

පැරණි නිර්දේශය/பழைய பாடத்திட்டம்/Old Syllabus

OLD இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம்
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 Department of Examinations, Sri Lanka

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கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2020
General Certificate of Education (Adv. Level) Examination, 2020

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 உயிரியல் I
Biology I

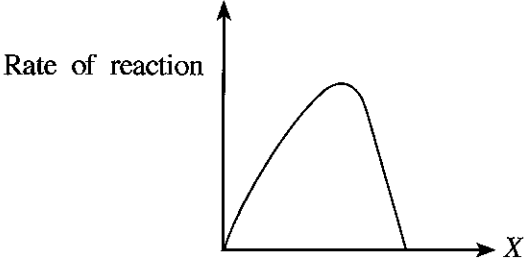
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පැය දෙකයි
இரண்டு மணித்தியாலம்
Two hours

Instructions:

- * Answer **all** questions.
- * Write your **Index Number** in the space provided in the answer sheet.
- * Instructions are given on the back of the answer sheet. Follow them carefully.
- * In each of the questions from 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 (x)** on the number of the correct option in accordance with the instructions given on the back of the answer sheet.

1. Which of the following is the basic structural unit of life?
 (1) Carbon atom (2) DNA molecule (3) RNA molecule
 (4) Cell (5) Tissue
2. High adhesive and cohesive forces of water help in
 (1) transpiration. (2) sweating.
 (3) blooming of flowers. (4) photosynthesis.
 (5) living in deep waters.
3. Generally, the highest magnification and resolution power of a compound light microscope are respectively
 (1) $\times 1000$ and 200 nm. (2) $\times 1000$ and 200 μm .
 (3) $\times 2000$ and 200 nm. (4) $\times 1500$ and 0.2 mm.
 (5) $\times 1500$ and 2 μm .
4. DNA synthesis of a cell occurs in
 (1) G_1 phase. (2) S phase. (3) M phase.
 (4) G_1 and S phases. (5) G_1 and G_2 phases.
5. The effect of a certain factor on the rate of an enzymatic reaction is shown in the following graph.



- Which of the following factors could be denoted by X axis?
- (1) pH
 - (2) Substrate concentration
 - (3) Enzyme concentration
 - (4) Concentration of inhibitors
 - (5) Temperature

6. Which of the following statements regarding C4 photosynthesis is correct?
- (1) It increases the efficiency of CO₂ fixation at high CO₂ concentrations.
 - (2) CO₂ fixation occurs only once.
 - (3) CO₂ fixing enzyme is Rubisco present in mesophyll cells.
 - (4) CO₂ acceptor in mesophyll cells is PEP.
 - (5) First stable product is a 3C acid.
7. During the glycolysis of a glucose molecule,
- (1) oxidative phosphorylation takes place.
 - (2) NADH is reduced to NADH₂.
 - (3) four ATP molecules are synthesized.
 - (4) two acetyl Co-A molecules are synthesized.
 - (5) one FADH₂ molecule is produced.
8. Animals having each of the structures, the hydrostatic skeleton, nerve ring and nephridia in correct sequence are
- (1) *Bipalium*, *Chiton* and sea lily.
 - (2) leech, octopus and sea cucumber.
 - (3) *Nereis*, sea urchin and squid.
 - (4) earthworm, cockroach and snail.
 - (5) leech, star fish and centipede.
9. Some major features of organisms of kingdom Plantae are given in the following table.

| Seeds | Flowers | Vascular tissues | Nature of spores |
|-------------|-------------|------------------|-------------------|
| A – Present | P – Present | R – Present | X – Homosporous |
| B – Absent | Q – Absent | S – Absent | Y – Heterosporous |

Select the response that indicates the correct combination of above features for each of the organisms given below.

- (1) *Cycas* – A, Q, R, X
 - (2) *Pinus* – A, P, R, Y
 - (3) *Nephrolepis* – B, Q, R, Y
 - (4) *Marchantia* – B, Q, S, X
 - (5) *Selaginella* – B, Q, S, X
10. Each of the following features can be seen in some of the six classes of phylum Chordata.
- A - Ctenoid scales
 - B - Three chambered heart
 - C - Pentadactyle limb
 - D - Neck
- When each of the above features are arranged as seen only in one, two, three or four classes of the phylum Chordata, the correct sequence is
- (1) A, B, C and D.
 - (2) A, B, D and C.
 - (3) A, C, B and D.
 - (4) A, C, D and B.
 - (5) A, D, B and C.
11. Nutrients needed for activation of enzymes, chlorophyll synthesis and ionic balance in plants are respectively
- (1) Mn, Mg and Ca.
 - (2) Cu, Mo and B.
 - (3) Mg, Fe and Cl.
 - (4) Zn, S and Fe.
 - (5) B, Mn and K.

