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Provincial Department of Education - NWP

09 | E | I

Second Term Test - Grade 12 - 2019

Index No : ....

Biology I

Two Hours Only

Important

Answer All Questions

- **Answer all questions.**
- **Write your Index number in the space provided in the answer sheet.**
- **When you select the response which you consider to be the best answer to a question mark your response on the answer sheet according to the instructions given in it.**

01. Which of the following responses is incorrect regarding characteristic features of living organisms?
   1. Metabolism 2. Adaptation 3. Movement
   4. Reproduction 5. Growth and development

02. What is the specific characteristics of water which is important in maintaining body surface cool?
   1. High adhesive force 2. High latent heat of vaporization
   3. High surface tension 4. High specific heat capacity.
   5. High heat of fusion.

03. Which one of the following is incorrect regarding carbohydrates.
   1. H:O ratio of all carbohydrates is equal to H:O ratio in water molecule.
   2. All polysaccharides are polymers.
   3. Nucleotides contain carbohydrates.
   4. Branched carbohydrates are abundant in plant cell wall.
   5. A water molecule removes when a glyosidic bond is formed.

04. Several functions of organic compounds are given below.
   A - Maintaining fluidity of plasma membrane.
   B - Helping for contraction of muscle fiber.
   C - Transporting amino acids towards Ribosomes.
   D - Transporting amino acids within blood.
   What is the function or functions of protein
   1. Only A and B 2. B Only 3. C and D only
   4. A, B and D only 5. B and D only

05. Which of the following statement regarding the microscopes are correct.

1. Resolution power of a light microscope is limited due to wave length of visible light.
2. The maximum resolution power of a light microscope is 0.2 nm.
3. Resolution power of a microscope is a value which obtain from multiplication of magnification in each lenses of that microscope.
4. Practically magnification of a electron microscope is $1\ x\ 10^8$
5. Scanning electron microscope is the most suitable microscope for the studying internal structures of cells.

06. Which of the following regarding structure function relationships is correct.

1. Golgi body – Transporting undigested materials from the cells by exocytosis.
2. Glyoxisome – Involving in photorespiration.
3. Cell wall – prevention of bursting at turgidity.
4. Vacuole – Maintaining shape of the cell.
5. Rough endoplasmic reticulum – synthesizing of lipids.

07. The few statements regarding cell Junctions are given below.

A - Binding the neighbouring cytoskeleton tightly.
B - Signals and materials exchange between neighbouring cells through direct contacts.
C - Prevention of leaking of extracellular fluids through intercellular spaces.

Which of the following is the correct order of statement regarding gap junction, tight junction and anchor junction.

1. B A C 2. A B C 3. A C B 4. C A B 5. B C A

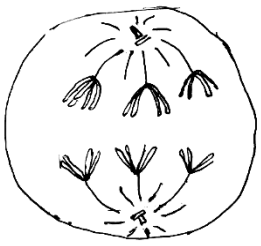
08. What is the common character which is formed in both prokaryotic and eukaryotic cell organization.

1. Ability of fixing nitrogen.
2. Having $70\ S$ ribosomes.
3. Having cell walls with polysaccharides.
4. Occurring both mitosis and meiosis.
5. Having cells with diameter of about $10\mu m - 100\mu m$

09. Which of the following is incorrect regarding proteins in plasma membrane?

1. Help in recognition of neighbouring cells.
2. Acts as enzymes.
3. Involve in maintaining shape of a cell.
4. Act as hormones.
5. Act as receptor molecules for specific bio chemical molecules.

10. The following diagram shows a rough sketch of an event of a cell division. What is the types of division and phase regarding the diagram given below?



1. Mitosis, Anaphase.
2. Meiosis, Metaphase
3. Meiosis, Metaphase I
4. Meiosis, Anaphase I
5. Meiosis, Anaphase II

11. Which of the following stage of cell cycles synthesize histone.

1. prophase 2. Metaphase 3. Anaphase 4. Telophase 5. Interphase

12. Which of the following statements regarding enzyme cofactors is correct.
    1. These are porteinous components which essential for catalytic action of some enzyme. .
    2. Cofactors which bind loosely to the enzymes are irreversible in some extents.
    3. Inorganic cofactors are also referred as co- enzymes.
    4. FAD is an inorganic cofactor.
    5. Factors that permanently and tightly bound to the enzyme is called cofactors.

13. Which of the following does not occur when the temperature in a media of enzyme reactions increase beyond its optimum temperature.

    1. Breakage of shape of active site of enzymes.
    2. Prevention of binding of an enzymes active site and complementary binding site of substrate.
    3. Breakage of hydrogen bond Ionic bond, and other weak chemical bond in active sites of enzymes.
    4. Decreasing rate of enzyme catalyzed reaction gradually.
    5. Decreasing the rate of collisions between molecules.

14. Which of the following statements is not fit regarding the reaction that depend on light in photosynthesis.
    1. Production of NADH
    2. Absorption of energy is sunlight.
    3. Catalyzing of enzyme for breaking water molecule.
    4. Production of ATP.
    5. Charging of chlorophyll molecule as positive.

15. Same event occurred in Calvin cycle are given below.

A - Regeneration of RUBP
B - Production of Gly ceralde hyde – 3 – phosphate from 1,3 – bisphosphoglycerate.
C - Combination of CO_2 with RUBP
D - Breaking down of 6C unstable product.

Which of the following is, the correct sequence of these events courted in calvin cycle?

1. A C B D 2. C D B A 3. D B C A 4. B A D C 5. A B D C

16. Which of the following statements regarding photo respiration and cellular respiration is correct?

	Photo respiration	**Cellular respiration**
1.	need light.	light does not need.
2.	net yielding of energy	net losing of energy
3.	occur in some cells	occur in all living cells.
4	Occur CO_2 fixation	release CO_2
5.	take place in chloroplast	occur in mitochondria.

17. The electron transport chains regarding oxidative phosphorylation locates in,
    1. Matrix of mitochondria
    2. Inner membrane of mitochondria.
    3. Stroma of ochloroplast
    4. Thylakoids membranes of chloroplasts.
    5. Matrix of cytoplasm.

18. The total number of ATP produced by one glucose molecule during cellular respiration occurred in liver cell is,

1. 30 2. 28 3. 32 4. 36 5. 38

19. Which of the following is not a main geological eon.

1. Paleozoic 2. Proterozoic 3. Phanerozoic
4. Archean 5. Hadean

20. Which of the following responses is unmatched regarding the process of natural selections.

1. variations
2. overproduction
3. inheritance of acquired characteristic
4. Competition and survival of the fittest.
5. Natural selection of favourable traits.

21. Which of the following statements regarding classification of animals is correct?

1. Classification of flowering plants based on number of stamens in a flower - Theophrastus.
2. Classification of animals according to mode of locomotion – Aristotle.
3. Classification of organisms based on unicellular, multicellular and mode nutrition – Haeckel.
4. Classification of living organisms by introducing the taxon called phylum – Whittaker.
5. Introducing a three domain system of classification.

22. The unsuitable statement regarding a species is,

1. Can be identified by using morphological criteria such as body shape, and other structural characters.
2. The smallest group of individuals which derived from common ancestor.
3. A group of organisms which bear common similar characteristics.
4. A group of organisms which can reproduce living, fertile offsprings by interbreeding.
5. The total sum of interactions done by a species with the individuals in another species.

23. Archaeabacterial and bacteria.

1. Can be classified according to amount of peptidoglycan in the cell wall.
2. Are all unicellular.
3. Are about 2.5nm to 5 μm in size.
4. Some species in digestive tract of other animals.
5. Most are carrying out sexual reproduction.

24. Some characteristics in kingdom Protista are given below.

A - Having floats
B - Having pellicle
C - Having eyespots.

Which of the following is the correct matching regarding to the organisms of *Euglena*, *Sargassum* and *paramecium*?

1. C, A, B 2. B, A, C 3. A, B, C 4. C, B, A 5. B, C, A

25. An un important character of seedless vascular plant is,
    1. Evolution of leaves.
    2. Evolution of roots.
    3. Heterospory
    4. Variation of sporophylls.
    5. Transportation via xylem and phloem.

