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ජාතික අගයීම් හා පරීක්ෂණ සේவை
 இலங்கைப் பரீட்சைத் திணைக்களம்
 தேசிய மதிப்பீட்டிற்கும் பரீட்சித்தலுக்குமான சேவை

අ.පො.ස.(උ.පෙළ) විභාග - 2016
 க.பொ.த (உயர் தர)ப் பரீட்சை - 2016

විෂය අංකය } 09

විෂය } Biology

ලකුණු දීමේ පටිපාටිය/புள்ளி வழங்கும் திட்டம் - I පත්‍රය/பத்திரம் I

ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුරු අංකය விடை இல.
01.	3	11.	2	21.	4	31.	4	41.	2
02.	2	12.	1	22.	2	32.	5	42.	1
03.	3	13.	4	23.	4, 5	33.	4	43.	5
04.	2	14.	1	24.	1	34.	4	44.	2
05.	1	15.	5	25.	2	35.	2	45.	2
06.	4	16.	1	26.	4	36.	4	46.	5
07.	3	17.	4	27.	2	37.	2	47.	5
08.	3	18.	5	28.	2	38.	2	48.	5
09.	5	19.	3	29.	3	39.	2	49.	2
10.	2	20.	2	30.	1	40.	2	50.	1

විශේෂ උපදෙස් }
 விசேட அறிவுறுத்தல்

එක් පිළිතුරකට }
 ஒரு சரியான விடைக்கு

ලකුණු

02

මැගින් } 50
 புள்ளி வீதம்

මුළු ලකුණු }
 மொத்தப் புள்ளிகள்

2 × 50 = 100

PART A – Structured Essay

i. (A)

i. What are macromolecules?

- They are (large) molecules with a molecular weight of $10^4 - 10^{10}$,
- made up of large number of monomer units / polymers

2 x 2½

ii. Name the three types of macromolecules found in living organisms.

- Polysaccharides
- Proteins
- Nucleic acids

3 x 2½

iii. Name the disaccharide sugar found in the following and indicate the constituent monosaccharide unit of each of them.

	Disaccharide	Monosaccharide unit
a) Sugar cane plant	Sucrose	Glucose and Fructose
b) Germinating seeds	Maltose	Glucose
c) Milk	Lactose	Glucose and Galactose

(3 + 3) x 2½

iv. What is the monosaccharide unit found in NAD and ATP?

Ribose

1 x 2½

v. Lipids are one of the major organic compounds in living organisms. State two important characteristics of lipids which distinguish them from other major biological molecules.

- Insoluble in water / Soluble in organic solvents
- H:O is greater than 2:1 / less oxygen content

2 x 2½

vi. Name five major types of lipids found in organisms.

- Fats and oils
- Phospholipids
- Terpenes
- Wax
- Steroids

5 x 2½

B.

i. What are mutations?

Changes occurring in DNA /Genetic material/ Genome of an organism

1 x 2½

ii. State the significance of mutations in evolution.

(Beneficial) mutations can produce new variations, leading to more suitable/ or more fitted organism.

1 x 2½

- iii. Some human disorders are inherited as mutations. State three such genetic disorders indicating the type of mutation in each of them.

Disorder	Type of mutation
Colour blindness	Gene mutation
Haemophilia	Gene mutation
Albinism	Gene mutation
Down's Syndrome	Chromosomal mutation
Klinefelter syndrome	Chromosomal mutation
Turner's syndrome	Chromosomal mutation
Phenylketonuria	} gene mutation
Cystic fibrosis	
Thalassemia	
Sickle cell anaemia	

any (3+3) x 2½

C.

- i. What is Biological Oxygen Demand?

Amount of dissolved oxygen needed by aerobic microorganisms to breakdown organic matter in ^{organic} waste

1 x 2½

- ii. What happens when a large amount of waste with high Biological Oxygen Demand (BOD) is discharged into an aquatic ecosystem?

- Microorganisms consume large amount of oxygen in water for decomposition of waste
- Dissolved oxygen content in water is decreased affecting aquatic organisms

2 x 2½

- iii. State two methods used in current waste water treatment plants to reduce Biological Oxygen Demand (BOD) by oxidation of organic matter.

- Trickling filter method
- Activated sludge method

2 x 2½

- iv. Solid waste disposal has caused serious environmental issues in Sri Lanka. What are the adverse effects of open dumping of solid waste on land?

