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Department of Examinations, Sri Lanka

අධ්‍යාපන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2013 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2013 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2013

නව නිර්දේශය
புதிய பாடத்திட்டம்
New Syllabus

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உயிரியல் I
Biology I

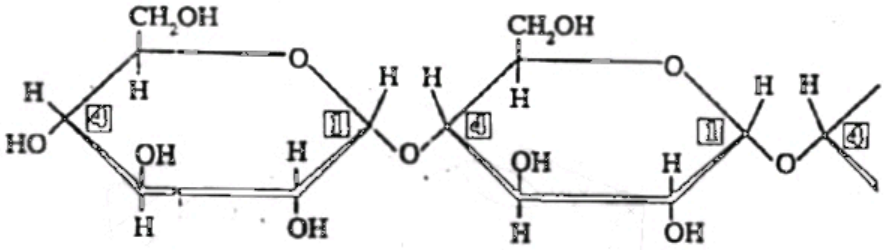
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පැය දෙකයි
இரண்டு மணித்தியாலங்கள்
Two hours

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. Structure of a part of a polysaccharide molecule is shown in the diagram. What is the type of bond involved in joining the monosaccharide molecules?



(1) Peptide bonds (2) Hydrogen bonds (3) Disulphide bonds
(4) Glycosidic bonds (5) Ionic bonds

2. Which of the following are found only in plants?
(1) 80 S ribosomes (2) Endoplasmic reticulum (3) Plasmids
(4) Glyoxisomes (5) Golgi complex

3. Approximately what percentage of ATP is produced by the electron transport system in cellular aerobic respiration of glucose?
(1) 63% (2) 58% (3) 89% (4) 11% (5) 79%

4. Which of the following is incorrect regarding glycolysis?
(1) ATP is produced. (2) ATP is utilized.
(3) $NADH_2$ is produced. (4) CO_2 is released.
(5) Occurs in the cytosol.

5. Which of the following structures can be seen in Phylum Mollusca as well as in Phylum Platyhelminthes?
(1) Ganglia, gills, suckers (2) Nerve cords, excretory ducts, anus
(3) Nerve ring, eye spots, mucous glands (4) Chemoreceptors, tentacles, nephridia
(5) Statocysts, hooks, gonadal ducts

6. Which of the following statements regarding the characteristic features of vertebrate classes with homoiothermic animals is correct?
(1) All vertebrate classes with homoiothermic animals have viviparous animals.
(2) All vertebrate classes with ovoviviparous animals have homoiothermic animals.
(3) All vertebrate classes with animals having nictitating membranes have homoiothermic animals.
(4) All vertebrate classes with homoiothermic animals have animals with 12 pairs of cranial nerves.
(5) All vertebrate classes with animals showing internal fertilization have homoiothermic animals.

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7. Members of the Domain Archaea
   (1) have cell walls which lack peptidoglycans.
   (2) are ubiquitous.
   (3) have only one type of RNA polymerase.
   (4) are sensitive to many antibiotics.
   (5) have cell membranes which contain unbranched lipids.

8. Which of the following is correct regarding the members of Phylum Rhodophyta?
   (1) They are either unicellular or multicellular.
   (2) Contain chlorophylls, carotenes and xanthophylls.
   (3) Reproductive cells do not have flagella.
   (4) Cell walls contain cellulose and pectin.
   (5) Mannitol is a stored food.

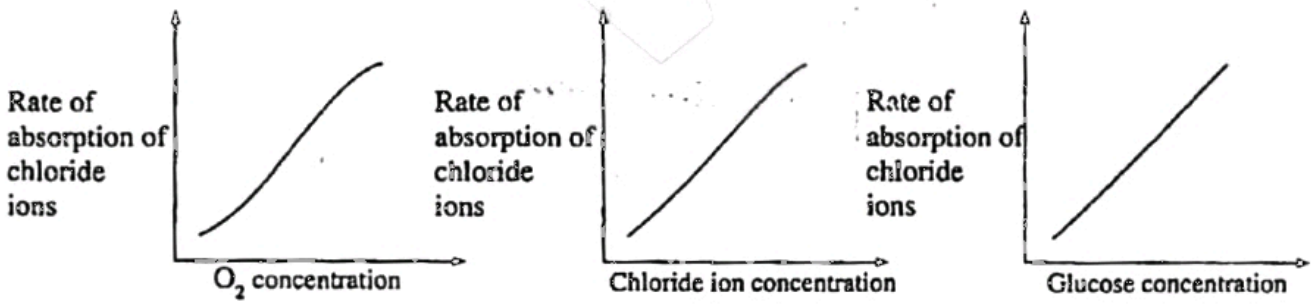
9. Function of which one of the following enzymes of man cannot be substituted by any other enzyme?
   (1) Dipeptidase (2) Trypsin (3) Chymotrypsin
   (4) Carboxypeptidase (5) Maltase