12. Total lung capacity and some lung volumes of a particular person are as follows.

- Total lung capacity – 5500 ml
- Tidal volume – 500 ml
- Expiratory reserve volume – 1500 ml
- Inspiratory reserve volume – 2000 ml

The vital capacity, residual volume and the volume of air inhaled during a deep inspiration of this person in correct sequence are

- (1) 4000 ml, 1500 ml and 2500 ml.
 - (2) 4500 ml, 1500 ml and 2500 ml.
 - (3) 5500 ml, 5000 ml and 2500 ml.
 - (4) 4000 ml, 1500 ml and 1500 ml.
 - (5) 4000 ml, 1500 ml and 2000 ml.
13. Which of the following is used to measure the rate of transpiration?
- (1) Audus apparatus
 - (2) Membrane filter
 - (3) Potometer
 - (4) Respirometer
 - (5) Barometer
14. Several types of circulatory systems seen among animals and an example for each of these types are given below.
- A : Single circulatory system – Shark
 - B : Open circulatory system – Earthworm
 - C : Double circulatory system – Toad
- Select the correct combination/combinations of the above.
- (1) A only.
 - (2) B only.
 - (3) A and B only.
 - (4) A and C only.
 - (5) B and C only.
15. If tricuspid valve of a person does not close properly, some amount of
- (1) oxygenated blood will flow into left ventricle during auricular systole.
 - (2) oxygenated blood will flow into left auricle during ventricular systole.
 - (3) deoxygenated blood will flow into right ventricle during auricular systole.
 - (4) deoxygenated blood will flow into right auricle during ventricular systole.
 - (5) oxygenated blood will flow into right auricle during ventricular systole.
16. Embryonic origins of pons Varolii, hypothalamus and corpora quadrigemina in the human brain are respectively
- (1) fore brain, mid brain and hind brain.
 - (2) mid brain, fore brain and mid brain.
 - (3) hind brain, fore brain and hind brain.
 - (4) mid brain, mid brain and hind brain.
 - (5) hind brain, fore brain and mid brain.
17. Cardiovascular centre in the human brain is located in
- (1) cerebellum.
 - (2) cerebrum.
 - (3) medulla oblongata.
 - (4) thalamus.
 - (5) hypothalamus.
18. Stimulation of parasympathetic system of the autonomic nervous system of humans
- (1) dilates the pupil of the eye.
 - (2) inhibits saliva secretion.
 - (3) increases the rate of heart beat.
 - (4) promotes emptying of bladder.
 - (5) relaxes bronchi.

19. Select the correct combination of the human hormone and its function given below.
- (1) Calcitonin – Increases blood Ca^{2+} level
 - (2) Glucagon – Decreases blood glucose level
 - (3) Cortisol – Increases resistance to stress
 - (4) Aldosterone – Increases water loss through kidneys
 - (5) Oxytocin – Stimulates milk synthesis
20. Select the correct combination regarding excretory structures in animals.
- (1) Nephridia – Platyhelminthes
 - (2) Malpighian tubules – Annelids
 - (3) Green glands – Crustaceans
 - (4) Sweat glands – Reptiles
 - (5) Salt glands – Insects
21. Which of the following are normally **not** seen in the urine of a healthy man?
- (1) Albumin and glucose
 - (2) Creatinine and glucose
 - (3) Albumin and ammonium ions
 - (4) Glucose and potassium ions
 - (5) Albumin and creatinine
22. Select the correct statement regarding human appendicular skeleton.
- (1) Elbow joint permits only flexion and extension.
 - (2) Deep glenoid cavity in the scapula maximizes the movement of upper limb.
 - (3) Pectoral girdle directly articulates with the vertebral column.
 - (4) Femur is the weight bearing bone in the leg.
 - (5) Acetabulum formed by ilium and ischium articulates with tibia.
23. When observing slides A, B and C under the light microscope, following cells were observed in each of them.
- Slide A – Uninucleated, unbranched, non-striated cells
Slide B – Uninucleated, branched, striated cells
Slide C – Multinucleated, unbranched, striated cells
- The slides A, B and C respectively are likely to contain the tissues of
- (1) skeletal, smooth and cardiac muscles.
 - (2) skeletal, cardiac and smooth muscles.
 - (3) cardiac, smooth and skeletal muscles.
 - (4) smooth, skeletal and cardiac muscles.
 - (5) smooth, cardiac and skeletal muscles.
24. Cells that are alive at maturity and provide support in plants are present in
- (1) xylem vessels.
 - (2) cork.
 - (3) tracheids.
 - (4) sieve tube elements.
 - (5) collenchyma.
25. Select the correct statement regarding female reproductive system of humans.
- (1) At birth, two ovaries contain a large number of secondary follicles.
 - (2) Endometrium of the uterus contains smooth muscle layers.
 - (3) Thickening of endometrium occurs due to progesterone secreted by growing follicles.
 - (4) Implantation in uterus occurs at the morula stage of embryo.
 - (5) Luteal phase of the ovarian cycle coincides with the secretory phase of the uterine cycle.
26. By the end of third month of pregnancy, human foetus contains
- (1) external ears.
 - (2) separated eye lids.
 - (3) hardened head bones.
 - (4) a wrinkled skin.
 - (5) a fine hair cover.