- Develops mosquito breeding grounds
- Produces bad smell due to anaerobic decomposition of waste
- Hazardous/explosive Methane is produced
- Spreading out of insects/ rodents ^{breeding} / increasing of population of insects & rodents
- Ground water can be contaminated

5 x 2½

- v. What are the methods that can be used to minimize the issues of disposal of solid waste?

- Separation and recycling
- Decomposition of organic matter/composting
- Sanitary landfills

3 x 2½

Total marks 40 X 2½ = 100

2.

(A)

i. **What is homeostasis?**

Maintenance of constant internal environment (in the body)

1 x 2½

ii. **State three factors that are homeostatically regulated in man**

- Body temperature
- Blood Glucose
- Blood Oxygen
- Blood carbon dioxide/CO₂
- Blood water content/ osmotic pressure
- Blood pH/H⁺
- Blood Na⁺/ K⁺/ Ca²⁺/Cl⁻/HCO₃⁻
- Blood pressure

any 3 x 2½

iii. **State two advantages of homeostasis in man**

- Maintenance of optimum conditions in tissue fluids/ maintain optimum metabolic rate/ maintain optimum conditions for enzyme activity
- Maintains steady state
- Person becomes active
- Person becomes healthy

any 2 x 2½

iv. **State one disadvantage of homeostasis in man**

Energy has to be spent / ATP has to be spent

1 x 2½

v. **Human liver plays a variety of roles in homeostasis. State four such roles**

- Regulation of blood glucose level
- Regulation of lipid content
- ^{Production} Synthesis of non-essential amino acids
- Detoxification
- Thermoregulation
- Elimination/ breakdown of sex hormones
- Breakdown/ elimination of haemoglobin
- Storing blood
- Storage of vitamins A/D/E/K/ fat soluble vitamins
- Synthesis of blood proteins
- ^{production} Synthesis of cholesterol
- Production of urea

any 4 x 2½

vi. Give two examples of positive feedback mechanisms operating in man.

- Parturition/ Oxytocin stimulates myometrial contractions and myometrial contraction increases releases of oxytocin further.
- Milk ejection/ Suckling of breasts stimulates oxytocin release which causes milk ejection

2 x 2½

B.

i. What is lactation?

Lactation is the synthesis/production and release/ejection of milk from breasts/ mammary glands

1 x 2½

ii. What is the most abundant component in human milk?

- Water

1 x 2½

iii. Name two placental hormones which act on the breasts.

- Oestrogen
- Progesterone
- Human placental lactogen / hPL

any 2 x 2½

iv. Name two components of colostrum

- Water
- Immunoglobulin/ Globulin/ antibodies
- Fats
- Proteins
- cells of mammary glands

any 2 x 2½

v. What is the role of oxytocin in lactation?

- Stimulates milk ejection/release

1 x 2½

vi. Name two hormones which inhibit milk production in women.

- Prolactin inhibiting factor / PIH / ^{PIF} Prolactin inhibiting hormone.
- Progesterone

2 x 2½

vii. State three advantages of breast feeding.

- Milk is sterile / less prone to infection
- Milk is correctly warmed
- Ensures optimal growth and development / right components in correct proportion
- Provides antibodies / passive immunity
- Facilitates iron absorption
- Facilitates development of facial muscles (which are involved in speech)
- Less prone to allergies
- Facilitates development of intimate contact between mother and infant/ baby

any 3 x 2½

C.

i. State the three main functions of the human nervous system.

- Co-ordination
- Integration
- Homeostasis

3 x 2½

ii. Name two phyla having animals with double ventral nerve cords.

- Annelida
- Arthropoda

2 x 2½

iii. Name a Phylum having animals with radial nerves.

- Echinodermata

1 x 2½

iv. State two advantages of nervous regulation over endocrine regulation.

- Quick responses
- Pathway is specific
- Localized responses can be elicited
- Blood system is not required

any 2 x 2½

v. What is a receptor?

Specialized organ or structure that detects a stimulus

1 x 2½

vi. State three features of receptors.

- Designed to receive specific stimuli
- Act as transducers
- Consist of specialized cells
- Connected to nervous system
- Shows adaptations
- Respond to a minimum threshold level

any 3 x 2½

vii. Name three receptors sensitive to touch.

