Answers

Chapter 1

1.Forms blooms in polluted water

2.a)five kingdom classification

b)extreme salt

3.diatomaceous earth used in polishing, filtration of oils and syrups

4.a)eukaryote

b)halophiles

c)mycorrhiza

5.methanogens

6.a)symbiosis is a close physical association between the individuals

b)lichens are used as pollution indicator, it is used in the preparation of usnic acid

7.cell structure, thallus organization, mode of nutrition, mode of reproduction, phylogenetic relationship

8.a)plasmodium

b)physarum

9.because they have the characteristics of both living and non living organism

10.mycoplasma

11.

Rhizopus	Phycomycetes
Yeast	Ascomycete
Agaricus	Basidiomycete
Alternaria	Deuteromycetes

12. because

1. There was no place for viruses and bacteriophages
2. Both eukaryote and prokaryote is found in same group
3. Both photosynthetic and non photosynthetic organism are put together in same group

chapter 2

1.a)because it depend on water for sexual reproduction

b)because in angiosperm two fertilization events occur-syngamy and triple fusion

2.a)selaginella,salvinia

b)production of two kinds of spores- macro and micro spore.

3.

1. half of the CO_2 fixation on earth is done by algae
2. 70 species of marine algae are used as food
3. Chlorella and spirullina are rich in protein and used as food supplement by the space travellers
4. Agar- agar is used for the preparation of ice cream

4.

Class	Stored food
Phaeophyceae	Mannitol, laminarin
rhodophyceae	Floridean starch

5. haplo- diplontic

6.

1. Undifferentiated plant body
2. Male and female sex organ are antheridium and archegonium
3. Haplo- diplontic life cycle

7.micorrhizal root

8.

A	B
Algae	Thalloid body, photosynthetic and mainly aquatic
Pteridophyte	Independent sporophytic and gametophytic phase commonly called ferns
Gymnosperm	Naked seeded plant
Angiosperm	Flowering plants
Bryophyte	Amphibians of plant kingdom

9

a) Gymnosperm
b) They are naked seeded plant, plant body is differentiated into root,stem and leaves

Chapter-3

1.a)fabaceae

b)

2.pneumatophores. function : respiration

3.a)solanaceae

b)epipetalous

4.a) A-valvate,B-twisted

b) A-no over lapping of margins,B-margins overlap

5.a-axile placentation,b-parietal placentation

6.the leaves are modified in to spines and stem is modified to perform photosynthesis

7.thorn

8.

9.a)stem tendrils,

b)thorn

10.

1. Coleoptile
2. Plumule
3. Radicle
4. Coleorhiza

11.a)aestivation

b)

a) Valvate
b) Twisted
c) Imbricate
d) Vexillary

12.pneumatophores

13.arrangement is of two types – recemose and cymose

In recemose the peduncle does not terminate in a flower. It continues growing and produces flower laterally on acropetal succession eg: crotalaria

In cymose the peduncle terminate in a flower and the younger flowers are arranged laterally on basipetal succession eg: jasmine

14.region of maturation

Function : root hairs absorb water and minerals from the soil

15.because it has node and inter node. It is the characteristic of stem. So it is not a root. It is underground stem

16.Drupe

17.Fibrous

Chapter 4

1.

A	B
Companion cells	Phloem tissue
Lenticels	Exchange of gases
Bulliform cells	Empty colourless cells
Subsidiary cells	Stomata
Mesophyll cells	Chlorophyll bearing cells
Endodermal cells	Casparian strips

2. a) dicot stem and monocot root

b) dicot stem – b,e,f

monocot root – a,c,d

3.a) monocot root

b)d,b,f,e,a,c

c)suberin deposition in the endodermis

4.a)yes

b) counting annual rings/counting spring wood and autumn wood

5.a) vascular cambium and phellogen (cork cambium)

b)vascular cambium

secondary xylem to inner side

secondary phloem to outer side

phellogen

phellom (cork) to outside ,phelloderm (secondary cortex) to inside

6.a) permanent tissue (mature tissue)

b) paranchyma,collenchyma and sclerenchyma

c)

Root	Leaf
Root hairs present	Stomata present
Cuticle absent	Cuticle present

7. a) radial

b) phellogen

8.

