2) High adhesive and cohesive forces
(3) High latent heat of vaporization (4) High specific heat (5) Polarity

3. Which one of the following structure - function relationships is **incorrect**?
(1) Nucleus – Ribosome synthesis
(2) Microbodies – Photorespiration in plants
(3) Lysosomes – Detoxification
(4) Mitochondria – Synthesis of ATP
(5) Golgi complex – Synthesis of glycolipids

4. Which one of the following m[illegible]holic processes is exergonic?
(1) $ADP + P_i \longrightarrow ATP + H_2O$
(2) $6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$
(3) $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$
(4) Amino acids $\longrightarrow$ Protein
(5) Glycerol + Fatty acids $\longrightarrow$ Fat

5. Description of a type of plant cell is given below.

Vacuolated cells, living at maturity, have thin primary cell walls, usually isodiametric, metabolically active, storage cells, found in both primary and secondary tissues of plants.

Which of the following cell types fits into the above description?
(1) Sieve tube cells (2) Companion cells
(3) Parenchyma cells (4) Collenchyma cells
(5) Sclerenchyma cells

6. The action spectrum of photosynthesis is a graph showing
(1) the amount of light absorbed by pigments at different wavelengths of light.
(2) the amount of light absorbed by pigments at different times of the day.
(3) the rate of phtosynthesis at different wavelengths of light.
(4) the amount of CO_2 absorbed at different wavelengths of light.
(5) the rate of photosynthesis at different light intensities.

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7. Members of the group Lycophyta
   (1) are aquatic.
   (2) produce gametophytes which are non-photosynthetic.
   (3) are always homosporous.
   (4) have no vascular tissues.
   (5) depend on external water for fertilization.

8. Some characteristics of three animals labelled A, B and C are as follows.
   (i) All three animals show bilateral symmetry and cephalization.
   (ii) Alimentary canals of A and B are complete while in C it is incomplete.
   (iii) Gills and dorsal hearts are present only in A and B.
   (iv) A has an exoskeleton, B has an endoskeleton and C does not have an exoskeleton or an endoskeleton.

   The animals labelled A, B and C are respectively
   (1) prawn, squid and tapeworm.
   (2) snail, tilapia and earthworm.
   (3) sea turtle, tuna and *Planaria*.
   (4) crab, snail and liver fluke.
   (5) prawn, mussel and tapeworm.

9. Which of the following characters could be seen in both Annelida and Echinodermata?
   A - Well developed coelom
   B - Nephridia
   C - External fertilization
   D - Gills
   E - Larval stages
   F - Cephalization

   (1) B, D and E only
   (2) A, C and D only
   (3) A, C, D and E only
   (4) A, C, D and F only
   (5) A and E only

10. Which one of the following is **not** a contributory factor for gastritis?
   (1) Consumption of alcohol
   (2) Skipping breakfast
   (3) Tuberculosis
   (4) Mental stress
   (5) Consumption of diets deficient in fibres

11. Some respiratory structures found in the animal kingdom are as follows.
   A - Lungs B - Book lungs C - Trachea
   D - Internal gills E - External gills F - Body covering

   Which of the above are used by vertebrates for respiratory gas exchange?
   (1) A only
   (2) A and D only
   (3) A, D and E only
   (4) A, D, E and F only
   (5) A, C, D, E and F only

12. Which of the following processes does **not** involve active transport of material?
   (1) Transport of soil mineral nutrients into plant root hair cells
   (2) Transport of K^+ into guard cells during stomatal movement
   (3) Transport of sugar from mesophyll cells of leaves into sieve tube cells
   (4) Transport of photosynthetic products from one sieve tube cell to another sieve tube cell.
   (5) Transport of mineral nutrients through cell wall to the symplast

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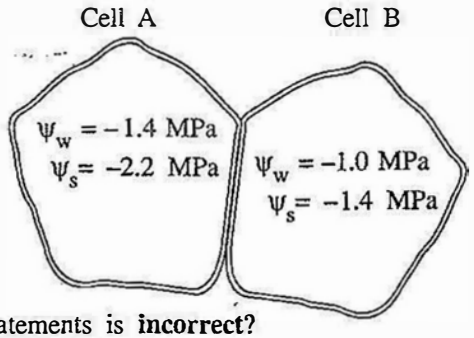
13. A and B are two plant cells adjacent to each other. The ψ_w and ψ_s values of the two cells are indicated in the diagram.