10. This question is based on the blood circulatory systems of the following animals.
    a. Turtle b. Slug c. *Ichthyophis* d. Cockroach
    e. Octopus f. Spider g. *Nereis*
    Which of the above animals have an open blood circulatory system?
    (1) a, c and g only (2) a and c only (3) b and e only
    (4) b, d, e and f only (5) d and f only

11. Which one of the following statements regarding SA node of man is correct?
    (1) It is located in the wall of right auricle close to inter-auricular septum.
    (2) Purkinje fibres originate from it.
    (3) It is stimulated by the impulses received from the pacemaker of heart.
    (4) Stimulus for heart beat originates from it.
    (5) It consists of nervous tissue.

12. Which of the following is not transported by phloem tissue in plants?
    (1) Potassium ions (2) Phosphate ions (3) Vitamins
    (4) Nitrate ions (5) Herbicides

13. The graphs below show the effect of various factors on the rate of absorption of chloride ions by discs of carrot tissue from a solution in a flask.



(a) (b) (c)

Which of the above graphs support/supports the hypothesis that chloride ion absorption by carrot tissue involves active transport?
(1) a and b only (2) b and c only (3) a and c only
(4) a, b and c (5) c only

14. Which one of the following statements regarding the end products of nitrogenous excretion is correct?
    (1) Urea is the least toxic nitrogenous waste product in vertebrates.
    (2) Excretion of urea requires a large amount of water due to its high solubility.
    (3) Due to excretion of urea, loss of carbon from body is high.
    (4) Main nitrogenous excretory product of aquatic birds is uric acid.
    (5) Creatine is a nitrogenous excretory product of mammals.

15. If proteins are present in the urine of a person, which of the following structures could have been damaged?
(1) Bowman's capsule
(2) Proximal convoluted tubule
(3) Descending limb of loop of Henle
(4) Ascending limb of loop of Henle
(5) Glomerulus

16. Which one of the following statements regarding human skeletal muscle contraction is incorrect?
(1) A motor nerve stimulation is essential for its initiation.
(2) Cross bridges are formed between myosin heads and actin binding sites.
(3) Actin filaments shorten.
(4) I-bands shorten.
(5) Calcium ions are essential for the formation of cross bridges.

17. Which of the following statements regarding human pelvis is incorrect?
(1) Pelvis is a basin-shaped structure formed by sacrum, coccyx and innominate bones.
(2) Ilium is the largest bone of pelvis.
(3) Acetabulum is a deep lateral depression in the pelvis.
(4) Pubis bears most of the body weight when we are seated.
(5) Compared to the male pelvis the female pelvis is more shallow and rounded.

18. Which of the following statements regarding nervous systems is correct?
(1) All multicellular animals possess a nervous system.
(2) Neurone is the functional unit of the human nervous system.
(3) Parasympathatic nervous system prepares a person for an emergency.
(4) Resting potential of a human motor neurone is about -40 mV.
(5) Larger the diameter of an axon, faster would be the speed of conduction of an impulse.

19. Which one of the following statements regarding the action potential of a neurone is incorrect?
(1) It is a transient reversal of polarity of axolemma.
(2) A threshold stimulus is required to produce it.
(3) Its depolarization phase is due to influx of Na^+.
(4) Na^+ K^+ pump is not essential for its completion.
(5) It is self propagating.

20. Which of the following statements regarding homoeostasis in man is incorrect?
(1) It is the maintenance of a constant internal environment.
(2) It is mediated via negative feedback mechanisms.
(3) Blood urea level is homoeostatically regulated.
(4) Liver plays an important role in homoeostasis.
(5) Homoeostatic mechanisms are mainly involuntary.