Specimen A	Specimen B
Closed vascular bundle	Open vascular bundle
Sclerenchymatous hypodermis	Collenchymatous hypodermis
Large number of vascular bundle	Limited number of vascular bundles
Scattered vascular bundle	Vascular bundles are arranged in the form of a ring
Ground tissue is not differentiated	Ground tissue is differentiated

9. due to the presence of intercalary meristem

10. colourless cells seen on the upper epidermis in many grasses are called the bulliform cells. They make the leaf curl inwards to minimize the water loss

11.

Dicot stem	Dicot root
Cambial ring in partially primary and partially secondary in origin	Cambial ring is completely secondary in origin
Interfasicular cambium and fasicular cambium joined to form vascular cambium	Cambial strip formed from permanent tissue inner to phloem and outer to proto xylem
Cambial ring is circular	Cambial ring is wavy

12. a) conjoint and collateral vascular bundle

b)pericycle/stele

13.a) (i) collenchyma (ii) sclerenchyma fibres

b) (i) cell wall thickened at the corners (ii) uniform thickening on the walls

14.diarch to hexarch , radial

15.extra – stellar secondary growth is due to the activity of the cork cambium. The cells of cork cambium cut off cells towards the inside (phelloderm) and outside (cork). The cells of the phelloderm are thin walled and living. The cells of cork are dead cells which are uniform in shape and radially arranged without inter cellular spaces. Cork is impervious to water and bad conductor of heat.

16. a) a- conjoint and collateral vascular bundle . b- radial vascular bundle

b)

Collateral vascular bundle	Radial vascular bundle
Xylem and phloem in the same bundle	Xylem and phloem found as separate bundle
Xylem and phloem lie in the same radius	Xylem and phloem lie in different radii

17.phloem. its elements are sieve tube element,companioncells,phloemfibre and phloem parenchyma

18.

A	B	C
Monocot stem	Closed	Protoxylem lacunae
Dicot stem	Open	Secondary thickening
Isobilateral leaf	Bulliform cells	Epidermis
Dicot root	radial	Casparian thickening

19.during winter season the cambium stops its activity. In spring season cambium becomes more actives and produces large quanity of secondary tissue. The secondary xylem produced during spring season is called spring wood. During autumn season and summer season the cambium becomes less active and produces small quantity of secondary tissue. The secondary xylem produced during this period is called autumn wood

20.latewood

Chapter 5

1.

a) False. Aleuroplast store protein
b) True
c) True
d) False. SER is the major site for synthesis of lipids

2.mesosome,cell wall formation, DNA replication, respiration, secretion ,increase surface area of plasma membrane

3.Diagram b. in b centromere is present on the center of the chromosome and it has no secondary constriction(satellite)

4.

a) Fluid mosaic model
b) Lipid, protein
c) Cell growth, formation of intercellular junctions, secretion

5.

a) Coleorhiza
b) Elaioplast

6.

a) Nucleus, mitochondria, chloroplast
b) Nucleus – controlling center of all the activities of the cell, seat of hereditary characters, RNA synthesis
Mitochondria - cellular respiration, production of energy
Chloroplast – photosynthesis

7.a)Ribosomes

b) protein synthesis. It is a non membranous structure.

8.

A	B
Synthesis and storage of energy	Mitochondria
Packaging and delivery of material	Golgi apparatus
Digestion of intercellular material	Lysosome
Formation of basal body of cilia and flagella	Centriole

9.a)1-metacentric 2- telocentric

b) presence of secondary constriction (satellite)

10.Glycocalyx,cell wall and plasma membrane

11. mitochondria are the centers of production, storage and distribution of energy. So it is called the power house of the cell

12. A – acrocentric chromosome – the centromere is near the end of the chromosome

B- sub-metacentric chromosome – the centromere is near the middle of the chromosomes

C-sub-metacentric chromosome – the centromere is near the middle of the chromosomes