Which one of the following statements is **incorrect?**

(1) Water will move from cell B to cell A.
(2) Movement of water will occur until ψ_w of the two cells are equal.
(3) ψ_p of cell A is 1.0 MPa.
(4) ψ_p of cell B is 0.6 MPa.
(5) The ψ_w and ψ_s values of normal plant cells are always negative.

14. Some statements regarding the basic plan of the blood circulatory system of mammals are given below.

A - Dorsal aorta is formed by the 4th pair of aortic arches of the basic plan.
B - Carotid arteries are formed by the 2nd pair of aortic arches of the basic plan.
C - The 3rd and 5th aortic arches of the basic plan are lost.
D - The 6th pair of aortic arches of the basic plan form pulmonary arteries.

Which of the above statements is/are correct?

(1) A and D only (2) A and B only (3) C only
(4) B and D only (5) D only

15. Blood circulatory systems found among animals are as follows.

A - Open circulatory system.
B - Closed single circulatory system.
C - Closed double circulatory system.

Which of the following indicates in correct order, the animals which possess the above circulatory systems A, B and C?

(1) Spider, snail and rat (2) Centepede, *Ichthyophis* and bat
(3) Crab, earthworm and turtle (4) Sea urchin, shark and crow
(5) Cockroach, *Nereis* and octopus

16. A person developed a tumour between pons varoli and thalamus affecting the functions carried out by that region of the brain. Which of the following could be most affected by this tumour?

(1) Movement of eyes (2) Maintenance of balance
(3) Memory (4) Control of respiration
(5) Speech

17. Which of the following statements regarding a motor neurone of man at the stage of not transmitting an impulse is correct?

(1) Inner surface of the plasma membrane of neurone is negatively charged compared to outside due to entering of higher number of anions than that goes out.
(2) Major anion inside the neurone is Cl^-.
(3) Concentration of Na^+ and organic anions is higher inside the neurone than outside the neurone.
(4) Na^+ K^+ pump is maintained by active transport that involves carrier proteins.
(5) Permeability of plasma membrane for Na^+ is higher than that for K^+.

18. Which of the following best indicates the site of organ of Corti?

(1) Cochlea (2) Cochlear canal (3) Inner ear
(4) Membranous labyrinth (5) Sacculus

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19. Some excretory structures found in the animal kingdom and examples for the animals having those structures are given below. Which of these excretory structure - example combinations is **incorrect?**
(1) Salt glands - Tilapia
(2) Green glands - Prawn
(3) Nephridia - Leech
(4) Flame cells - *Bipalium*
(5) Malphigian tubules - Honey bee

20. In man, a well developed centrum, a long neural spine and long transverse processes could be seen in
(1) lumbar vertebrae only.
(2) thoracic vertebrae only.
(3) lumbar and thoracic vertebrae only.
(4) 6th cervical, lumbar and thoracic vertebrae only.
(5) thoracic, lumbar and sacral vertebrae only.

21. When a cross section of an organ of man was examnied under a microscope, ciliated cells, goblet cells and lacunae containing one or two cells were observed. This organ could be the
(1) liver. (2) trachea. (3) oviduct. (4) intestine. (5) kidney.

22. This question is based on the following animal groups:
A - Crustacea B - Vertebrata C - Mollusca D - Radiolaria
Which of the above groups include/includes animals with exoskeletons as well as animals with endoskeletons?
(1) B only (2) B and C only (3) B, C and D only
(4) A and C only (5) A and D only

23. Which one of the following plant tissues/cells contains suberin?
(1) Epidermis (2) Endodermis (3) Sclerides (4) Trachieds (5) Sieve tubes

24. In angiosperms, which of the following does **not** develop from the fertilized ovum?
(1) Cotyledons (2) Plumule (3) Radicle (4) Endosperm (5) Hypocotyl

25. Which one of the following classes of plant hormones are essential for mitosis and cell division?
(1) Auxins (2) Gibberellins
(3) Abscisic acid (4) Cytokinins
(5) Ethylene

