Chapter 11 (TRANSPORT IN PLANTS)

Multiple Choice Questions

Q1. Which of the following statements does not apply to reverse osmosis?
(a) It is used for water purification.
(b) In this technique, pressure **greater than osmotic pressure is applied to the system.**
(c) It is a passive process.
(d) It is an active process.
Ans: (c) If pressure greater than the osmotic pressure is applied to the higher concentration, the direction of water flow through the membrane can be reverse. This is called reverse osmosis. Reverse osmosis occurs when water is moved across the membrane against the concentration gradient, from lower concentration to higher concentration. Reverse osmosis is an active process.

Q2. Which one of the following will not directly affect transpiration?
(a) Temperature
(b) Light
(c) Wind speed
(d) Chlorophyll content of leaves
Ans: (d) The chlorophyll content of leaves will not directly affect transpiration, while temperature, light and wind speed directly affect the transpiration.

Q3. The lower surface of leaf will have more **number of stomata in a**
(a) Dorsiventral leaf
(b) Isobilateral leaf
(c) Both (a) and (b)
(d) None of the above
Ans: (a) Usually, the lower surface of a dorsiventral (dicotyledonous) leaf has a greater number of stomata. On the upper surface, stomata may be even absent sometimes.

Q4. The form of sugar transported through phloem is

(a) Glucose (b) Fructose (c) Sucrose (d) Ribose
Ans: (c) Food, primarily sucrose, is transported by the vascular tissue phloem from a source to a sink.

Q5. The process of guttation takes place
(a) when the root pressure is high and the rate of transpiration is low
(b) when the root pressure is low and the rate of transpiration is high
(c) when the root pressure equals the rate of transpiration
(d) when the root pressure as well as rate of transpiration **are high.**
Ans: (a) The effect of root pressure is observable at night as well as early morning when evaporation is low. Excess water gets collected in the form of droplets around special openings of veins near the tip of grass blades and leaves of many herbaceous parts of plants

Q6. Which of the following is an example of imbibition?

(a) Uptake of water by root hair (b) Exchange of gases in stomata (c) Swelling of seed when put in soil (d) Opening of stomata

Ans: (c) Imbibition is a special type of diffusion. A classic example of imbibition is absorption of water by seeds and dry wood.

Q7. When a plant undergoes senescence, the nutrients may be

(a) accumulated

(b) bound to cell **wall**

(c) translocated

(d) None of the above

Ans: (c) Mineral ions are frequently remobilized (translocation), particularly from older senescing parts. Before the leaf fall in deciduous plants, minerals are translocated to other parts.

Q8. Water potential of pure water at standard temperature is equal to

(a) 10

(b) 20

(c) Zero

(d) None of these

Ans: (c) The water potential of pure water at standard temperature is equal to zero.

Q9. Choose the correct option. Mycorrhiza is a symbiotic association of fungus with root system which helps in A. Absorption of water B. Mineral nutrition

C. Translocation D. Gaseous exchange

(a) Only A

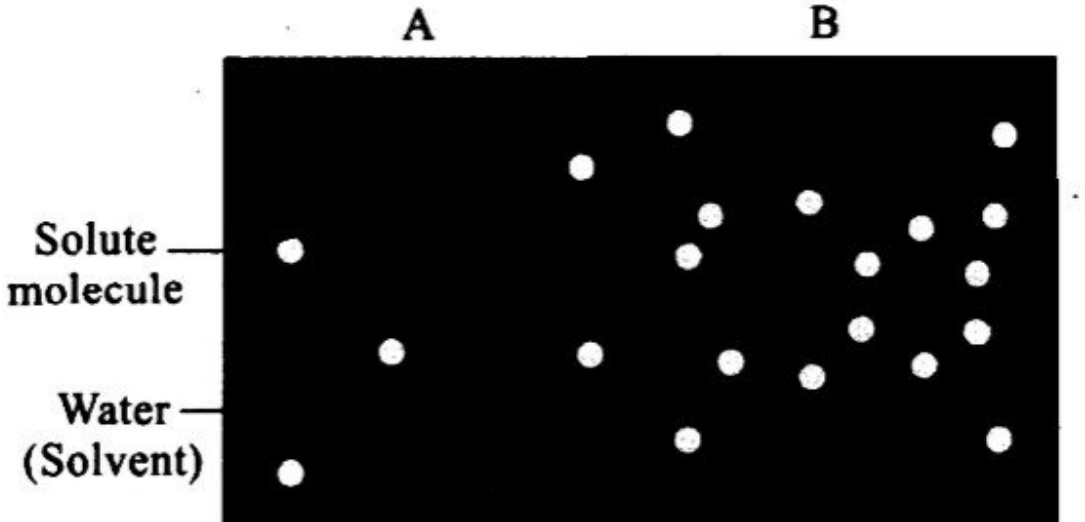
(b) Only B –

(c) Both A and B

(d) Both B and C

Ans: (c) Mycorrhiza is a symbiotic association of fungus with root system which helps in absorption of water and mineral nutrition.