21. Some parts of human brain and their functions are given below. Which of the following "part of the brain - function" combination is incorrect?
(1) Hypothalamus - Regulation of hunger
(2) Medulla oblongata - Regulation of rate of heart beat
(3) Cerebellum - Regulation of posture
(4) Temporal lobe - Regulation of speech
(5) Thalamus - Integration of sensory information

22. Which of the following statements regarding human lactation is incorrect?
(1) It is the production and release of milk from mammary glands.
(2) Oxytocin is involved in the milk ejection reflex.
(3) Progesterone suppresses milk production.
(4) Baby's suckling is essential for maintenance of milk production.
(5) Human placental lactogen enhances milk production.

23. Which of the following statements regarding human male reproductive system is correct?
(1) Inhibin inhibits the secretion of LH.
(2) Vas deferens is the main site of sperm storage.
(3) Capacitation of sperms occurs in the epididymis.
(4) Bulk of the seminal fluid is produced by prostate gland.
(5) Seminal vesicle secretion is a rich source of prostaglandins.

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24. Which of the following statements regarding human reproduction is correct?
(1) Acrosome reaction of sperms is necessary for penetration of corona radiata.
(2) Cortical reaction of ovum prevents polyspermy.
(3) During ovulation a primary oocyte is ejected from Graafian follicle.
(4) Fertilization should occur within 48 hours after ovulation.
(5) Oogenesis starts after puberty.

25. In angiosperms, meiosis occurs during the formation of
(1) pollen mother cells. (2) embryo sac. (3) megasporangium.
(4) megaspore mother cell. (5) nuclei in the pollen tube.

26. In *Selaginella*, meiosis occurs during the formation of
(1) spores. (2) gametophyte. (3) gametes.
(4) sporophyte. (5) embryo.

27. Which one of the following features distinguishes *Nephrolepis* from *Pogonatum*?
(1) Presence of well developed vascular system
(2) Absence of heterospory
(3) Presence of alternation of generation in the life cycle
(4) Requirement of external water for fertilization
(5) Nutritionally independent sporophyte

28. In mice, grey fur colour (G) is dominant to black fur colour (g). Expression of colour is determined by another gene with a pair of alleles where the dominant allele (C) expresses colour and recessive allele (c) indicates albinism. When a grey coloured mouse was bred with a black coloured mouse, the resultant progeny had a phenotypic ratio of 3 grey : 3 black : 2 albino. Which of the following indicates the genotypes of the parents?
(1) GGCc × ggCC (2) GGCC × ggCc (3) GGCc × ggCc
(4) GgCC × ggCc (5) GgCc × ggCc

29. A man of blood group A married a woman of blood group B. Their first child is of blood group O. The identical twin sister of this woman married a man of blood group AB and the possible blood groups of their children are
(1) B and AB only. (2) A and B only. (3) A and AB only.
(4) A, B and AB only. (5) A, B, AB and O.

30. If a DNA molecule contains 8000 nucleotides of which 20% are adenine, the number of guanine nucleotides present in this DNA molecule is
(1) 1600. (2) 2000. (3) 2400. (4) 3200. (5) 1000.

31. Which of the following is not a current application of genetic engineering in plants?
(1) Production of plants resistant to herbicides
(2) Production of plants which can fix nitrogen
(3) Production of plants with insecticidal proteins
(4) Production of plants resistant to viral diseases
(5) Production of nutrient rich plants

32. Which one of the following animals has the highest risk of becoming extinct in the near future?
(1) Leatherback turtle (2) Asian elephant (3) Giant tortoise
(4) Lamp shell (5) Blue magpie

33. Which of the following groups of organisms appeared on land first?
(1) Conifers (2) Insects (3) Amphibians
(4) Angiosperms (5) Spiders

34. Which of the following Acts and Conventions has helped most to protect the environment of Sri Lanka?
(1) National Environmental Act (2) Fauna and Flora Protection Act (3) CITES
(4) Ramsar Convention (5) Biodiversity Convention

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35. Some air pollutants are given below.

a. Carbon monoxide
b. Sulphur dioxide
c. Oxides of nitrogen
d. Hydrocarbons
e. Chlorofluorocarbons
f. Ozone
g. Particulate matter

Which of the above pollutants aggravate asthma?