D- metacentric chromosome – the centromere is at the middle of the chromosome

Chromosome D has satellite

Chapter-6

1. (i)

a) Zygotene
b) Diakinesis
c) Pachytene
d) Leptotene
e) Pachytene

(ii) leptotene,zygotene, pachytene, diplotene and diakinesis

2.a) A- metaphase , B- telophase

b) metaphase – chromosomes are arranged at metaphase plate, chromosomes most condensed, spindle fibers attach on the kinetochore of the chromosome

telophase – nuclear membrane, nucleolus reappear, chromosome recoil to form chromatin fibers

3.a) i) s- phase

ii) metaphase

b)

1. formation of genetically identical daughter cell
2. growth of multicellular organism
3. cell repair
4. continuous growth in plants
5. restore nucleo cytoplasmic ratio

4.a) metaphase

b)

Metaphase of mitosis	Metaphase I of meiosis I
• spindle fibers attach on the kinetochore of the chromosomes • chromosomes are arranged on the metaphase plate	• spindle fibers attach on the homologous chromosomes •

c)separation of sister chromatids

5.a)metaphase

b) A- spindle fiber, B- chromosome

c) crossing over occurs between the non-sister chromatids

6.i)anaphase

ii) prophase

7.it is the stage in cell cycle where cells do not divide further and they exit G_1 phase and enter into an inactive stage of the cell cycle

8.exchange of genetic material between non sister chromatids

Source of variation

9.pachytene

10.a)metaphase

b) spindle fibers attach on the kinetochore of the chromosomes,

chromosomes are arranged on the metaphase plate

11.spindle fibers contract

Centromere split

Chromatids move to opposite poles

12.no, nucleus and cytoplasm are metabolically active and amount of DNA become double during this phase

13.a)

b)G_1 phase – cell grow continuously and are metabolically active, RNA and protein are synthesized

s – phase – DNA replication

G_2 phase – cell growth continues, RNA and protein synthesis continues

Chapter 7

1.

A	B
Apoplast	Cell wall
Transpiration	stomata
Mass flow hypothesis	Phloem transport
Osmosis	Semipermeable membrane

2.a) guttation

b)to reduce transpiration

3. a) A solution – hypertonic , C solution – hypotonic

b) B solution – it is an isotonic solution , here osmotic pressure of external solution and cell sap are same and hence no net flow of water towards inside or outside the potato pieces

chapter 8

1.a) leg haemogoblin

b) protect the nitrogenase enzyme from the oxygen

2. calcium is the part of structural component of cell wall

3. nitrification .eg:nitrosomonas,nitrosococcus, nitrobacter

4. a) nitrogenase enzyme

b)protect the nitrogenase enzyme from the oxygen

5.a) magnesium

b) chlorosis, yellowing of leaves, necrosis

6. mosaic formation, leaf rolling, curling, yellowing, vein clearing, dwarfing, stunted growth

7.minerals are presented in the soil as charged particles,ions or polar molecules, this can not move across the cell membrane. Concentration of mineral is lower than that in the root

8.

- both are highly selective
- respond to inhibitors
- under hormonal regulation

9.N_2 is a mobile element which moves from older parts tom younger parts. Ca is an immobile element,whichcan not move

10. criteria for the essentiality of an element are :

- the element must be absolutely necessary for supporting normal growth and reproduction
- the requirement of the element must be specific
- the element must be directly involved in the metabolism

but these are not applicable for the above elements(Gold, vanadium, silicon)

11.nitrogenase enzyme – it catalyses fixation (conversion) of atmospheric nitrogen into nitrates.