Q10. Based on the figure given below, which of the following statements is not correct?



(a) Movement of solvent molecules will take place from chamber AtoB

(b) Movement of solute will take place from A to B

(c) Presence of a semipermeable is a prerequisite for this process to occur

(d) The direction and rate of osmosis depends **on both the pressure gradient and concentration gradient.**

Ans: (b) The movement of solute will take place from B to A

Q11. Match the following and choose the correct option.

A.	Leaves	(i)	Anti-transpirant
B.	Seed	(ii)	Transpiration
C.	Roots	(iii)	Negative osmotic potential
D.	Aspirin	(iv)	Imbibition
E.	Plasmolyzed cell	(v)	Absorption

Options:

(a) A–(ii), B–(iv), C–(v), D–(i), E–(iii)

(b) A–(iii), B–(ii), C–(iv), D–(i), E–(v)

(c) A–(i), B–(ii), C–(iii), D–(iv), E–(v)

(d) A–(v), B–(iv), C–(iii), D–(ii), E–(i)

Ans: (a)

A.	Leaves	(ii)	Transpiration
B.	Seed	(iv)	Imbibition
e.	Roots	(v)	Absorption
D.	Aspirin	(i)	Anti-transpirant
E.	Plasmolyzed cell	(ii)	Negative osmotic potential

Q12. Mark the mismatched pair.

(a) Amyloplast–Store protein granule

(b) Elaioplast–Store oils or fats

(c) Chloroplasts–Contain chlorophyll pigments

(d) Chromoplasts–Contain coloured pigments other than chlorophyll

Ans: (a) Aleuroplasts–Store proteins

Amyloplast–Store carbohydrate (starch)

Very Short Answer Type Questions .

Q1. Smaller, lipid soluble molecules diffuse faster through cell **membrane, but the movement of hydrophilic substances are facilitated by certain transporters which are chemically**

_____.

Ans: Protein

Q2. In a passive transport across a membrane, when two protein molecules move in opposite direction and independent of each other, it is called as _____.

Ans: Antiport

Q3. Osmosis is a special kind of diffusion, in which water diffuses across the cell membrane. The rate and direction of osmosis depends upon both _____

Ans: Pressure and concentration gradient

Q4. A flowering plant is planted in an earthen pot and irrigated. Urea is added to make the plant grow faster, but after some time the plant dies. This may be due to _____.

Ans: Exosmosis

Q5. Absorption of water from soil **by dry seeds increases the _____ thus helping seedlings to come out of** soil.

Ans: Pressure

Q6. Water moves up against gravity and even for a tree of 20 m height, the tip receives water within two hours. The most important physiological phenomenon which is responsible for the upward movement of water is _____

Ans: Transpiration pull

Q7. The plant cell cytoplasm is surrounded by both cell wall and cell membrane. The specificity of transport of substances are **mostly across the cell membrane,** because _____ .

Ans: The cell wall is freely permeable to water and substances in solutions but membrane is selectively permeable.

Q8. The C4 plants are twice as efficient as C3 plants in terms of fixing C02 but lose only _____ as much water as C3 plants for the same amount of C02 fixed.

Ans: Half

Q9. Movement of substances in xylem is unidirectional while in phloem it is bidirectional. Explain.

Ans: The direction of movement in the phloem can be upwards or downwards, i.e. bi-directional. This contrasts with that of the xylem where the movement is always unidirectional, i.e. upwards. Hence, unlike one-way flow of water in transpiration, foo phloem sap can be transported in any required direction, as it is a source of sugar an as a sink to use, store or remove the sugar

Q10. Identify the process occurring in I, II and III.

NUTRITION)

Multiple Choice Questions

Q1. Which one of the following roles is not a characteristic of an essential element?