26. Some characteristic's of members in kingdom plantae are stated below.
    - Gametophyte is a photosynthetic, independent plant.
    - gametophyte is dioecious.
    - photosynthetic sporophyte is unable to survive indecently.
    - sporophyte bears a small pores called stomata.

    The group of plant with above characters is,

    1. pterophyta 2. Lycophyta 3. Bryyophyta
    4. Cycadophyta 5. Anthophyta

27. All fungi consists of,
    1. Haustoria 2. Septa 3. hypha 4. chitin 5. flagella

28. Which of the following combination, is incorrect.?
    1. Seate – Earth Worm
    2. Mantle - Shail
    3. Malphigian tubules - Cockroach
    4. Closed circulatory system without heart - *Taenia*
    5. Eversible pharynx - *Planaria*

29. Some features of an animal found in the environment are stated below.
    - Body is covered with hard chitinous cuticle.
    - No clear cephalization.
    - Locomote with the help of longitudinal muscles.
    - No segmentation in the body.

    The above organism is,

    1. Mollusc 2. An Annelid 3. A Nematode
    4. An Arthropod 5. An Echinodermate

30. Select the incorrect statement.
    1. Nictitating membrane is found in amphibia.
    2. Birds have colour vision.
    3. Placcoid scales are in cartilaginous fish.
    4. Reptiles are heterodonts.
    5. Mammals use different methods of communication.

31. Which of the following animal groups exhibit characteristics features of internal fertilization and eggs with shell?
    1. Chondrichthyes and Osteichthyes
    2. Reptilia and aves.
    3. Aves and Amphibia
    4. Osteichthyes and Reptilia
    5. Amphibia and chondrichthyes

32. Which of the following does not include in dermal tissues in plant.
    1. Collenchyma cells
    2. Epidermal cells
    3. Guard cells
    4. Trichomes
    5. Root hairs

33. Which of the following is not a common character of a meristematic cell.
    1. They are living cells
    2. Structurally and functionally undifferentiated
    3. Have an ability of multiplication
    4. Has a central nucleus and thin cytoplasm
    5. They are isodiametric

34. Which of the following statements is correct regarding monocot root?
    1. No casparian strips on the cell walls of endodermal cells.
    2. Pericycle does not involve in meristematic functions.
    3. No clear pith.
    4. Multi layered epidermis locate as the outer most layer.
    5. Collenchyma may present just beneath the epidemics.

35. The tissue formed by short initials in vascular cambium during secondary growth of root and shoot is,
    1. Xylem
    2. Vascular rays
    3. Phloem
    4. Cork
    5. Periderm

36. Which of the following does not occur in guard cells during day time?
    1. Providing K+ to neighbouring epidermal cells.
    2. Decreasing water potential in guard cells.
    3. Entering water from epidermal cell to guard cells.
    4. Raising turgor pressure in guard cells.
    5. Expansion of guard cells.

37. A factor that unaffected on the function of stomata is,
    1. CO_2 Concentration in substomatal opening
    2. Internal clock mechanism in guard cells.
    3. Humidity
    4. High temperature
    5. Wind

38. Which of the following responses include structures belong to extra cellular components in a plant.
1. Cell wall, plasma membrane, cytoplasm.
2. Cell wall, extra cellular matrix, tight junction
3. Cell wall, inter cellular space, Tonoplast.
4. Cell wall, lumen of tracheid, Plasma Membrane.
5. Cell wall, vacuole, extracellular space.

39. Main constituent which may present in aqueous solution which conduct through sieve tube elements in phloem is,
1. Sucrose 2. Amino acid. 3. Glucose
4. Hormone 5. Minerals

40. A group of animals colonized on land firstly is,
1. Insects, Centipedes 2. Spiders, insects
3. Tetrapods, insects. 4. Scorpions, Centipedes
5. Tetrapods, Spiders.

- **For each of the questions 41 to 50 one or more of the responses is / are correct. Describe which of the response / responses is / are correct and then select the correct numbers.**

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 summaries.				
ABD	**ACD**	**AB**	**CD**	**Any other response or combination of responses correct.**
1	**2**	**3**	**4**	**5**

41. Which of the followings is / are water soluble organic compound / compounds.
A) Maltose B). Inulin C). Glycogen
D). Ribulose E). Triglycerides.

42. Select the structure / structures which give functional contribution in maintaining shape of cells.
A) Cell wall B). Vacuole C). Cytoskeleton
D). Plasma membrane E). Cell junctions.

43. Which of the following phase / phases contained check point in the cell cycle?
A) G_1 B). G_2 C). M D). S E). C

44. Select incorrect statement.
A) Most competitive inhibitors are reversible inhibition.
B) Competitive inhibitors bind with the other region in enzyme other than active site.
C) ATP is an allosteric activator.
D) Most enzyme reactions are irreversible.
E) Lower the activation energy of the reaction by enzymes.

45. Limiting factor / factors of photosynthesis.

A) Carbon dioxide B). Enzyme inhibitors C). Light
D). Temperature E). Water

46. Which of the following product / products is / are produces during anaerobic respiratory process.

A) ATP B). NADH C). CO_2 D). $FADH_2$ E). H_2O

47. Natural Classification

A) Based on few characteristics.
B) Represents evolutionary relationship based on phylogeny.
C) Developed after the study of evolution.
D) Can expand by adding more living groups.
E) The only system of classification used before 18^{th} century.

48. What are the adaptation / adaptations regarding flight mode of class avers.

A) lean hind limbs B). beak without teeth. C). light body
D). high metabolism E). Bones with dense matrix

49. What are the main part/s belong to the bark of a plant.

A) Primary phloem B). Secondary phloem C). Periderm
D). Secondary xylem E). Primary xylem

50. Which of the following structure / structures are involved in increasing girth of the stems and roots during secondary growth.

A) Vascular cambium B). Cork Cambium C). intercalary meristems
D). Apical meristem in root. E). Apical meristem in stem.

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Provincial Department of Education - NWP

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Second Term Test - Grade 12 - 2019

Index No : .....

Biology II

Two Hours Only

Important

Part A - Structured Essay. Answer all questions on the paper itself.

Part B - Essay, Answer Two questions only. Give clearly labled diagrams where necessary.

Part A (Structured Essay)

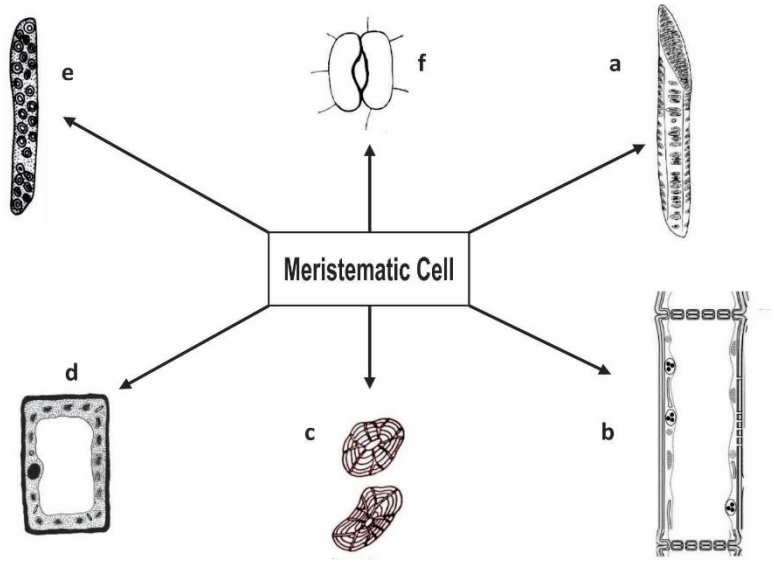
01). A). i. Vascular plants have three main tissue systems. Name these three tissues systems.

.....

.....