27. Which of the following plant growth substances is important for abscission of leaves?
 (1) Cytokinin (2) Indole acetic acid
 (3) Gibberellin (4) Abscisic acid
 (5) Ethylene
28. Life cycle of *Nephrolepis* differs from that of *Pogonatum* because in *Nephrolepis*
 (1) antheridia are present.
 (2) megasporangia are present.
 (3) microsporophylls are present.
 (4) sporophyte is present.
 (5) protothallus is present.
29. Parthenogenesis in plants is the development of
 (1) fruits without fertilization.
 (2) seedless fruits.
 (3) infertile seeds without pollination.
 (4) fruits without pollination.
 (5) infertile seeds without fertilization.
30. Which of the following statements regarding alleles is correct?
 (1) Allele encodes for a particular character.
 (2) Allele is the basic unit of inheritance.
 (3) Allele is a variant form of a gene.
 (4) Alleles are located on different loci of a chromosome.
 (5) Breeding can increase the number of alleles.
31. In which of the following phenotypes, can the genotype be known as soon as it is seen?
 (1) Widow's peak
 (2) Attached ear lobe
 (3) Dimples on cheek
 (4) Rolling tongue
 (5) Straight thumb
32. In the progeny of a cross between the genotypes AaBb and aabb, the genotypic ratio of AaBb:Aabb:aaBb:aabb was 1:1:1:1. This result can be due to
 (1) independent assortment.
 (2) gene linkage.
 (3) codominance.
 (4) polygenic inheritance.
 (5) incomplete dominance.
33. If both parents are of AB blood group, what is the probability that they have a child of blood group B?
 (1) 0% (2) 25% (3) 33% (4) 50% (5) 67%
34. In which of the following pair/pairs, did the first group of organisms originate on earth before the second group of organisms?
- | first group of organisms | second group of organisms |
|--------------------------|---------------------------|
| A : Mosses | mammals |
| B : Amphibians | modern fish |
| C : Conifers | insects |
- (1) A only. (2) B only. (3) A and B only.
 (4) A and C only. (5) B and C only.

35. Some characteristic features of certain ecosystems in Sri Lanka are periodic fires, sparse canopy and trees with twisted trunks. Each of these features is respectively found in
- (1) patana, tropical rain forests and montane forests.
 - (2) savanna, dry mixed evergreen forests and montane forests.
 - (3) savanna, thorn forests and patana.
 - (4) savanna, montane forests and dry mixed evergreen forests.
 - (5) patana, dry mixed evergreen forests and mangroves.
36. Some global agreements and the subjects they are associated with are given below.
- A : Montreal protocol – Ozone depletion
B : Marpol convention – Transboundary movement of hazardous waste
C : Kyoto protocol – Emission of green house gases
D : Ramsar convention – Conservation of threatened habitats
- Which of the above combinations are correct?
- (1) A and B only.
 - (2) A and C only.
 - (3) A and D only.
 - (4) A, B and C only.
 - (5) A, C and D only.
37. Which of the following statements is correct?
- (1) Cyanobacteria show gliding movements with the aid of flagella.
 - (2) Prions can exist without nucleic acids.
 - (3) Although most fungi are heterotrophic, some are autotrophic.
 - (4) Life cycles of animal and plant viruses are not similar to each other.
 - (5) Chemoautotrophic bacteria use organic carbon as the carbon source.
38. *Penicillium* and *Allomyces* respectively belong to phyla
- (1) Ascomycota and Chytridiomycota.
 - (2) Zygomycota and Ascomycota.
 - (3) Chytridiomycota and Zygomycota.
 - (4) Ascomycota and Basidiomycota.
 - (5) Basidiomycota and Chytridiomycota.
39. Which of the following statements regarding pathogenic microorganisms is correct?
- (1) Microorganisms that grow within organisms are called pathogenic microorganisms.
 - (2) Occurrence of a disease depends mainly on intrinsic properties of pathogenic microorganisms.
 - (3) Toxins produced by *Salmonella typhi* can be inactivated by boiling at 100°C.
 - (4) Mucus membrane of the respiratory tract of man destroys pathogenic bacteria mainly by producing antimicrobial substances.
 - (5) Lecithinase contributes to the invasiveness of microorganisms.
40. Which of the following statements regarding spoilage of food is correct?
- (1) Putrefaction is the chemical conversion of carbohydrates in food to acids and gases.
 - (2) Lime and oranges are most likely to be spoiled by bacteria.
 - (3) Spoilage of food due to microorganisms will not take place in a refrigerator where the temperature is 4°C.
 - (4) Proteolytic enzymes released by microorganisms can result in rancidity of food.
 - (5) Growth of most microorganisms in food can be prevented by adding sugar.