- Meissner's corpuscles
- Merkel's discs
- Free nerve endings

3 x 2½

Total marks 40 x 2½ = 100

3.A

- i. Some external features of five invertebrates labeled as A,B,C,D and E are as follows.
- A – Flattened, bilaterally symmetrical body with eye spots
 - B – Cylindrical radially symmetrical body with a mouth surrounded by tentacles
 - C – Cylindrical , bilaterally symmetrical body with numerous setae and without a clitellum
 - D - Cylindrical , bilaterally symmetrical body with a clitellum
 - E – Umbrella shaped radially symmetrical body with many tentacles around its edge

Complete the following dichotomous key using correct numbers and the letters A,B,C,D and E

1. Bilaterally symmetrical body.....2
Radially symmetrical body.....3
2. Flattened body.....A
Cylindrical body.....4
3. Tentacles around the edge of the body..... E
Tentacles around the mouth.....B
4. Clitellum present.....D
Clitellum absent..... C

8 x 2½

- ii. State the class of each the animals labeled as A,B,C,D and E

- A- Turbellaria
- B- Anthozoa/ Hydrozoa
- C- Polychaeta
- D- Oligochaeta
- E- Scyphozoa

5 x 2½

(B)

- i. Name the parts that can be seen in a longitudinal section of a mature unfertilized ovule of an angiosperm

Chalaza	Embryo sac
Nucellus	Polar nuclei/ Secondary nucleus
Integument	Egg cell/ ovum
Antipodal nuclei	synergids
Micropyle	Hilum/Funiculus

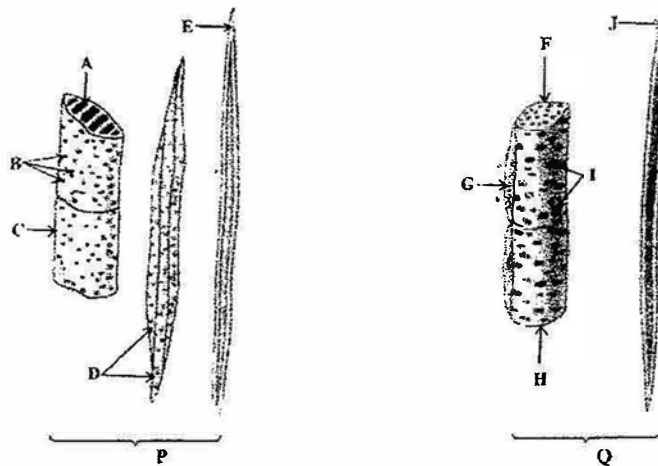
10 x 2½

- ii. List the post fertilization changes that take place in the major structures of the angiosperm ovary

- Zygote develops into embryo
- Endosperm nucleus develops into endosperm
- Integuments develop into seed coat
- Ovule develops into seed
- Ovary develops into fruit

5 x 2½

- C. The diagram P and Q given below show some constituent elements of the two vascular tissues in angiosperm



- i. Identify the two vascular tissues shown in the diagram

P- Xylem

Q- Phloem

2 x 2½

- ii. Name the constituent elements indicated with arrows

A- Perforation plate

F- Sieve plate

B- Pits

G- Companion cell

C- Vessel element/ vessel

H- Sieve tube element

D- Tracheids

I- Sieve area

E- (Xylem) fiber

J- (Phloem) fibers

10 x 2½

Total marks 40 x 2½ = 100

4.A.

- i. What is an ecosystem?

- Functional/dynamic unit
- comprising of all living organisms in a community and the abiotic environment that interacts with them

2 x 2½

- ii. What are the major biotic components of an ecosystem?

- Primary producers
- Consumers
- Detritivores/ decomposers

3 x 2½

- iii. How are the biotic components of an ecosystem connected with each other?