.....

ii. Given below (a-f) are the six (6) types of pant cells those 'differentiated from a meristematic cell. Answer the following questions related to those cells.



a) Identify the (a-f) cells

a. .....
b. .....
c. .....
d. .....
e. .....
f. .....

b) Out of the above types of tissue systems, mention in above (I). What is the tissue system of above each (a-f) cell belong ?

Type of cell	Main tissue system
a.	.....
b.	.....
c.	.....
d.	.....
e.	.....
f.	.....

iii. a) Out of the above a-f. what are the cells that bear cell walls which impermeable to water? (Mention relevant English letter)

.....

b) Write the reason for the above answer.

.....

.....

iv. Out of the identified cells from the above a-f , write a main functions for each.

Type of cell	Main functions
a	.....
d	.....
f	.....

B) i. Explain what is the absorption spectrum of photosynthesis. ?

.....

.....

.....

ii. Draw a graph to show the action spectrum of photosynthesis.

iii. a) What are the photosynthetic pigments of higher plants?

.....

.....

b) What is the basic pigment of photosynthesis out of the above mentioned pigments?

.....

iv. Write two functions of other pigment except the basic pigment.

.....

.....

v. What three ways of plant leaves for capturing maximum light.

.....

.....

.....

C) i. Mention the phylum's of kingdom plantae that show following characteristics.

a) dioecious, dominant, haven't vascular tissues in gametophyte. - .....

b) autotrophic, monocious gametophyte - .....

c) sporophyte bears stribilus, sterms are horizontally grown on the earth -

.....

d) Sporophyte bears naked seeds, vessels in xylem - .....

ii. a) What are the stages that meiotic division takes place in plants of Anthophyta ?

.....

b) Write the places where above cell division takes place in Anthophytic plants.

.....

iii. There are two classes in Anthophyta. How do you identify separately these two classes from each other, based on only external character tics of these two classes?

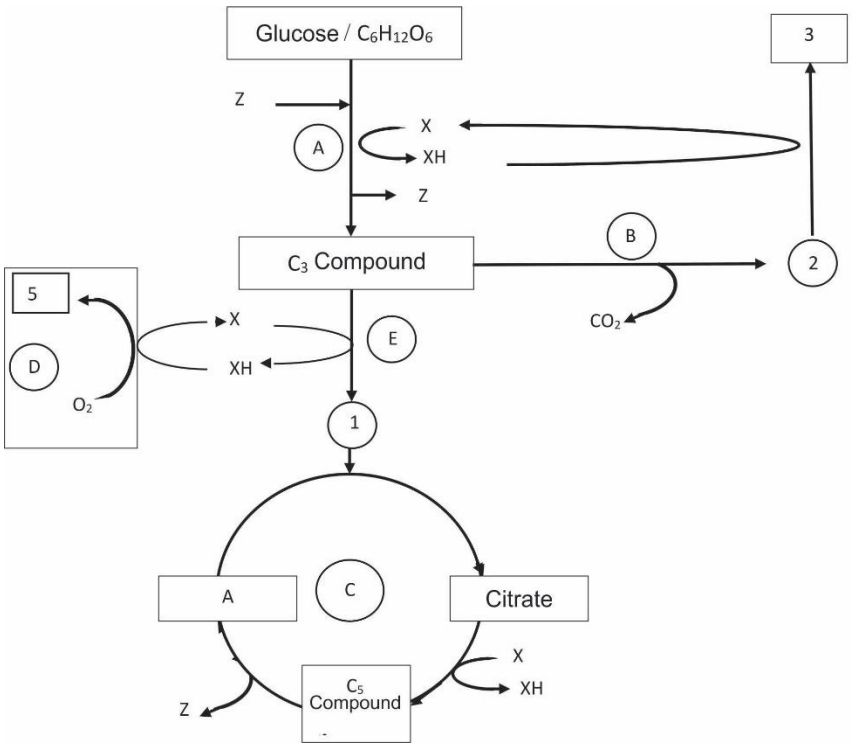
.....

.....

.....

.....

02). A). Several processes of cellular respiration are shown simply in the following chart.



i. Name the above mentioned process A,B, C,D,E.

A. - .....

B. - .....

C. - .....

D. - .....

E. - .....

ii. Write answers related to the process A.

a) What is Z .....

b) Identify X .....

c) What is C_3 compound .....

iii. Name an unicellular organism, that shows the process B which bears cell wall with chitin.

.....

iv. Name the compounds that labeled from 1-5.

1. - .....

2. - .....

3. - .....

4. - .....

5. - .....

v. a) Write three main incidents take place in the process D.

.....

.....

.....

b) How Z is formed in the processes A and C ?

.....

B) Given below are the several proteins that meet in living matter.

- Silk protein - Hemoglobin - Keratin - Immunoglobulin - Myoglobin

i. What is the type of structure of following proteins.

a) Silk protein .....

b) Haemoglobin .....

c) Myoglobin .....

ii. What is the type of chemical bond that is important to maintain the structure of keratin protein?

.....

iii. What is the type of protein of Immunoglobulin ? Write the function of it.

Type of protein - .....

Function -.....

iv. Out of the above, what is the polymeric compound that directly contribute to the protein synthesis in a living cell?

.....

v. a) What is the basic unit that contribute to the formation of above mentioned (iv) polymeric compound?

.....

b) Write 2 other compound that consist of the above mentioned basic unit in (v) – (a)

.....

C) i. What is meant by magnification power of a microscope?

.....

ii. What is the maximum magnification power of compound light microscope?

.....

iii. What is the reason of using a mounting medium for preparing of temporaly slide for light microscope?

.....

iv. Write answers related to the microscope that use to study interior fine structure of cells.

a) What is the type of this microscope?.....

b) What is the material that use to stain the specimen? .....

c) What is the principle that use for this? .....

v. What is the chemical composition of structure that important to do the following function of an Eukaryotic cell?

a) Maintain the exchange of substances into and outside of the cell.

.....

b) Act as a center of protein synthesis.

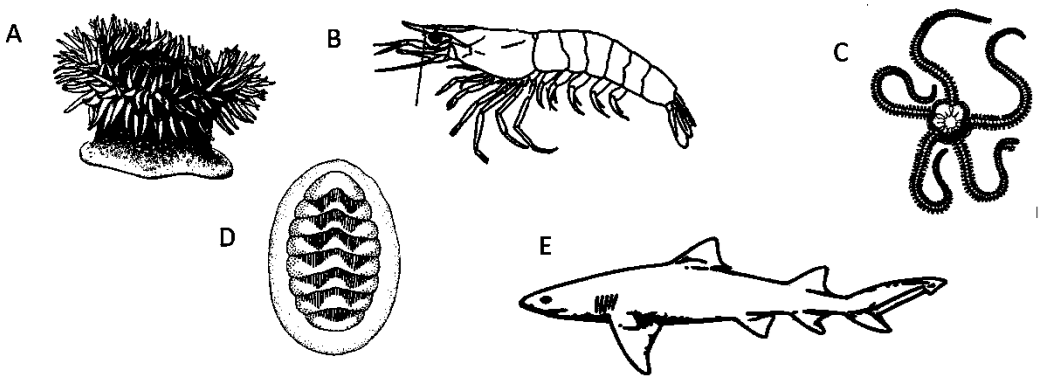
.....

c) Movement of chromosomes. .....

vi. What is plasmadesmata?

.....

03). A). Few animals you have studied are given below.



i. Name the phylums of the above organisms

Organisms		**Phylum**
A.	-	.....
B.	-	.....
C.	-	.....
D.	-	.....
E.	-	.....

ii. Write a similar external characteristics of A and C animals.

.....

.....

iii. a) Out of above mentioned animals which bear chitinous exoskeleton and a calcareous exoskeleton.

Chitinous exoskeleton .....

Calcareous exoskeleton .....

b) Out of above animals, which animal/ animals bear endoskeleton

.....

iv. Write a main difference in the endoskeletons of the animals identified in above (iii (b))

.....

.....

v. Write a main difference in nervous system of A and B.

.....

.....

vi. Some structures in animals belong to kingdom Animalia are given below. State the phylums of those animals and give a function of each.

	Phylum	**Function**
a) Nematocysts	.....	.....
b) Radula	.....	.....
c) Clitellum	.....	.....