(a) Being a component of biomolecules

(b) Changing the chemistry of soil

(c) Being a structural component of energy-related chemical compounds

(d) – Activation or inhibition of enzymes

Ans: (b)

(i) Essential elements as components of biomolecules and hence structural elements of cells.

(ii) Essential elements that are components of energy-related chemical compounds in plants.

(iii) Essential elements that activate or inhibit enzymes.

(iv) Some essential elements can alter the osmotic potential of a cell.

Q2. Which one of the following statements can best explain the term critical concentration of an essential element?

(a) Essential element concentration below which plant growth is retarded

(b) Essential element concentration below which plant growth becomes enhanced

(c) Essential element concentration below which plant remains in the vegetative phase

(d) None of the above

Ans: (a) The concentration of the essential element below which plant growth is retarded is termed as critical concentration.

Q3. Deficiency symptoms of an element tend to appear first in young leaves. It indicates that the element is relatively immobile. Which one of the following elemental deficiency would show such symptoms?

(a) Sulphur (b) Magnesium (c) Nitrogen (d) Potassium

Ans: (a) The deficiency symptoms tend to appear first in the young tissues whenever the elements are relatively immobile and are not transported out of the mature organs, e.g., S and Ca.

Q4. Which one of the following symptoms is not due to manganese toxicity in plants?

(a) Calcium translocation in shoot apex is inhibited

(b) Deficiency in both Iron and Nitrogen is induced

(c) Appearance of brown spot surrounded by chlorotic veins

(d) None of the above

Ans: (b) Excess of manganese may, in fact, induce deficiencies of iron, magnesium and calcium.

Q5. Reaction carried out by N2 fixing microbes include

$$2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2H_2O \quad \ldots(i)$$

$$2NO_2^- + O_2 \rightarrow 2NO_3^-$$

2

Which of the following statements about those equations is not true?

(a) Step (i) is carried out by Nitrosomonas or Nitrococcus

(b) Step (ii) is carried out by Nitrobacter

(c) Both steps (i) and (ii) can be called nitrification

(d) Bacteria carrying out these steps are usually photoautotrophs

Ans:(d) Bacteria carrying out these steps are usually chemoautotrophs.

Q6. With regard to the Biological Nitrogen Fixation by Rhizobium in association with soyabean, **which one of the following statement/statements does not hold true?**

(a) Nitrogenase may require oxygen to its functioning

(b) Nitrogenase is Mo-Fe protein

(c) Leghaemoglobin is a pink coloured pigment

(d) Nitrogenase helps to convert N2 gas into two molecules of ammonia

Ans:(a) Nitrogenase is highly sensitive to molecular oxygen (02), thus requires anaerobic conditions. Nodules have adaptations that ensure that the enzyme is protected from 02. To protect nitrogehase, nodule contains an 02-scavenger celled leghaemoglobin.

Q7. Match the element with its associated functions/roles and choose the correct option among the given below.

A.	Boron	(i) V	Splitting of H_20 to liberate 0_2 during photosynthesis
B.	Manganese	(ii)	Needed for synthesis of auxins
C.	Molybdenum	(iii)	Component of nitrogenase
D.	Zinc	(iv)	Pollen germination
E.	Iron	(v)	Component of ferredoxin

(b) A–(iv), B–(i), C–(iii), D–(ii), E–(v)
(c) . A–(iii), B–(ii), C–(iv), D–(v), E–(i)
(d) A–(ii), B–(iii), C–(v), D–(i), E–(iv)
Ans: (b)

A.	Boron	(iv)	Pollen germination
B.	Manganese	(0	Splitting of H_20 to liberate 0_2 during photosynthesis
C.	Molybdenum	(iii)	Component of nitrogenase
D.	Zinc	(ii)	Needed for synthesis of auxins
E.	Iron	(v)	Component of ferredoxin

Q8. Plants can be grown in (Tick the incorrect option).
(a) Soil with essential nutrients
(b) Water with essential nutrients
(c) Either water or soil with essential nutrients
(d) Water or soil without essential nutrients
Ans: (d) Plants can be grown in soil with essential nutrients, water with essential nutrients and either water or soil with essential nutrients.

Very Short Answer Type Questions
Q1. Name a plant, which accumulates silicon.
Ans: Rice, sugarcane, etc.