- Through feeding
- and energy transfer

2 x 2½

- iv. **Define "ecological niche"**
Role of an organism in the ecosystem/ environment
1 x 2½
- v. a) **What is meant by gross primary productivity of an ecosystem?**
Total amount of light energy converted to chemical energy by primary producers within a unit area, within a unit time/per unit time
1 x 2½
- b) **State the main primary producer of each of the following ecosystem**
Ocean – Phytoplankton
Villu – Grass
Patana – Grass
3 x 2½
- B.
- i. **Explain what is a biome?**
- Widely spread,
 - major ecosystems of the world
 - classified according to predominant vegetation
 - and characterized by regional climatic conditions
 - and adaptations of organisms to that particular environment
- 5 x 2½**
- ii. **What are the three main terrestrial biomes in the tropics?**
- Tropical forests
 - Deserts
 - Savanna
- 3 x 2½**
- iii. **What is the largest terrestrial biome?**
- Taiga/ Coniferous forests
- 1 x 2½**
- iv. **What is a keystone species?**
- A species that plays an important role in the stability
 - and functioning of an ecosystem.
 - If removed system may collapse
- 3 x 2½**
- v. **Explain the concept of flagship species.**
Publicity is given to few key species which will help to conserve the entire ecosystem (and organisms contained in it)
1 x 2½

C.

i. What is global warming?

Increase of average temperature of the atmosphere

1 x 2½

ii. a) Name five atmospheric gases that contribute to global warming.

- Carbon dioxide/CO₂
- Oxides of nitrogen /N₂O /NO₂ /NO /NO_x
- Methane/CH₄
- Water vapor
- Ozone/O₃

5 x 2½

b) Explain how the gases stated in (a) above contribute to global warming.

Prevent part of the solar radiation that reaches earth surface being radiated back (to the space)

1x 2½

iii. Explain what is an invasive species.

- Non- native species which can spread beyond its introduction site
- and become established in new sites
- where it may cause deleterious effects on local biodiversity.

3 x 2½

iv. Explain how agriculture contribute to biodiversity loss

- Use of few species/varieties (of plants and animals),
- displacement of traditional varieties/breeds/ species
- result in genetic erosion / loss of genetic diversity/ loss of genetic resources
- Habitat loss
- resulting in loss of ecosystem diversity

5 x 2½

Total 40 x 2½ = 100

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Part B - Essay

5. (a) Describe the basic chemical nature and general structure of proteins.

Chemical nature

1. Proteins are complex organic compounds.
2. Contain elements C, H, O, N, and S.
3. Macromolecules/ molecules with high molecular weight.
4. Polymers of amino acids.
5. Peptide bonds connect amino acids,
6. forming polypeptide chains.
7. Around 20 amino acids are involved in making proteins.
8. Some proteins form complexes with metal ions Cu/ Iron/ Zn.
9. Different proteins have different sequences of amino acids / Each protein has a specific sequence
of amino acids.
10. The sequence of amino acids in a protein is genetically controlled by the DNA (of the cell
which
it is manufactured) / determined by the base sequence of the DNA strand (which produces
the
corresponding m-RNA.)
11. The sequence of amino acids in a protein determines its (biological) function.

General Structure

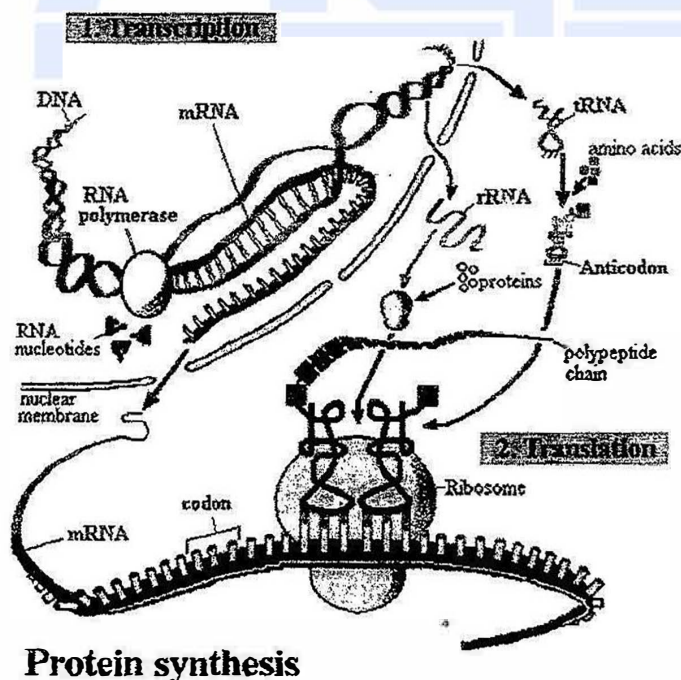
Described in 4 stages / 4 levels of organizations