26. Diploid stage of the life cycle is shortest in
(1) *Pogonatum.* (2) *Nephrolepis.* (3) *Selaginella.* (4) *Cycas.* (5) *Musa.*

27. This question is based on the following statements regarding the human ovum.
A - At the time of ovulation, it is in the metaphase of the first meiotic division.
B - It releases the first polar body immediately after ovulation.
C - It is multicellular because granular cells of corona radiata are attached to it.
D - It has a dense cytoplasm with minute amount of yolk.
E - It is usually fertilized in the Fallopian tube.
Which of the above statements is/are correct?
(1) A and B only (2) A, B and C only
(3) B, C, D and E only (4) D and E only
(5) E only

28. Which of the following statements regarding seminal fluid of man is correct?
(1) Its pH is 6.5 - 7.0.
(2) It contains ascorbic acid.
(3) About 40% of it is secreted by seminal vesicles.
(4) It contains proteins to provide energy for the movement of sperms.
(5) It contains substances that help in capacitation of sperms.

29. Which of the following are examples for bisexuality, unisexuality and parthenogenesis respectively?
(1) Mosquito, prawn, *Cycas* (2) Earthworm, cat, honey bee
(3) *Hibiscus*, dog, *Cycas* (4) Sea urchin, bat, honey bee
(5) Centepede, *Cycas*, whale

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30. Which of the following is arranged in correct order by size, from largest to smallest?
(1) Chromosome → gene → nucleotide → nitrogenous base
(2) Codon → chromosome → gene → nucleotide
(3) Chromosome → gene → nitrogenous base → nucleotide
(4) Gene → chromosome → codon → nucleotide
(5) Nucloeotide → chromosome → gene → codon

31. Three types of RNA are involved in the synthesis of proteins in cells. Which of the following shows the correct sequence of the participation of the three types of RNA in protein synthesis?
(1) mRNA, tRNA, rRNA
(2) rRNA, tRNA, mRNA
(3) tRNA, mRNA, rRNA
(4) tRNA, rRNA, mRNA
(5) rRNA, mRNA, tRNA

32. In a variety of pea, flower colour red (R) is dominant over white (r) and seed colour yellow (Y) is dominant over green (y). Assume that genes for flower colour and seed colour are on two different chromosomes. When two plants with red flowers and yellow seeds were crossed, 3/4 of the progeny were red flowered with yellow seeds and the remaining 1/4 were white flowered with yellow seeds. The genotypes of the parents are likely to be
(1) RRYY and rrYy.
(2) RrYY and RRYY.
(3) RrYy and RrYy.
(4) RrYy and RrYY.
(5) Rryy and RrYy.

33. The following are some steps occuring during the process of meiosis.
A - Formation of four daughter cells
B - Separation of homologous chromosomes
C - Exchange of genetic material
D - Duplication of chromosomes
E - Division of cytoplasm
F - Pairing of homologous chromosomes
Which of the following is the correct order of steps of meiosis?
(1) DCBEFA
(2) FDBCEA
(3) DFCBEA
(4) FDECBA
(5) DBFEBA

34. In genetic engineering technology several enzymes are used to produce recombinant DNA. Which one of the following enzymes is used to recognize and cut a specific sequence of nucleotide bases in DNA?
(1) Exonuclease
(2) Ligase
(3) Polymerase
(4) Restriction endonuclease
(5) Deoxyribonuclease

35. Which of the following ecosystems has evergreen trees with continuous canopy?
(1) Dry mixed evergreen forest
(2) Thorn forest
(3) Montane forest
(4) Tropical rain forest
(5) Mangrove forest

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36. Which of the following statements regarding air pollutants is correct?
(1) Sulphur dioxide, oxides of nitrogen and chlorofluorocarbon are found to be associated with high incidence of lung cancer.
(2) Hydrocarbons and ozone reduce the resistance of the human body to pneumonia.
(3) Particulate matter and hydrocarbons can be carcinogenic and may reduce primary productivity.
(4) Carbon monoxide and sulphur dioxide cause eye irritation.
(5) Ozone cannot be considered as an air pollutant because it contributes to the maintenance of the ozone layer in the atmosphere.