Leg hemoglobin – it protect the nitogenase enzyme. It act as oxygen scavenger

12.a)hydroponics

b) to obtain optimum growth

Chapter 9

1.a) C_4 pathway

b) yes

c) Kranz anatomy

d) photorespiration is absent

2.a) 3-PGA

b)carboxylation,reduction,regeneration

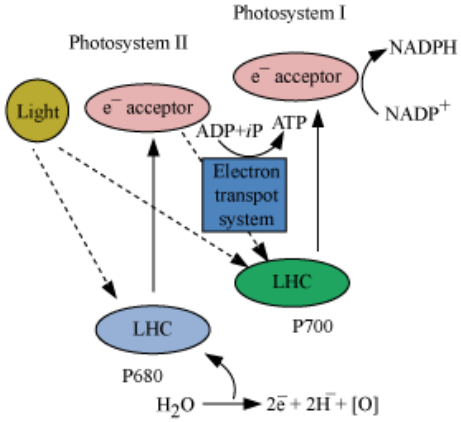
c)RuBisCO

d)18 ATP and 12 NADPH

3. a) cyclic and non-cyclic photophosphorylation

b) electron travel from PS II to PS I

c)



4.a) carboxylation and oxygenation

b) photosynthesis

c) A-stroma lamellae B-Grana C-Stroma D-Starch granule

5.a) photorespiration

b)mesophyll cells and bundle sheath cells

c)

C3 plant	C4 plant
Kranz anatomy is absent	Kranz anatomy is present
Photorespiration is present	Photorespiration is absent
Primary CO2 acceptor is RuBP	Primay CO2 acceptor is PEP

6.a) during light reaction ATP is produced. And in photophosphorylation ATP is produced. So light reaction is also called photophosphorylation

b)grana

c)

Cyclic photophosphorylation	Non- Cyclic photophosphorylation
Only PS I is functional	PS I and PS II is functional
Cyclic flow of electron	Non - Cyclic flow of electron
Only ATP is synthesized	Both ATP and NADPH are synthesized
Oxygen is not liberated	Oxygen is liberated

7.a) grana b)ATP,NADPH and Oxygen

c) ATP and NADPH produced in light reaction is used in dark reaction(calvin cycle). 2 molecule of NADPH and ATP are used in reduction process and 1 molecule ATP in regeneration

8.a) No ATP,NADPH or Sugar is produced in photorespiration

b) when the concentration of Oxygen in atmosphere increases RuBisCO fix Oxygen. This is the reason for photorespiration

9.C3plants,Melvincalvin,RuBisCO, RuBP

10.

SL No	C3 plant	C4 plant
1	RuBisCO	PEP case
2	3-PGA	Oxalo acetic acid
3	Rice plant	Maize plant
4	CO2	

11.speciality – C 4 cycle is present, first formed stable product is OAA, CO2 acceptor molecule is PEP

Anatomy- Kranzantomy

chapter 10

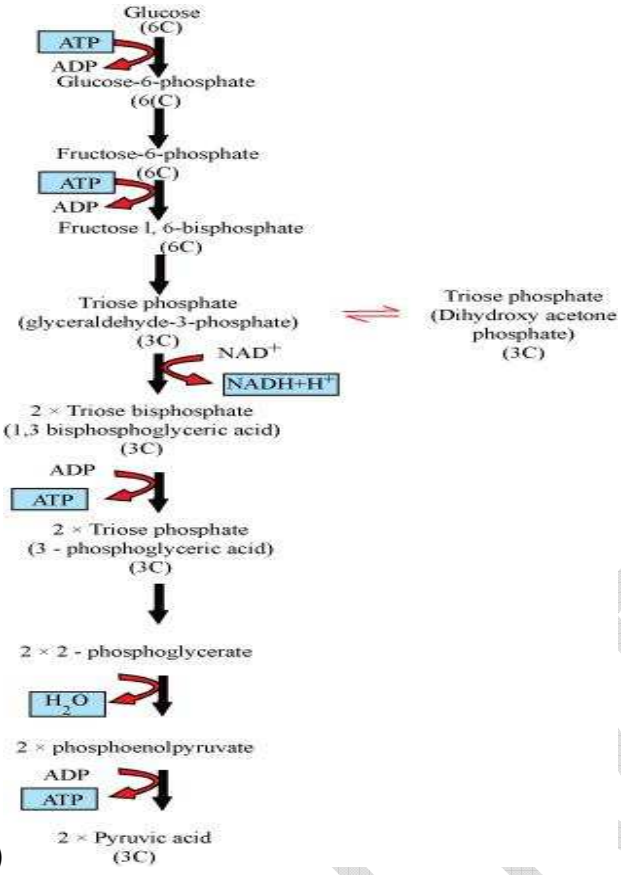
1.During exercise anaerobic respiration occur in muscle cells

2.