12. Primary structure
13. Linear sequence of amino acids held together by peptide bonds/ in a polypeptide chain.
14. Secondary structure
15. Spiral/ Helical (α -helix) structure
16. formed by hydrogen bonds
17. between adjacent COOH and NH_2 groups ~~between amino acids.~~
18. ex. Keratin
19. Pleated sheet structure/ β pleated structure
20. Ex. Silk protein
21. Tertiary structure
22. Formed by bending and folding of polypeptide chains.
23. Produce globular shape/ structure.
24. Stabilized by many types of bonds/ ionic/ hydrogen/ disulfide bonds.
25. Quaternary structure
26. Globular structure
27. Formed by the aggregation of several polypeptide chains
28. by interaction of hydrogen and ionic bonds.
29. Ex. Haemoglobin

(b) Briefly discuss the specific roles of DNA and RNA in protein synthesis

30. DNA carries the genetic information for synthesis of proteins
31. in the form of coded instruction in the (nucleotide) base sequence.
32. Double helix of DNA molecule opens up and
33. acts as a template
34. for the synthesis of m-RNA,
35. which contains (coded / triplet) instructions for synthesis of protein.
36. This is called transcription.
37. It is catalyzed by RNA - polymerase.
38. m-RNA moves in to the cytoplasm and attach to ribosome/ forms polyribosome.
39. Other types of RNA/ t-RNA, r-RNA, synthesized in the nucleus
40. move out in to the cytoplasm.
41. r-RNA reads the m-RNA/ helps to assemble the amino acids/ polypeptide with amino acids.
42. t-RNA brings amino acids to the ribosome/ small unit of the ribosome.
43. Each t- RNA carries a specific amino acid.
44. Ribosome moves along m-RNA,
45. translates the coded message in the triplet base in mRNA
46. in to a specific sequence of amino acids brought by t-RNA
47. recognized by the anticodon of t-RNA.
48. m-RNA contains a triplet code (AUG) for methionine
49. which functions as a starter/ start codon.
50. Several other codons (UAA, UAG, UGA) act as terminator/stop codon for ending protein synthesis.

50 x 03 = 150 marks



Protein synthesis

6. (a) Describe the location of the human kidney.

1. In the abdominal cavity,
2. close to posterior wall,
3. below the diaphragm,
4. retroperitoneal (cavity)
5. on either side of the vertebral column,
6. between thoracic and lumbar vertebrae.
7. Left kidney slightly above the right kidney.

(b) Briefly describe the microscopic structure of a typical human nephron.

8. Tubule closed at one end and opened at other end.
9. Single layered.

Consists of

10. Bowman's capsule
11. Proximal convoluted tubule
12. Descending limb of loop of Henle
13. Ascending limb of loop of Henle
14. Distal convoluted tubule
15. Bowman's capsule is cup shaped and
16. consists of inner wall
17. made up of specialized cells/ Podocytes and
18. outer wall
19. made up of squamous epithelial cells and
20. capsular space.
21. Proximal convoluted tubule is (Irregularly) coiled;
22. Made up of cuboidal epithelial cells
23. with (many) microvilli/ projection/ brush border
24. facing the lumen.
25. Descending limb of loop of Henle is straight; *and descending limb*
26. Made up of squamous epithelial cells.
27. Ascending limb of loop of Henle is straight; *Ascending limb*
28. Made up of cuboidal epithelial cells.
29. Distal convoluted tubule is (Irregularly) coiled;
30. Made up of cuboidal epithelial cells
31. with (few) microvilli/ projection/ brush border
32. facing the lumen.

/loop of Henle is U shaped.

(c) Briefly explain how human kidney regulates blood osmotic pressure

33. When osmotic pressure is increased
34. it is sensed by Osmoreceptors
35. in the Hypothalamus
36. which stimulates posterior pituitary
37. to release ADH.
38. ADH acts on Distal convoluted tubule and
39. collecting duct
40. making them permeable to water;
41. Results in reabsorption of water
42. producing hypertonic/ concentrated urine.
43. Osmotic pressure restored to normal level.
44. Mechanism stops/ negative feed back mechanism.
45. When osmotic pressure falls
46. no stimulations of osmoreceptors;
47. No release of ADH; *impaired release*
48. No reabsorption of water in
49. distal convoluted tubule and
50. collecting duct;
51. Produce hypotonic/ dilute urine.
52. Osmotic pressure restored to normal level.