37. Some categories of threatened organisms given in the IUCN red data book with examples are given below. Which one of the following IUCN category - example combinations is correct?
(1) Extinct - Tuatara
(2) Critically endangered - Loggerhead turtle
(3) Endangered - Leatherback turtle
(4) Vulnerable - Asian elephant
(5) Near threatened - Marsh crocodile

38. Which of the following international conventions / protocols is concerned with global climatic change?
(1) Basel convention
(2) Marpol convention
(3) Montreal protocol
(4) Kyoto protocol
(5) Biodiversity convention

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39. W... lowing antimicr... of bacteria by inhibiting the synthesis of DNA?
... mycin ... acin ... ole
(3) Polymyxin

40. Which one of the following stages ... n nature is carried out by chemoautotrophic bacteria?
(1) Proteolysis ... onification
(4) Denitrification ... itrogen fixation
(3) Nitrification

For each of the questions 41 to 50 one ... more of the responses is/are correct. Decide which of the 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. Which of the following characteristics is/are common to Domains Archea and Eukarya?
(A) Presence of several kinds of RNA polymerases
(B) Non-sensitivity to antibiotics
(C) Presence of branched lipid molecules in the cell membrane
(D) Absence of peptidoglycans in the cell wall.
(E) Eukaryotic cellular organization

42. Which of the following statements is/are correct regarding essential elements in plants?
(A) They are components of the structural material in plants.
(B) Plants cannot complete the life cycles without these nutrients.
(C) Plants show deficiency symptoms when some of the essential elements are in short supply.
(D) Atmosphere is the major reservoir of essential elements.
(E) All essential elements are macronutrient elements.

43. Which of the following statements regarding reflex arcs of man is/are **incorrect**?
(A) They help to control many involuntary actions.
(B) Responses resulting due to their involvement are automatic.
(C) They generally consist of two neurones.
(D) They connect the receptor and effector organs through the autonomic nervous systems.
(E) They are the functional units of the nervous system.

44. Which of the following statements regarding human skin is/are **incorrect**?
(A) All four types of basic tissues can be seen in the dermis.
(B) It excretes salts and urea.
(C) Nerve endings do not penetrate into the epidermis.
(D) Epidermis is a stratified squamous epithelium containing glands.
(E) It synthesizes vitamin D.

45. Which of the following endocrine glands in man secrete hormones that are responsible for the regulation of functioning of the kidney?
(A) Hypothalamus, adrenal medulla, posterior pituitary
(B) Posterior pituitary, adrenal cortex, thymus
(C) Anterior pituitary, hypothalamus, posterior pituitary
(D) Hypothalamus, parathyroids, adrenal cortex
(E) Hypothalamus, thyroid, pancreas

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46. Which of the following statements regarding human kidney is/are **incorrect**?
(A) Glomeruli of cortical nephrons have fewer number of capillaries than those of juxta-medullary nephrons.
(B) Water is never reabsorbed actively in the kidney.
(C) Amino acids are actively reabsorbed in the kidney.
(D) Excess of vitamin D is secreted in the kidney.
(E) Thoracic vertebrae are also located at the same level of the kidneys.

47. Which of the following could be seen in a six month old human male foetus?
(A) Wrinkled skin
(B) Eye lashes
(C) Fused eye lids
(D) Nails extended to the tip of the fingers
(E) Scrotum with descended testicles

- Questions **48** and **49** are based on the following microrganisms.
(A) *Saccharomyces cerevisiae*
(B) *Acetobacter aceti*
(C) *Clostridium tetani*
(D) *Corynebacterium diptheriae*
(E) *Salmonella typhi*

48. Which of the above organisms is/are important for the production of vinegar from toddy?

49. Which of the above organisms produce/produces exotoxins?

50. Which of the following substances are generally transported in the xylem?
(A) Nitrates
(B) Water
(C) Phosphates
(D) Vitamins
(E) Auxins

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උසස් පෙළ විද්‍යා/ගණිත/කලා/වාණිජ හා තාක්ෂණ විෂය ධාරාවන්ට අදාළ සියලුම ප්‍රශ්න පත්‍ර/සටහන් හා තවත් බොහෝ දෑ ලබා ගැනීමට පිවිසෙන්න www.alevelapi.com වෙත.