B) i. In biochemical evolution, Phanerozoic is one of geological eon. Name the 3 eras of that eon in order to increase the age.

.....

ii. Out of the events given below, underline the events which were not took place in current era of Phanerozoic eon

a) Origin of many primate groups
b) Origin of mammals
c) Origin of genus homo
d) Flowering plants appeared and diversified.
e) Diversification of bony fish and first tetrapods.

iii. In which era of Phanerozoic eon the above selected events were took place. Apply the relevant English letter to write the answer.

.....

.....

.....

iv. Write 2 reasons for causing confusion in classification when using common names for organisms.

.....

.....

v. a) Name and introduce nomenclature proposed by carlous Linnaeus.

.....

.....

b) Write the scientific name of Sri Lankan leopard according to the international codes.

.....

C) i What is meant by energy of an organisms.

.....

ii. Write a metabolic reaction take place in living cells using energy.

.....

iii. Enzymes act as biological catalysts, how enzymes increases their rate of reaction

.....

iv. Some metabolic reactions take place in a photosynthetic plant cell is given below complete those reactions using suitable words.

a) RuBP + ... → PGA + Phosphoglycolate

b) PEP + CO_2 → .....

c) ..... + ATP → PEP

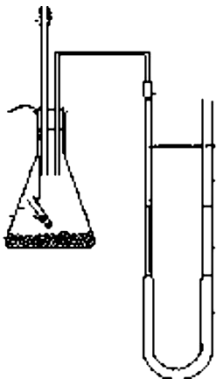
v. Name the enzymes that catalyze the above (a) and (b) reactions.

(a) .....

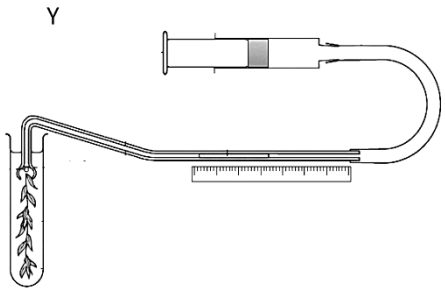
(b) .....

04). A). Two instruments you used in laboratory are given below

X



Y



i. Identify X an Y instruments

X .....

Y .....

ii. What did you study by using the above instruments in the laboratory.

X .....

Y .....

iii. What are the live specimens used, when you set the X and Y apparatus.

X .....

Y .....

iv. Name the materials and instruments that you used to set the X apparatus to find out releasing O_2 volume. (except live specimen)

.....

.....

v. Write two pre – strategies to prevent practical errors when take readings using Y instrument and state 2 errors.

Pre strategies	**Errors that can be prevented.**
.....	.....
.....	.....
.....	.....
.....	.....

B) i. Introduce following terms

a) homologous chromosomes - .....

b) Chiasma formation - .....

ii. Draw a lablled chromosome in the given space

iii. Which of the cell division maintain the genetic stability.

.....

iv. How genetic composition getting changed in cell Division

.....

.....

v. How genetic material of prokaryotic organisms (Write three points) change from eukaryotic organisms.

.....

.....

.....

C) i State the mode of nutrition of following organisms

a) *Euglena* - .....

b) *Agaricus* - .....

c) *Sargassum* - .....

ii. Name the phylum belong to kingdom of *Agaricus* which haven't motor cells, aseptate, coenocytic.

.....

iii. What is the main process in sexual reproduction of the organisms identified in the above phylum.

.....

.....

.....

iv. Name a genus of fungi as a example for the following characteristics.

a) Form ascospores within a ascus .....

b) Form a basidium and bear dominant dikaryotic fungal hyphae. .....

c) Form flagellated zoospores .....

v. *Euglena* is a protist.

What is the main characteristic that *Euglena* different from other protista.

.....

Second Term Test – 2019

Biology – Grade 12 Part II

Part B (Essay)

❖ **Answer four questions only.**

05). a. Introduce a stomata and briefly describe the mechanism of opening and closing of stomata
b. State the factors affecting for the rate of transpiration and briefly explain them.

06). a. List out the characteristics of meristematic cells.
b. Classify meristems according to the location and describe primary growth of a plant stem.

07). a. Describe the fine structure of chloroplast.
b. Explain the process of converting atmospheric CO_2 molecule into a starch molecule of the photosynthesis in a C_3 plant.

08). Explain the key characteristics of phylum chordate related to the skeleton, skin, locomotive appendages, respiratory structures, reproduction and body temperature.

09). a. Mention the basic characteristics of domain bacteria.
b. Compare the basic differences between prokaryotic and Eukaryotic cellular organizations.

10). Write short notes on,
a. Bio – chemical evolutions
b. Extra cellular matrix
c. Phloem tissue of flowering plants.

Second Term Test -2019
Grade 12- Biology
Part 1 - Answers

Part 1

1 (3)	9. (4)	17 (2)	25. (3)	33. (4)	41. (1)	49. (5)
2 (2)	10. (4)	18. (3)	26. (3)	34. (2)	42. (2)	50. (3)
3. (4)	11. (5)	19. (1)	27. (4)	35. (2)	43. (5)	
4. (5)	12. (2)	20. (3)	28. (4)	36. (1)	44. (5)	
5. (1)	13. (5)	21. (2)	29 (3)	37. (3)	45 (2)	
6. (3)	14. (1)	22. (5)	30. (4)	38. (2)	46. (5)	
7. (5)	15. (2)	23. (4)	31. (2)	39. (1)	47. (5)	
8. (2)	16. (3)	24. (1)	32. (1)	40. (2)	48. (4)	

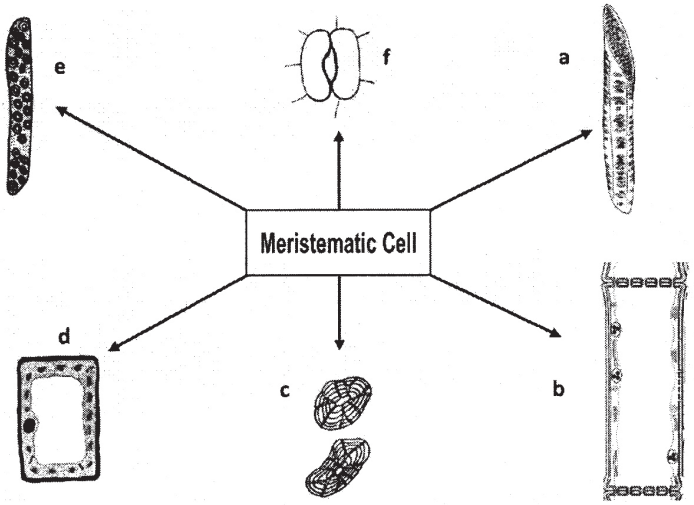
Part A (Structured Essay)

01). A). i. Vascular plants have three main tissue systems. Name these three tissues systems.

- Dermal tissue system
- Ground tissue system
- Vascular tissue system

3 x 0.5

ii. Given below (a-f) are the six (6) types of pant cells those 'differentiated from a meristematic cell. Answer the following questions related to those cells.



a) Identify the (a-f) cells

a. Xylem vessle unit
b. Seive tube element
c. Sclereids
d. Palisade parenchyma
e. Xylem tracheids
f. Pair of guard cells

6 x 2.5

b) Out of the above types of tissue systems, mention in above (I). What is the tissue system of above each (a-f) cell belong ?

Type of cell	Main tissue system
a.	Vascular tissue.
b.	vascular tissue.
c.	Ground tissue.
d.	Ground trssue.
e.	Vascular tissue.
f.	Dermal tissue.

6×2·5

iii. a) Out of the above a-f. what are the cells that bear cell walls which impermeable to water? (Mention relevant English letter)

• a • c • e. 3×2·5

b) Write the reason for the above answer.

• Lignification of cells.
• Lignin impermeable to water

2×2·5

iv. Out of the identified cells from the above a-f , write a main functions for each.

Type of cell	Main functions
a	transportation of water and minerals.
d	Photosynthesis.
f	Maintain the gases exchenge / size of the stoma.