Q2. Mycorrhiza **is a mutualistic association. How do the organisms involved in this association gain from each other?**
Ans: Mycorrhiza is a symbiotic association between a fungus and the roots of a vascular plant. Through mycorrhization, the plant obtains phosphate and other minerals, such as zinc and copper, from the soil. The fungus obtains nutrients, such as sugars, from the plant root.

Q3. Nitrogen fixation is shown by prokaryotes and not eukaryotes. Comment?
Ans: Very few living organisms can utilise the nitrogen in the form N2, available abundantly in the air. Only certain prokaryotic species are capable of fixing nitrogen. The enzyme, nitrogenase which is capable of nitrogen reduction is present exclusively in prokaryotes. Such microbes are called N2-fixers.

Q4. Carnivorous plants like Nepenthes and Venus fly trap have nutritional adaptations. Which nutrient do they especially obtain and from where?
Ans: Carnivorous plants grow in nitrogen deficient soil but they utilise their nitrogen by killing

Q5. Think of a plant which lacks chlorophyll. From where will it obtain nutrition? Give an example of such a type of plant.

Ans: Cuscuta, a parasitic plant that is commonly found growing on hedge plants, has lost its chlorophyll and leaves in the course of evolution. It derives its nutrition from the host plant which it parasitises.

Q6. Name an insectivorous angiosperm.

Ans: Nepenthes, Utricularia, Drosera, Dionea, etc.

Q7. A farmer adds Azotobacter culture to soil **before sowing maize. Which** mineral element is **being replenished?**

Ans: Nitrogen

Q8. What type of conditions are created by leghaemoglobin in the root nodule of a legume?

Ans: Anaerobic condition

Q9. What is common to Nepenthes, Utricularia and Drosera with regard to mode **of nutrition**

Ans: All are carnivorous plant (angiosperms).

Q10. Plants with zinc deficiency show reduced biosynthesis of .

Ans: Auxin

Q11. Yellowish edges appear in leaves deficient in .

Ans: K (potassium)

Q12. Name the macronutrient which is a component of all organic compounds but is not obtained from soil.

Ans: Carbon

Q13. Name one non-symbiotic nitrogen fixing **prokaryote.**

Ans: (i) Free-living (non-symbiotic) and non photosynthetic aerobic N2-fixing microbes: Azotobacter and Beijernickia.

(ii) Free-living and anaerobic N2-fixing microbes: Rhodospirillum, Bacillus polymyxa and Clostridium.

Q15. Complete the equation for reductive amination

$$\text{.....?.....} + NH_4^+ + NADPH \xrightarrow{?} \text{glutamate} + H_2O + NADP$$

Ans. α-ketoglutaric acid + NH_4^+ + NADPH $\xrightarrow[\text{dehydrogenase}]{\text{Glutamate}}$ glutamate + H_2O + NADP

Q16. Excess of Mn in soil leads to deficiency **of Ca, Mg and Fe. Justify.**

Ans: Manganese competes with iron and magnesium for uptake and with magnesium for binding with enzymes. Manganese also inhibits calcium translocation in shoot apex. Therefore, excess of manganese may, in fact, induce deficiencies of iron, magnesium and calcium. Thus, what appears as symptoms of manganese toxicity may actually be the deficiency symptoms of iron, magnesium and calcium.

Short Answer Type Questions

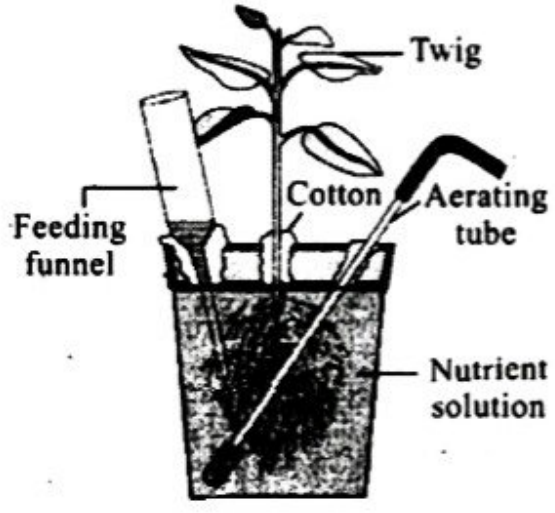
Q1. How is sulphur important for plants? Name the amino acids in which it is present.

Ans: Sulphur, besides being present in some amino acids essential for protein synthesis, is also a constituent of several coenzymes, vitamins and ferredoxin which are involved in some biochemical pathway.