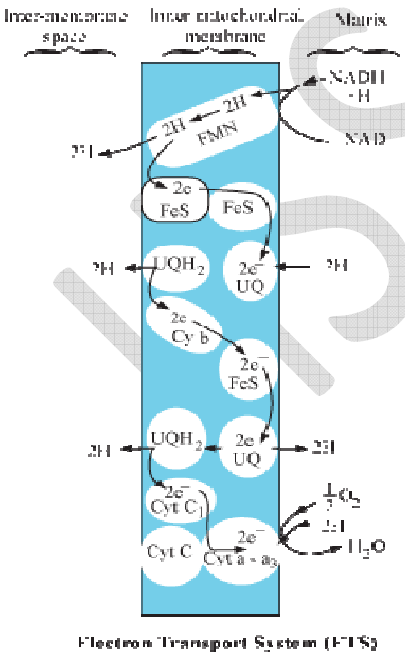
a) Breakdown of glucose into pyruvic acid
b) Cytoplasm
c) Glucose undergo partial oxidation to form two molecules of pyruvic acid
d) 8 ATP

3.a)Mitochondria b)Glycolysis

c)



4.a)



Electron Transport System (ETS)

b)Inner mitochondrial membrane

5.

a) Glycolysis – cytoplasm
   Krebs cycle – mitochondria
b) Glucose undergo partial oxidation to form two molecules of pyruvic acid. All C-C bonds are not broken.

6.a) amphibolic

b) leaf

7. pathway – glycolysis, product – pyruvic acid

8.a) krebs cycle

b)mitochondria

c)conversion of pyruvic acid into acetyl CoA, conversion of citric acid into alpha-ketoglutaric acid, conversion of alpha-ketoglutaric acid into succinic acid

9. a)Krebs cycle

b) A- acetyl CoA, B-citric acid, C- succinic acid, D- oxaloacetic acid

c) 4 NADH and 1 $FADH_2$

10.a) glycolysis

b) A- glucose-6-phosphate, B-triose phosphate, C- 2-phosphoglyceric acid, D- 2-phosphoenol pyruvic acid

c) lactic acid fermentation, alcoholic fermentation , aerobic respiration

11. a) citrate synthetase

b)6NADH

c)2 FADH

d)2 ATP

12.Glycolysis – cytoplasm

Krebs cycle – mitochondria

13.presence of stomata and lenticels for gaseous exchange, plants do not present great demand for gaseous exchange

14.find Respiratory quotient

15.a) aerobic respiration and anaerobic respiration

b) aerobic respiration is more efficient. Because it is the complete oxidation of glucose. More ATP is synthesized durin aerobic respiration(36)

16.yes. As a result of respiration the energy is released in the form of ATP. This energy is used for the active absorption of salt.

chapter- 11

1.a) gibberellin

b) cytokinin

2.

a) auxin
b) ethylene
c) ABA
d) Gibberellin

3.

a) Gibberellin
b) Auxin
c) ABA
d) Ethylene
e) Gibberellins
f) Cytokinin

4.

A	B
Auxin	Root initiation
Gibberellins	bolting
Cytokinins	Overcome Apical dominance
Ethylene	Fruit ripening

5.gibberellin

6.a) vernalisation b)phycobiont

7.a) 2.4-D and NAA

b) weedicide, initiating rooting in stem cutting

8.a) Geometrical growth curve

b) A- lag phase , C- stationary phase

c)Decapitation. Hormone- auxin

9.vernalisation

10. a) seed dormancy

b)ABA (abscisic acid)

c)

1. ABA inhibit seed germination
2. It stimulate the stomatal closure

11.a) sigmoid curve

b) lack of nutrient