B) i. Explain what is the absorption spectrum of photosynthesis. ? 3×2·5

It is a graph of the relative amounts of light absorbed at different wave lengths by a pigment

ii. Draw a graph to show the action spectrum of photosynthesis. 1×2·5

• Correct axis
• Correct shape.

2×2·5

iii. a) What are the photosynthetic pigments of higher plants?

• Chlorophyll - a • Carotenes
• Chlorophyll - b • Xanthophyll

1 x 2·5

b) What is the basic pigment of photosynthesis out of the above mentioned pigments?

• Chlorophyll - a •

1 x 2·5

iv. Write two functions of other pigment except the basic pigment.

• Absorption of light rays that includs various wave length of visible spectrum • for photoprotection.

2 x 2·5

v. What three ways of plant leaves for capturing maximum light.

• large leaf blade.
• Phylotaxy / arrangment of plant leaves arround the stem.
• leaf orientation / leaves may be horizontaly oriented

3 x 2·5

) i. Mention the phylum's of kingdom plantae that show following characteristics.

a) dioecious, dominant, haven't vascular tissues in gametophyte. - Bryophyta.

b) autotrophic, monocious gametophyte - Pterophyta.

c) sporophyte bears ~~strobilus~~ sterms are horizontally grown on the earth - Lycophyta.

d) Sporophyte bears naked seeds, vessels in xylem - Gnetophyta.

4 x 2·5

ii. a) What are the stages that meiotic division takes place in plants of Anthophyta ?

In the formation of microspores and megaspores.

1 x 2·5

b) Write the places where above cell division takes place in Anthophytic plants.

• Microsporangium of stamens / Pollensacks / stamen.
• ~~On the carpels~~ / Macrosporangium

2 x 2·5

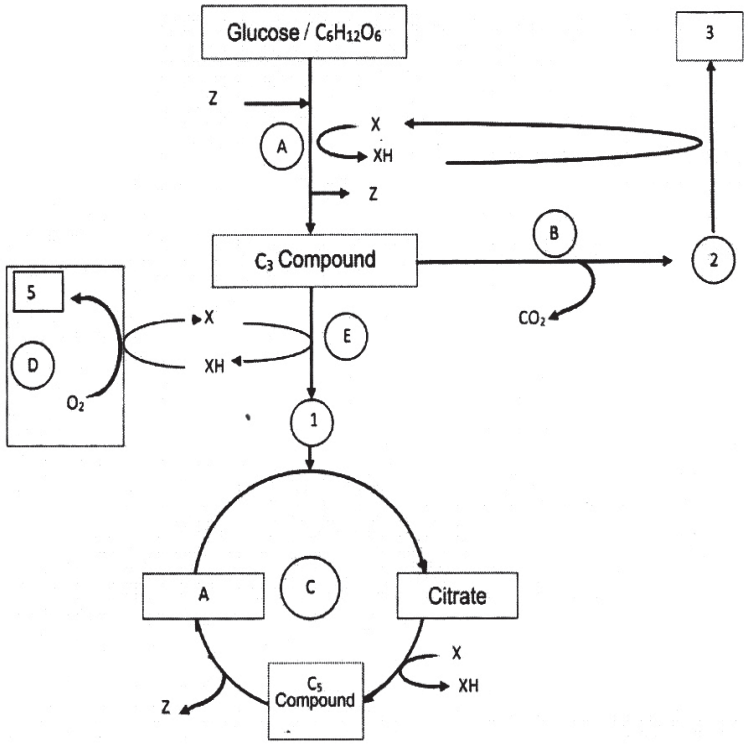
iii. There are two classes in Anthophyta. How do you identify separately these two classes from each other, based on only external character tics of these two classes?

Tap root system / fibrous root system.
Reticulate venation / Parallel veination.
Pentamerous or tetramerous flowers / trimerous flowers.
Distinct calyx and corolla / Perianth present in flower.

2 x 2·5

Maximum 40 x 2·5 ⟶ 100.

02). A). Several processes of cellular respiration are shown simply in the following chart.



i. Name the above mentioned process A,B, C,D,E.

A. - Glycolysis.

B. - Alcohol fermentation

C. - TCA cycle / krebs' cycle / citric acid cycle.

D. - electron transport chain / Oxidative phophorylation.

E. - Oxidation of pyruvate / linking reaction.

5 x 2.5

ii. Write answers related to the process A.

a) What is Z ATP

b) Identify X NAD^+

c) What is C_3 compound Pyruvate / Pyruvic acid. 3 x 2.5

iii. Name an unicellular organism, that shows the process B which bears cell wall with chitin.

Saccharomyces / Yeast

1 x 2.5

iv. Name the compounds that labeled from 1-5.

1. - Acetyl CO-A.

2. - Acytaldehyde.

3. - Ethyl alcohol.

4. - Oxalo acitate.

5. - H_2O / water.

5 x 2.5

v. a) Write three main incidents take place in the process D.

• Oxidation of reduced co-enzyme

• transmission of e^- through carrier molecules

• Protone pump / Syothesis of ATP by oxidative Phosphorylation.

b) How Z is formed in the processes A and C ?

• by substrate phosphorylation. [3x2.5]

[1x2.5]

B) Given below are the several proteins that meet in living matter.

- Silk protein - Hemoglobin - Keratin - Immunoglobulin - Myoglobin

i. What is the type of structure of following proteins.

a) Silk protein — secondary structure / β pleated.

b) Haemoglobin — Quaternary structure.

c) Myoglobin — tertiary structure. [3x2.5]

ii. What is the type of chemical bond that is important to maintain the structure of keratin protein?

Hydogen bonds. [1x2.5]

iii. What is the type of protein of Immunoglobulin ? Write the function of it.

Type of protein - Protective protein. / Defensive.

Function - Elimination of foreign bodies. [2x2.5]

iv. Out of the above, what is the polymeric compound that directly contribute to the protein synthesis in a living cell?

RNA. [1x2.5]

v. a) What is the basic unit that contribute to the formation of above mentioned (iv) polymeric compound?

Ribo Nucleotide. [1x2.5]

b) Write 2 other compound that consist of the above mentioned basic unit in (v) – (a)

• ATP/ADP/AMP • $NADP^+$ / FAD/ NAD^+ [2x2.5]

C) i. What is meant by magnification power of a microscope?

ratio of an object's image size to its actual size. [1x2.5]

ii. What is the maximum magnification power of compound light microscope?

x 1000 [1x2.5]

iii. What is the reason of using a mounting medium for preparing of temporaly slide for light microscope?

• To avoid dehydration of specimen. [1x2.5]

iv. Write answer related to the microscope that use to study interior fine structure of cells.

a) What is the type of this microscope? Transmission electron microscope.

b) What is the material that use to stain the specimen? Heavy metals.

c) What is the principle that use for this? • a beam of electrons pass through a thin specimen

• and displays on a screen.

[4x2.5]

v. What is the chemical composition of structure that important to do the following function of an Eukaryotic cell?

a) Maintain the exchange of substances into and outside of the cell.
• Phospholipids • Proteins and carbohydrates

b) Act as a center of protein synthesis.
• r RNA and Protein

c) Movement of chromosomes. • Tubulin

2 × 2·5

1 × 2·5

vi. What is plasmadesmata?
• Microscopic channels which runs through plant cell walls.
• cytoplasmic living connection between cytoplasm and adjoining cells.

1 × 2·5

2 × 2·5

Maximum 40 × 2·5 → 100

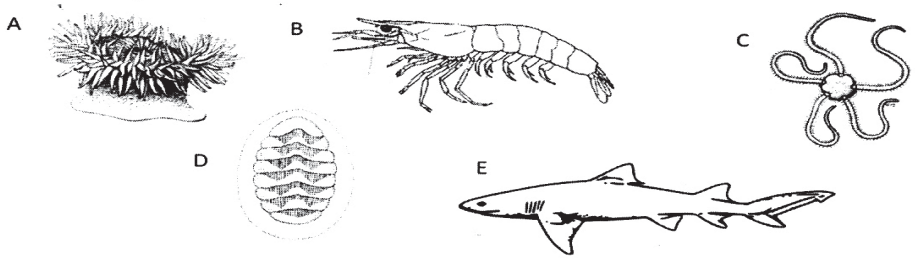
08). Explain the key characteristics of phylum chordate related to the skeleton, skin, locomotive appendages, respiratory structures, reproduction and body temperature.