(1) a, b, c and g
(2) b, c, d and f
(3) c, d, e and f
(4) b, c, f and g
(5) a, c d and g

36. Which of the following is normally used to demonstrate microscopically, the presence of live yeasts?

(1) Soil suspension
(2) Toddy sample
(3) Yoghurt
(4) Pond water
(5) Piece of bread soaked in water

37. Which of the following genera contains facultatively anaerobic microorganisms?

(1) *Acetobacter*
(2) *Azotobacter*
(3) *Clostridium*
(4) *Saccharomyces*
(5) *Lactobacillus*

38. Which of the following sites in a healthy human body is not a natural habitat of microorganisms?

(1) Skin
(2) Lungs
(3) Small intestine
(4) Buccal cavity
(5) Genital organs

39. A person who had an infection of measles rarely develops the same infection again. This is an example of

(1) nonspecific immunity.
(2) artificially acquired passive immunity.
(3) artificially acquired active immunity.
(4) naturally acquired active immunity.
(5) naturally acquired passive immunity.

40. Viruses are different from bacteria because viruses

(1) cause diseases in plants and animals.
(2) have RNA and DNA.
(3) do not show a cellular organization.
(4) cannot be cultivated in the laboratory.
(5) are widely distributed in nature.

○ **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. Phosphorous is a structural element in which of the following?

(A) Proteins
(B) Carbohydrates
(C) Lipids
(D) Nucleic acids
(E) Chlorophylls

42. Which of the following features is/are common to both DNA and RNA?

(A) Both are polymers of nucleotides.
(B) Both have identical sugar molecules.
(C) Both are genetic material.
(D) Both have pyrimidine and purine bases.
(E) Both are double stranded.

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43. Which of the following statements regarding the human skeletal system is/are incorrect?
(A) Both parietal and frontal bones of the skull are paired.
(B) Cervical curvature of the vertebral column develops around 7-8 months after birth.
(C) It plays a role in homoeostasis.
(D) It produces both red and white blood cells.
(E) There are two longitudinal arches in the foot.

44. In which of the following plant movements the direction of the stimulus determines the direction of the response?
(A) Phototropism
(B) Geotropism
(C) Nyctinasty
(D) Thigmotropism
(E) Photonasty

45. Which of the following hormones of man act/acts on bones?
(A) Growth hormone
(B) Erythropoietin
(C) Parathormone
(D) Thyroxin
(E) Adrenaline

46. When stretch receptors of lungs are stimulated
(A) stimulation of apneustic area in Pons Varolii is inhibited.
(B) stimulation of inspiratory area of medulla oblongata stops.
(C) stimulation of pneumotaxic area in Pons Varolii is inhibited.
(D) expiratory area of medulla oblongata is stimulated.
(E) stimulation of chemoreceptors in aorta stops.

47. Some categories of species, examples for these categories and the habitats of these examples are given in the following table.

Species category	Example	Habitat
I. Invasive species	i. *Chitala ornata*	a. Fresh water bodies
II. Migratory species	ii. *Eichhornia crassipes*	b. Marine water
III. Indigenous species	iii. *Caretta caretta*	c. Rain forests
IV. Endemic species	iv. *Caryota urens*	

Which of the following combinations is/are correct?
(A) III, iv, c (B) IV, iii, b (C) I, ii, a (D) I, i, a (E) II, iii, a

48. Which of the following microorganisms cause/causes diseases when contaminated water and food are consumed?
(A) *Mycobacterium tuberculosis*
(B) *Leptospira interrogans*
(C) Polio virus
(D) *Salmonella typhi*
(E) *Clostridium tetani*

49. Which of the following microorganisms use/uses organic chemical compounds as sources of both energy and carbon for growth?
(A) *Nitrobacter*
(B) *Nostoc*
(C) *Saccharomyces*
(D) *Pseudomonas*
(E) *Nitrosomonas*

50. Which of the following is/are not surrounded by a membrane?
(A) Nucleus
(B) Lysosome
(C) Ribosome
(D) Plasmid
(E) Peroxisome

* * *