Any 50 x 03 = 150 marks

7.(a) Describe Briefly the nature and distribution of microorganisms in soil.

Soil contains a diversity of microorganisms

1. bacteria
2. fungi
3. algae
4. virus / Protozoa
5. They belong to different genera/ species.
6. Soil provides a suitable chemical environment and
7. a suitable physical environment (for microbial growth.)
8. The number of microorganisms present depends on the soil environment.
9. In the fertile soil bacteria dominates soil microorganisms.
10. Microorganisms use minerals/ mineral nutrients,
11. (decomposing) organic material,
12. gases CO_2 / O_2 / N_2
13. Water in soil for their growth.
14. More microorganisms are found on surface layers of soil *due to availability of oxygen* ~~deeper layers contains less~~
15. *microorganisms* ~~due to availability of oxygen.~~

15) deeper layers contains less microorganisms due to unavailability of oxygen.

Any 13 x 4 = 52 marks

Maximum 50 marks

- (b) Discuss the specific role of microorganisms in the natural cycling of carbon and nitrogen in the biosphere.

In the natural carbon cycle element carbon is cycled in different forms in the environment through living organisms.

1. CO_2 in the environment (aquatic and terrestrial) is fixed
2. by chemoautotrophic/ photosynthetic bacteria
3. such as cyanobacteria and
4. Algae
5. by / photosynthesis
6. Dead plant and animal bodies are decomposed by heterotrophic bacteria
7. and fungi
8. and CO_2 is released (to the environment)
9. through respiration of microorganisms.

in the natural cycle of nitrogen, element nitrogen is cycled in different forms through atmosphere, living organisms aquatic and terrestrial environments.

10. soil microorganisms
11. such as *Azotobacter* and
12. *Rhizobium*
13. fix (gaseous) nitrogen
14. in to nitrogenous compounds/ protein/ NH_4^+
15. Decomposition of protein/ organic matter in dead organisms.
16. by heterotrophic microorganisms/ bacteria and fungi
17. produce amino acids (proteolysis) which
18. are converted to NH_4^+ (ammonification)
19. Ammonium ions are then converted to nitrite
20. by *Nitrosomonas*.
21. Nitrite is converted to nitrate
22. by *Nitrobacter*.
23. some nitrates are converted to gaseous nitrogen
24. by denitrifying bacteria/ *Pseudomonas* sp. / *Thiobacillus* spp

any 20 x 04 marks = 80 marks

- (c) State the significances of interactions of soil microorganisms relevant to plant growth.

1. Microorganisms are involved in the formation of soil aggregates
2. Symbiotic nitrogen fixation.
3. Mycorrhiza association between roots and fungi improve phosphate nutrition
4. Root surface (rhizosphere) microorganisms produce growth promoting substances and
5. chemicals that inhibit the growth of plant pathogenic bacteria / causing plant diseases.

5 x 04 = 20 marks

8. (a) What are the general characteristics of plant growth substance?

1. Organic compounds/chemicals
2. that act in small concentrations.
3. and affect / stimulate physiological processes of plants.

3 x 04 = 12 marks

(b) State the major types of plant growth substance and sites of their production in plants.

- | | |
|--------------------|------------------------------------|
| 1. Auxins | 2. Stem apices/apical meristem |
| | 3. Young leaves |
| 4. Gibberellins | 5. Root/Shoot tips |
| | 6. Young leaves |
| | 7. Germinating seeds |
| 8. Cytokinins | 9. Root apices/apical meristem |
| | 10. dividing cells of many tissues |
| 11. Ethylene | 12. Parenchyma cells of tissues |
| | 13. (Ripening) fruits |
| 14. Abscissic Acid | 15. Root caps |
| | 16. Immature seeds |

www.alevelapi.com 16 x 04 = 64 marks

(c) Explain how natural growth substance regulate growth and development of plants.