09). a. Mention the basic characteristics of domain bacteria.
b. Compare the basic differences between prokaryotic and Eukaryotic cellular organizations.

10). Write short notes on,
a. Bio – chemical evolutions
b. Extra cellular matrix
c. Phloem tissue of flowering plants.

Grade 12

03). A). Few animals you have studied are given below.



i. Name the phylums of the above organisms

Organisms		Phylum
A.	-	• Cnidaria
B.	-	• Arthropoda.
C.	-	• Echinodermata
D.	-	• Mollusca
E.	-	• chordata

ii. Write a similar external characteristics of A and C animals.
• Radial symmetry / They have only mout without anus

iii. a) Out of above mentioned animals which bear chitinous exoskeleton and a calcareous exoskeleton.
Chitinous exoskeleton • Prawns.
Calcareous exoskeleton • Chiton

b) Out of above animals, which animal/ animals bear endoskeleton
• Brittle star • shark.

iv. Write a main difference in the endoskeletons of the animals identified in above (iii (b))
• Endoskeleto of shark composed of cartilage
• Brittle ster consist of calcareous plates.

v. Write a main difference in nervous system of A and B.
• A has nerve net • But B has a dorsal brain with solid segmented, ventrally located nerve cord.

vi. Some structures in animals belong to kingdom Animalia are given below. State the phylums of those animals and give a function of each.

	Phylum	Function
a) Nematocysts	• Cnidaria	• Protect from predators/ capturing prey.
b) Radula	• Mollusca	• Scraping plant parts.
c) Clitellum	• Annelida.	• External fertilization.

B) i. In biochemical evolution, Phanerozoic is one of geological eon. Name the 3 eras of that eon in order to increase the age.
• Cenozoic era → Mesozoic era → Palaeozoic era.

ii. Out of the events given below, underline the events which were not took place in current era of Phanerozoic eon
a) Origin of many primate groups
b) Origin of mammals
c) Origin of genus homo
d) Flowering plants appeared and diversified.
e) Diversification of bony fish and first tetrapods.

iii. In which ~~period~~ era of Phanerozoic eon the above selected events were took place. Apply the relevant English letter ~~and~~ to write the answer.
b) • Mesozoic era
d) • Mesozoic era
e) • Palaeozoic era.

iv. Write 2 reasons for causing confusion in classification when using common names for organisms.
• Common names do not actually reflect the kind of organism they signify. • use different names in different languages. • not accepted in international level.

v. a) Name and introduce nomenclature proposed by carlous Linnaeus.
• Binanial nomenclature.
• The name of an organism has two parts as generic name and specific epithet.

b) Write the scientific name of Sri Lankan leopard according to the international codes.
• Pan thera padus kotiya / Panthera padus

C) i What is meant by energy of an organisms.

• Capacity to do work by organism.

ii. Write a metabolic reaction take place in living cells using energy.

• $6CO_2 + 6H_2O \xrightarrow{\text{Sunlight}} C_6H_{12}O_6 + 6CO_2$

iii. Enzymes act as biological catalysts, how enzymes increases their rate of reaction

• They lower the activation energy of a bio-chemical reaction.

iv. Some metabolic reactions take place in a photosynthetic plant cell is given below complete those reactions using suitable words.

a) RuBP + ..O_2.. → PGA + Phosphoglycolate

b) PEP + CO_2 → ..Oxaloacetate.

c) ..Pirurate.. + ATP → PEP

v. Name the enzymes that catalyze the above (a) and (b) reactions.

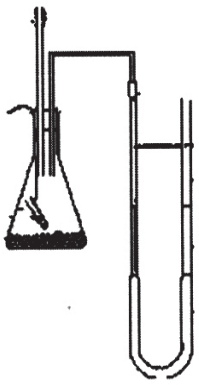
(a) • Rubisco / RuBP Carboxylase Oxygenase.

(b) • PEP Carboxylase

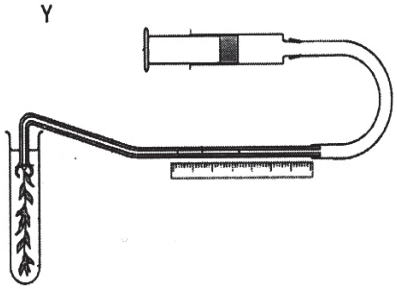
40x2.5 = 100

04). A). Two instruments you used in laboratory are given below

X



Y



i. Identify X an Y instruments

X • Respirometer

Y • Audus micro burette.

ii. What did you studied by using the above instruments in the laboratory.

X • Determination of rate of respiration of (germinating green grams)

Y • Determination of rate of photosynthesis based on released O_2 volume

iii. What are the live specimens used, when you set the X and Y apparatus.

X • germinating green grams / germinating seeds.

Y • Aquatic plant / Hydrilla plant part / Elodea

iv. Name the materials and instruments that you used to set the X apparatus to find out releasing O_2 volume. (except live specimen)

• KOH solution • Ignacious tube • stop watch

• Triple beam balance • water bath • Vaslene.

v. Write two pre – strategies to prevent practical errors when take readings using Y instrument and state 2 errors.

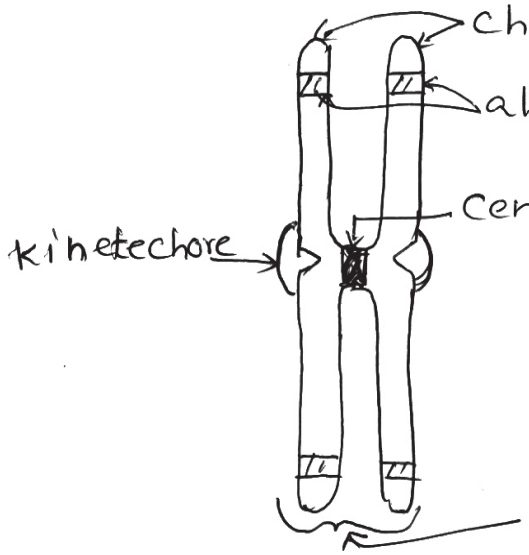
Pre strategies	Errors that can be prevented.
• Aeration of the water in test tube	• Prevent dissolving released O_2 in water
• Add excess MaltCo in test tube	• CO_2 Concentration not become a limiting factor.
• wash the equipment using soap water before the experiment.	• Reduce surface tension/ Reduce trap air bubbles.

B) i. Introduce following terms

a) homologous chromosomes • - morphologically similar chromosomes in Nucleus of diploid cells

b) Chiasma formation • - exchange the parts between non-sister chromatids of homologous chromosomes.

ii. Draw a lablled chromosome in the given space



5X2.5

iii. Which of the cell division maintain the genetic stability.

• Mitotic division.

iv. How genetic composition getting changed in cell ~~Denison~~ division.

• Chrasma formation in meiotic division

• Independent assortment in meiotic division

v. How genetic material of prokaryotic organisms change from eukaryotic organisms. • (3 points)

• Prokaryotes donot have true chromosomes Eukaryotes have true chromosomes.

• Prokaryotes have circular DNA and eukaryotes have linear DNA

• Genetic material of prokaryotes present within Cytoplasm freely and in eukaryotes locates them in nucleus.

• Prokaryotic DNA is not combine with histone protein In Eukaryotes DNA combine with histone prote

C) i State the mode of nutrition of following organisms

a) *Euglena* - • mixotrophs.

b) *Agaricus* - • heterotrophs.

c) *Sargassum* - • photo autotrophs.

ii. Name the phylum belong to kingdom of *Agaricus* which haven't motor cells, aseptate, coenocytic.

• Zygomycota.