Q2. How are organisms like Pseudomonas and Thiobacillus of great significance in nitrogen cycle?

Ans: Pseudomonas and Thiobacillus carry out denitrification process wherein the nitrate present in the soil is reduced to nitrogen thus contributing to the atmospheric nitrogen.

Q3. Carefully observe the following figure:



a. Name the technique shown in the figure and the scientist who demonstrated this technique for the first time.

b. Name at least three plants for which this technique can be employed for their commercial production.

c. What is the significance of aerating tube and feeding funnel in this setup?

Chapter 13 (PHOTOSYNTHESIS IN HIGHER PLANTS)

Multiple Choice Questions

Q1. Which metal ion is a constituent of chlorophyll?

(a) Iron (b) Copper (c) Magnesium (d) Zinc

Ans: (c) Magnesium ion is a constituent of chlorophyll.

Q2. Which pigment acts directly to convert light energy to chemical energy?

(a) Chlorophyll a (b) Chlorophyll b

(c) Xanthophyll (d) Carotenoid

Ans: (a) Chlorophyll a pigment acts directly to convert light energy to chemical energy.

Q3. Which range of wavelength (in nm) is called photosynthetically active radiation (PAR)?

(a) 100-390 (b) 390-430 (c) 400-700 (d) 760-10000

Ans: (c) 400-700 range of wavelength (in nm) is called photosynthetically active radiation (PAR).

Q4. Which light range is least effective in photosynthesis?

(a) Blue (b) Green (c) Red (d) Violet

Ans: (b) Green light range is least effective in photosynthesis.

Q5. Chemosynthetic bacteria obtain energy from

(a) Sun (b) Infrared rays

(c) Organic substances (d) Inorganic chemicals

Ans: (d) Chemosynthetic bacteria obtain energy from inorganic chemicals.

Q6. Energy required for ATP synthesis in PSII comes from

(a) Proton gradient (b) Electron gradient

(c) Reduction of glucose (d) Oxidation of glucose

Ans: (a) Energy required for ATP synthesis in PSII comes from proton gradient.

Q7. During light reaction in photosynthesis, the following are formed

(a) ATP and sugar

(b) Hydrogen, 0_2 and sugar

(c) ATP, hydrogen donor and 0_2

(d) ATP, hydrogen and 0_2 donor

Ans: (c) During light reaction in photosynthesis the following are formed ATP, hydrogen donor/(NADPH) and 0_2.

Q8. Dark reaction in photosynthesis is called so because

(a) It can occur in dark also

(b) It does not directly depend on light energy

(c) It cannot occur during day light

(d) It occurs more rapidly at night

Ans: (b) Dark reaction in photosynthesis is called so because it does not directly depend on light energy.

Q9. PEP is primary $C0_2$ acceptor in

(a) C_4 plants

(b) C_3 plants

(c) C_2 plants

(d) Both C_3 and C_4 plants

Ans: (a) PEP is primary $C0_2$ acceptor in C_4 plants.

Q10. Splitting of water is associated with

(a) Photosystem I

(b) Lumen of thylakoid

(c) Both Photosystem I and II

(d) Inner surface of thylakoid membrane

Ans: (d) Splitting of water is associated with inner surface of thylakoid membrane.

Q11. The correct sequence of flow of electrons in the light reaction is

(a) PSII, plastoquinone, cytochromes, PSI, ferredoxin

(b) PSI, plastoquinone, cytochromes, PSII, ferredoxin

(c) PSI, ferredoxin, PSII

(d) PSI, plastoquinone, cytochromes, PSII, ferredoxin

Ans: (a) The correct sequence of flow of electrons in the light reaction is PSII, plastoquinone, cytochromes, PSI and ferredoxin.

Q12. The enzyme that is not found in a C_3 plant is

(a) RuBP Carboxylase

(b) PEP Carboxylase

(c) NADP reductase

(d) ATP synthase

Ans: (b) The enzyme that is not found in a C_3 plant is PEP Carboxylase.

Q13. The reaction that is responsible for the primary fixation $C0_2$ is catalysed by

(a) RuBP carboxylase

(b) PEP carboxylase

(c) RuBP carboxylase and PEP carboxylase

(d) PGA synthase

Ans: (c) The reaction that is responsible for the primary fixation of $C0_2$ is catalysed by RuBP carboxylase and PEP carboxylase.