Auxins

1. Elongation of cells
2. Maintain apical dominance
3. Regulate tropic movements
4. Induce cambial activity
5. Inhibit leaf abscission
6. Induce root growth
7. Induce growth of fruit

Cytokinins

8. Stimulate/ induce cell division (interacting with Auxin)
9. Promote shoot growth
10. Inhibit apical dominance
11. Delay leaf senescence (Aging)

Gibberellins

12. (Promote) elongation of stem
13. Activate enzymes in seed germination

Abscissic Acid

14. Inhibits seed germination / (control) seed dormancy
15. Closure of stomata *involving*
16. Inhibition of bud growth
17. Inhibition of cambial activity of plants (in temperate countries)

Ethylene

18. *involving* Helps in stem elongation
19. Induces ripening of fruit
20. Induces flowering (in some plants)
21. Controls abscission of leaves / flowers/ fruits

any 19 x 04 = 76 marks

12+64+76 = 152 marks

Maximum 150 marks

9. (a) What are the for main forest ecosystems in Sri Lanka?

1. Tropical rain forests
2. Dry mixed evergreen forests
3. Mountain forests *montane*
4. Thorn forests/ shrubs

*If forests name are wrong
no marks.*

- (b) Describe the main features of each of these ecosystems with reference to their distribution, rainfall and characteristics of vegetation.

Tropical rain forests

5. Present in the South – Western region
6. Low to mid elevation/ sea level to 1200m
7. Rainfall 2500-5000 mm per Year (or more)
8. Rainfall throughout the year
9. Very high rainfall in May to August and November - December
10. Stratification
11. Emergent trees
12. Canopy
13. Sub canopy
14. Shrubs
15. Herbaceous Plants
16. Plants evergreen
17. Epiphytes
18. Woody climbers/ Lianas are present
19. High endemism

Dry mixed evergreen forests

20. Present in the Dry Zone
21. Rainfall 1250 – 1900 mm/year
22. Dry period from May to August
23. No (marked) stratification
24. Trees
25. Shrubs
26. Ground layer / grasses and
27. Climbers (frequent) are present

Mountain

Mountain forests

28. In the central massif/ high elevation
29. Rainfall 2500-4000 mm per year / more than 4000 mm per year
30. Trees short
31. with twisted trunks
32. gnarled and
33. covered with lichens/ mosses.

Thorn forests

34. In Arid zone
35. In the NorthWest and
36. South-East regions
37. Rainfall < 1250 mm / year
38. Drought period from May to September
39. Thorny shrubs
40. with xerophytic characters/ fleshy leaves
41. Some trees present ^{are also}
42. which are stunted

Any 38 x 04 = 152 marks
Maximum 150 marks

10. Write short notes in following

a) Human pancreas

1. Located in the abdominal cavity
2. in the curve of duodenum.
3. Consists of head , body and (narrow) tail.
4. Both exocrine and endocrine gland;
5. exocrine part made up of lobules;
6. each lobule is formed of number of small alveoli
7. consisting of acini cells/ secretory cells,
8. which secretes pancreatic juice,
9. consisting of water,
10. mineral salts and
11. enzymes.
12. Enzymes are amylase
13. lipase,
14. trypsinogen /trypsin
15. chymotrypsinogen/ chymotrypsin
16. nucleases and
17. carboxypeptidase/peptidase.
18. Lobules are drained by small ducts
19. which unite to form pancreatic duct.
20. Endocrine part is the Islets of Langerhans
21. formed of α and β cells.
22. α cells secrete glucagon.
23. β cells secrete insulin.

b) Biodiversity hotspots

24. The areas with high concentration of endemic species
25. facing exceptional/ high levels of threats/ under threats.
26. There are 25 biodiversity hotspots in the world
27. eg: Western Ghats of India and
28. (fragmented) rain forests of southwest of Sri Lanka

c) Mechanism of stomatal closure and opening

29. Starch sugar conversion hypothesis
30. During photosynthesis
31. CO₂ concentration decrease in guard cells
32. raising pH in guard cells.
33. Hydrolysis of starch to sugar (by enzymes)
34. increase solute potential and
35. decrease water potential in guard cells.
36. Water enters in to guard cells
37. from surrounding epidermal cells
38. by osmosis.
39. Increase in turgor causes opening of stomata.
40. At night reverse action occurs and close stomata.
41. K⁺ intake /K⁺ influx hypothesis
42. In the presence of light
43. active intake of K⁺ into guard cells.
44. increases solute potential and
45. decreases water potential in guard cells.
46. Water enters in to guard cells (from surrounding epidermal cells)
47. by osmosis.
48. Increase in turgor causes opening of stomata.
49. Exit of K⁺ from guard cells at night closes stomata.
50. Closure of stomata under water stress condition.
51. occurs due to Absciscic acid

Any 50 x 3 = 150 marks