• zygosporangium produces genetically diverse haploid spores when environmental conditions are favourable.

iii. What is the main process in sexual reproduction of the organisms identified in the above phylum.

• Plasmogamy and karyogamy occur in 2 morphologically similar gametophytes.
• Formation of zygosporangium which is a strong resistant structure

iv. Name a ~~gnus~~ genus of fungi as a example for the following characteristics.

a) Form ascospores within a ascus • Aspergillus.

b) Form a basidium and bear dominant dikaryotic fungal hyphae. • Agaricus

c) Form flagellated zoospores • chitridium / Allomyces

v. *Euglena* is a protist.

What is the main characteristic that *Euglena* different from other protista.

• Bear animal and plant features / being mixotrophs.

maximum 40×2.5 = 100

Second Term Test – 2019

Biology – Grade 12 Part II

Part B (Essay)

❖ **Answer four questions only.**

05). a. Introduce a stomata and briefly describe the mechanism of opening and closing of stomata
b. State the factors affecting for the rate of transpiration and briefly explain them.

06). a. List out the characteristics of meristematic cells.
b. Classify meristems according to the location and describe primary growth of a plant stem.

07). a. Describe the fine structure of chloroplast.
b. Explain the process of converting atmospheric CO_2 molecule into a starch molecule of the photosynthesis in a C_3 plant.

(5) a) Introduce a stomata and briefly describe the mechanism of opening and closing of stomata

1. Stomata are microscopic pores
2. surrounded by guard cells
3. in the epidermis of the leaves and stems of plants.
4. and have ability to open and close.

K^+ influx hypothesis.

5. During the day time guard cells from neighboring epidermal cells
6. actively accumulate K^+ ions.
7. it lowering their water potential in guard cells
8. leads to the inflow of water by osmosis from
9. surrounding epidermal cells to guard cells
10. As a result the turgor pressure in guard cells increase
11. opening stomata
12. The accumilation of K^+ in the guard cells requires the energy ~~[illegible]~~ is as ATP
13. loss of K^+ from guard cells to neighbouring epidermal cells.

14. leads to exosmosis of water from guard cells
15. As a result turgor pressure in guard cells decreases.

(b) State the factors affecting for the rate of transpiration and briefly explain them.

16. Light intensity.
17. Stomata usually open in the light and
18. close in darkness.
19. With the increase of light intensity the rate of transpiration increases.
20. Temperature.
21. The higher the temperature, the greater the rate of evaporation of water from mesophyll cells
22. and increase evaporation rate in out side the leaf
23. which result the greater saturation of the leaf atmosphere with water vapour.
24. rise in temperature lowers the relative humidity of the air outside the leaf.
25. Both events result in a steeper concentration gradient of water molecules from leaf to external atmosphere.
26. steeper this gradient is faster the rate of diffusion.
27. Humidity.
28. Low humidity outside environment of the leaf increases transpiration.
29. When humidity rises, the diffusion gradient becomes less steep result in lower transpiration.

30. Wind speed

31. Flow of air generally sweep away the shell. so increases transpiration rate.

32. Availability of soil solution.

33. As soil dries out, water usually binds more tightly to soil particles, reducing the amount of available water.

34. The soil solution becomes more concentrated and water potential decrease.

35. This reduces water uptake by plant

36. As a result transpiration rate reduced.

37. There is greater resistance to movement of water through the plant

38 Due to less steep water potential gradient from the soil through the plant to the atmosphere.

38x42 150

06) a) List out the characteristics of meristematic cells.

1. Living cells
2. Isodiametric / roughly spherical / less intercellular spaces.
3. Structurally and functionally undifferentiated
4. have a central nucleus.
5. have a dense cytoplasm / no permenant vacuoles
6. have ability to multiply.
7. There are large number of mitochondria

b) classify meristems according to the location and describe primary growth of a plant stem.

1. There are 3 types of meristems.
2. apical meristems
3. These meristems are located at root tips and shoot tips
4. Lateral meristems
5. They are found in woody plants.
6. Lateral meristems are two type
7. vascular cambium and
8. cork cambium.
9. vascular cambium is one cell layer
10. consist of a continuous cylinder
11. locate between primary xylum and primary phloem.

12. Cork cambium made up of cells that arises in the outer layer of cortex in stem
13 and in the outer layer of pericycle in the root.

14. Intercalary meristems.

15. Locate at the bases of stems and leaves

16. Due to the activity of primary meristem in shoot, primary growth of shoot take place.

17. A shoot apical meristem is a dome-shaped mass of dividing cells located at the shoot tip

18. shoot apical meristem produces new cells only towards the stem.

19. due to mitosis

20. By the elongation of those cells, stem elongation take place. | increase height

21. It is primary growth of shoot

22. This produces primary tissues in stem.

23. In Primary growth 3 processes take place.

24. cell division

25 cell elongation

26. Cell differentiation.

27. These stages are found in 3 overlapping regions.

28. In the zone of maturation, the cells begin specializing in structure and function.

29. Finger-like projections along the sides of the apical meristem

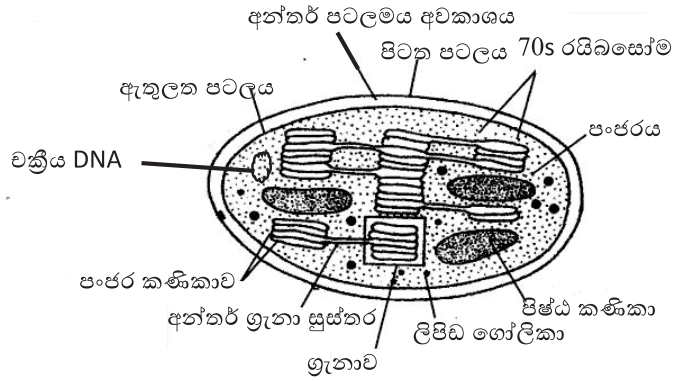
30 are leaf primordia.

31. These primodia cover the shoot apical meristem.

32. After cell elongation, cell differenciation takes place.

7+32 = 39 maximum 38 × 4 = 152

(7) a) Describe the fine structure of chloroplast



1. It is a bicohrex lens shaped organelle
2. With 2 membranes as inner and outer/ double membrane bound organelle.
3. The outer and inner membranes are smooth. and are
4. Separated by a very narrow intermembrane space.
5. The fluid outside the thylakoid is Stoma
6. Inside the chloroplast there is membrane system with flatten and interconnected sacks called thylakoids.
7. Thylakoids contain complexes called photosystems which are made up of photosynthetic pigments.
8. Thylakoids stacked to form a granum.
9. The grana are interconnected by intergranal lamellae.
10. Stoma contain circular DNA.
11. 70S ribosomes
12. many enzymes.
13. Starch granules.
14. lipid droplets.

(b) Explain the process of converting atmospheric CO_2 molecule into a starch molecule of the photosynthesis in a C_3 plant.

15. First atmospheric CO_2 enter into leaf through stomata.
16. Then CO_2 dissolved in the surface moisture of leaf mesophyl cells
17. and diffused to the leaf through cell membrane
18. pallisade parenchyma and spongy parenchyma are mesophyl cells.
19. Then CO_2 enter into stroma of chloroplast of mesophyl cells / CO_2 convert into to starch molecules in stroma.
20. Energy from ATP and NADPH produced by the light reaction are used to reduce CO_2.
21. the reactions are catalyzed by enzymes.
22. The series of reactions take place in stroma is known as calvin cycle.
23. It take place in three steps.
24. carboxylation.
25. Reduction
26. Regeneration of RuBP.
27. In carboxylation, 5C compound RuBP accept CO_2.
28. The enzyme involves in this reaction is RuBp carboxylase oxygenase.

29. The first product is a unstable 6C compound.

30. It breaks down immediately in to 2 molecules of 3-phosphoglycerate

31 3-phosphoglycerate molecule reduced to glyceraldehyde 3-phosphate through step by step.

32. Enzyme catalyzed reactions utilizing NADPH and ATP from light reaction.

33. G3P will act as a precursor for carbohydrate synthesis

34. In 3rd step RuBP is regenerate by part of G3P through a series of complex reactions

35. This process uses energy from ATP generated in the light reaction.

36. The remain G3P convert in to hexose sugar

37 and later convert in to starch.