- 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. Which of the following may be seen in both prokaryotic and eukaryotic cells?

- (A) Nuclear membrane (B) Cytoskeleton
(C) Cell wall (D) Flagella
(E) Glyoxysomes

42. Some characteristics of protists and phyla showing those characteristics are given below.

| Characteristic | Phylum |
|-------------------------------------|-----------------|
| P - Cellulose in the cell wall | A - Chrysophyta |
| Q - Unicellular | B - Phaeophyta |
| R - Presence of phycocyanin | C - Rhodophyta |
| S - Mannitol as a storage substance | D - Chlorophyta |

Select the response/responses where all "characteristic-phylum" combinations are correct.

- (A) P - C, Q - A, R - D, S - B
(B) P - B, Q - B, R - C, S - A
(C) P - D, Q - A, R - C, S - B
(D) P - A, Q - D, R - C, S - B
(E) P - C, Q - D, R - B, S - A

43. Three enzymes that digest the ingested food in the buccal cavity, stomach and small intestine of man in correct sequence are

- (A) ptyalin, pepsin and aminopeptidase.
(B) salivary amylase, pepsin and lactase.
(C) ptyalin, pepsin and enterokinase
(D) salivary amylase, pepsin and nucleotidase.
(E) ptyalin, pepsinogen and amylase.

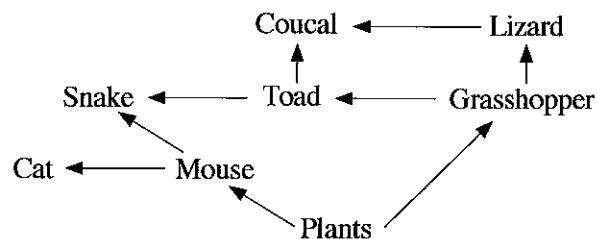
44. At incipient plasmolysis of a plant cell, which of the following pairs is/are equal to each other?

- (A) Water potential and solute potential
(B) Wall pressure and turgor pressure
(C) Water potential and turgor pressure
(D) Turgor pressure and solute potential
(E) Wall pressure and solute potential

45. Which of the following combinations regarding the nervous organisation of animals is/are correct?

- (A) Nerve net with multipolar neurons - Cnidaria
(B) Network of nerve cells - Sponges
(C) Longitudinal solid nerve cords and nerve ring - Platyhelminthes
(D) Radial nerve cords and nerve net - Echinodermata
(E) Cerebral ganglia and dorsal nerve cord - Arthropoda

46. In the human vertebral column,
- linearly arranged 22 vertebrae are present.
 - four vertebrae are fused to form the sacrum.
 - vertebral foramina provide spaces for nerves, blood vessels and lymph vessels.
 - lumbar vertebrae are the largest of the vertebrae.
 - cervical curvature develops at about eight months after birth.
47. Which of the following statements regarding human sperm is/are correct?
- Mitochondria in the sperm head provide ATP required for its motility.
 - Maturation of sperms occurs in seminiferous tubules.
 - Sperm head contains a modified lysosome.
 - Sperm tail consists of microtubules showing 9+2 arrangement.
 - After ejaculation, sperms are able to fertilize a secondary oocyte upto five days.
48. DNA probes are
- especially labelled DNA molecules.
 - used to identify DNA molecules having the same base sequence.
 - used to amplify a specific base sequence of DNA.
 - useful in DNA fingerprinting.
 - used in cloning of DNA.
49. A food web seen in a home garden is given below.



In the above food web, the animals that can be considered to be in the same trophic level are

- toad and snake.
 - lizard and cat.
 - grasshopper and snake.
 - snake and coucal.
 - cat and coucal.
50. During the secondary treatment of wastewater,
- microorganisms pass through a trickling filter.
 - activated sludge is treated in an aerobic digester.
 - aeration is done in the activated sludge system.
 - final products of sludge digestion are methane and CO_2 .
 - oil and grease are removed.