$36 \times 4 = 144$

$D - \underline{8}$

$\underline{150}$

(8) Explain the key characteristics of phylum chordata related to the skeleton, skin, locomotive appandages, respiratory structures, reproduction and body temperature.

Phylums of Chordata ar,

1. Chondrichthyes.
2. Osteichthyes.
3. Amphibia.
4. Reptilia.
5. Aves and
6. Mammalia.

Chondrichthyes animals;

7. Cartilagious skeleton
8. body is covered by rough scales.
9. fins are the locomotive structures.
10. Respiratory structures are gills which does not covered by an operculum.
11. Reproduction - internal fertilization.
12. Some are ovoviviparous and
13. others are oviparous or viviparous.
14. Ectothermic.

Osteichthyes animals;

15. bony skeleton
16. skin - covered by flattern bony scales
17. Ctenoid and sycloid scales.
18. Locomotion by fins.
19. Respiratory structures - gills are covered by operculum.
20. Reproduction - Internal and
21. External fertilization.
22. Most species are oviparous.
23. Ectothermic.

Amphibia,

24. Cartilagious and body Skeleton.
25. body is coverd by thin moist skin / lacks scale
26. Locomotive structures - Some are limbless /
27 Some are tetrapoda.
28. Respiratory structures - External gills / body cover / lungs.
29. Reproduction - Most amphibians show external fertilization.
30. Habitat - fresh water and terrestrial.
31 Ectothermic.

Reptilia,

32. Bony skeleton.
33. skin - body is coverd with kerctinized scales
34. Locomotive appendages - limbs with digites.
35. Respiratory structure - Lungs.
36. Reproduction - Internal fertilization.
37. Habitat - aqutic and terrestrial
38. Ectothermic.

Aves,

39. Skeleton - bones with air cavities.
40. body is covered by keratinized feathers.
41 forelimbs are converted to flight.
42 Respiratory structures - lungs.
43. Reproduction - Internal fertilization / Shelled eggs.
44. Habitat - arborial / aqutic / terrestrial.
45. Endothermic.

Mammalia,

46. Skeleton - mainly bones.
47. body is coverd by hairs.
48. Locomotive structures - forelimbs and hindlimbs
49. Respiratory structures are lungs.
50 Reproduction by internal fertilization.
51. Habitat - Terrestrial, aqutic.
52. Endo Ectothermic.

Maximum — 50 50x3 → 150

(9) a) Mention the basic characteristics of Domain bacteria.

1 Prokaryotic.
2 Multicellular, colonial or filermentous.
3 Most of them are found in size between 0.5 to 5 μm.
4 Most of them well adapted to live in normal habitats.
5 their cell walls contains peptidoglycan
6 they can grouped as gram positive and gram negative bacteria based on the amount of peptidoglycan present in the cell wall.
7 their cell walls are surrounded by a sticky layer of polysaccharide or protein cover / capsule.
8 Posses flagella of most of bacteria for locomotion.
9 flagella differ from the eukaryotic flagella.
10 they are not covered by a plasma membrane.
11 absence of 9+2 structure of Microtubules.
12 Posses divers nutritional mode / Autotrophs, or heterotrops.
13 Posses divers metabolic modes / obligate
14 anaerobes, obligate aerobs, facultative anaerobes.
15 some are capable of performing Nitrogen fixation.
16 Repid reproduction by binary fission
17 some perform conjugation as a sexual reproduction.
Certain bacteria use bacterial chlorophyll as a photosynthetic pigments,

b.) Compair the basic differences between prokaryotic and Eukaryotic cellular organization.

① Cell size (diameter) of prokaryotes are 1-5 μm ② while Eukaryotes are 10-100 μm / Eukaryotes are vary in size.

③ Prokaryotes are Mainly unicellular while

④ Eukaryotes are multicellular (except the most protist and fungi).

⑤ Prokaryotes originated befor 3.5 billion years while ⑥ eukaryotes were originated by prokaryotes befor 1.8 billion years.

⑦ prokaryotes mostly reproduce by binary fission (Lack Mitosis or meiosis)

⑧ eukaryotes by both mitosis and Meiosis

⑨ Posses 70 S ribosoms in prokaryotes

⑩ both 70 S and 80 S Ribosoms in Eukaryotes.

⑪ Prokaryotes lack membrane bounded organelles contribute to N_2 fixation, photosynthesis, respiration by inward foldings of internal membran.

⑫ Eukaryotes posses membraned organelles with vast diversity.

⑬ Prokaryotes — Bacteria & cynobacteria contains peptidoglycan in the cell wall. Polysaccharids and proteins of archea.

⑭ Eukaryotics — Plant cell walls contain cellulose and fungi contains chitin.

⑮ simple flagella of prokaryotes, and lack Microtubules and extracellular structure. 20 nm.

(16) complex flagella of Eukaryotes, 9+2 structure, intra cellular structure, 200 nm.

(17) cellular respiration of prokaryotes takes place in Mesosomes.

(18) in Eukaryotes, cellular respiration takes place in Mitochondria.

(19) photosynthesis of prokaryotes takes place in ~~cell~~ plasma membranes.

(20) Chloroplasts are used by Eukaryotes.

(21) some prokaryotes able to fix N_2 but

(22) Eukaryotes can not fix N_2.

22 + 17 → 39 Maximum → 38 × 4 → 150

(10) Short notes.

a) Bio - chemical evolution.

1 Life originated on the earth about 3.5 billion years ago.

2 fossils supply direct evidence for that.

3 by the observation experiments in chemistry, geology and physics.

4 Bio - chemical evolution arouse from the hypothesis based on chemical and physical processes on early earth.

5 according to this hypothesis, produced the first cells through the sequence of four main stages.

6 by the atmospheric condition of early earth, from inorganic molecules,

7 facilitate the abiotic synthesis of small organic molecules such as,

8. Amino acid.
9. Nitrogenous bases.
10. Polymerization of the above small molecules leads to the formation of organic macro molecules.
11. Protein synthesis occures by the Polymerization of Amin acid
12. Synthesis of nucleic acid by Nitrogenous bases, sugar and phophate.
13. Organic macro molecules were packed into into membranes, to produce protocells.
14. Nucleic acid gained self replicating capability.
15. Cells gain the inheritory ability.

(15)

b) Phloem tissue of flowering plants

1. Photosynthetic products are translocated through out the vascular plant body as phloem tissue.
2. four types of cells.
3. Seive tube elements.
4. companion cells.
5. Phloem parenchyma.
6. Phoem fibers.
7. except the fibers, other cells are living.
8. seive tube elements are long, tubular cells.
9. main transportive cells are tube elements.
10. Lack nucleus, Ribosoms, distinct vacuoles and cytoskeleton.
11. Pheriphery cytoplasm.
12. formation of a seive tube by alining of many seive tube elements as a chain.

13. Cross walls/end walls that connect two tube elements each other by phorous plate / seive plate.
14 Laterally connect a companion cell to each seive tube element.
15. Present many plasmodesmata between companion cells and seive tube elements.
16. Posses distinct nucleus in companion cells.
17. Posses only primary cell walls in phloem parenchyma cells.
18. Present large central vacuole and nucleus.
19 Phloem fibers have taperd ends.
20 Posses lignified secondary cell walls.

c.) Extra cellular metrix of animal cells.

1 Although animal lack cell wall they do have elaborate extracellular metrix.
2 two main components.
3 Glycoproteins.
4 and Carbohydrates that secreted by the cells.
5 Most abundant glycoprotein is Collagen.
6 they are the strong fibers outside the cell.
7 The collagen fibers are embeded as a network in the extra cellular metrix.
8 bay proteoglycan that secreted by cells.
9 ECM forms a protective layer over the cell surface.
10 and linking ECM and cytoskeleton.
11 influences the cell behavior by involving in the mechanical and chemical signaling.

Maximum (8) 13 + 17 + 08 → 38 × 4 → (152)