(b) Glyceraldehyde-3-phosphate

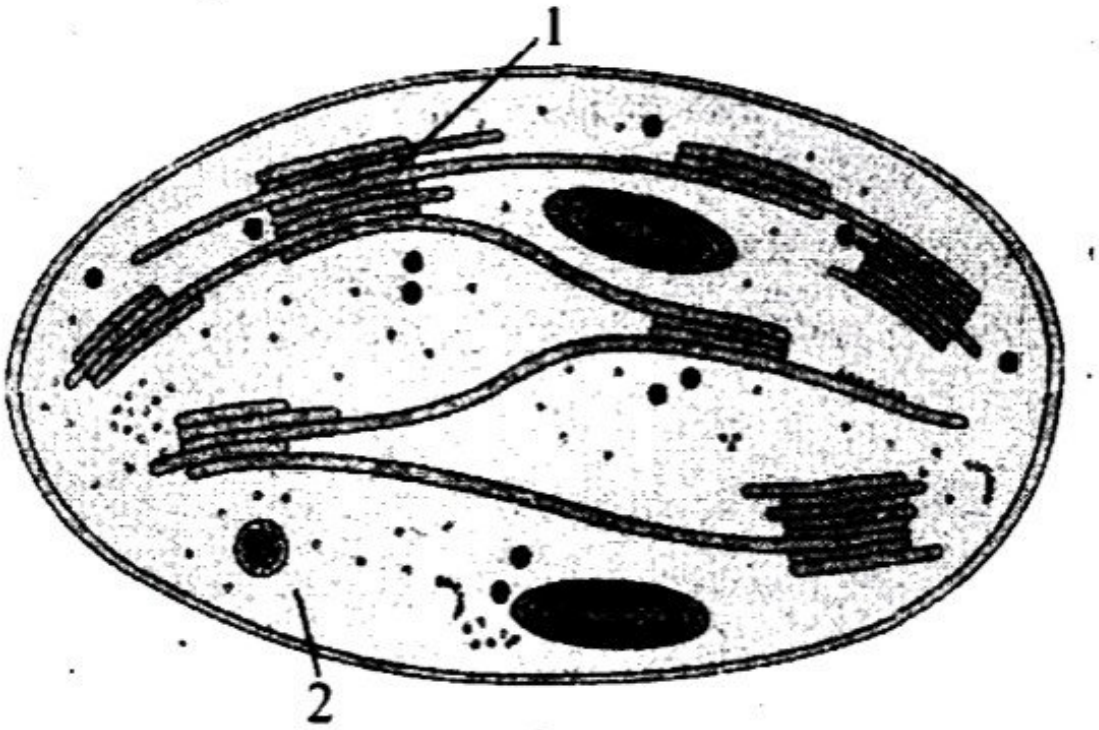
(c) Phosphoglycerate

(d) Oxaloacetate

Ans: (d) When CO_2 is added to PEP, the first stable product synthesised is oxaloacetate.

Very Short Answer Type Questions

Q1. Examine the figure.



a. Is this structure present in animal **cell or plant cell?**

b. Can these be passed on to the progeny? How?

c. Name the metabolic processes taking place in the places marked (1) and (2).

Ans: a. Plant cell.

b. Yes, through female gametes.

c. In part (1)– Photophosphorylation. In part (2)–Calvin cycle.

2. $2H_2O \rightarrow 2H^+ + O_2 + 4e^-$

Based on the above equation, answer the following questions:

a. Where does this reaction take place in plants?

b. What is the significance of this reaction?

Ans: a. Lumen of the thylakoids.

b. 0_2 is evolved during this reaction; moreover, electrons are made available to PS-II continuously.

Q3. Cyanobacteria and some other photosynthetic bacteria do not have chloroplasts. How do they conduct photosynthesis?

Ans: Cyanobacteria and other photosynthetic bacteria have thylakoids suspended freely in the cytoplasm (i.e., they are not enclosed in membrane), and they have bacteriochlorophyll.

Q4. a. NADP reductase enzyme is located on

Q4. a. NADP reductase enzyme is located on

b. Breakdown of proton gradient leads to release of

Ans: a. Grana-lamellae.

b. Energy.

Q5. Can girdling experiments be done in monocots? If yes, how? If no, why not?

Ans: No, because vascular bundles are scattered in monocot.

6. $3CO_2 + 9ATP + 6NADPH + Water \rightarrow$ glyceraldehyde 3-phosphate $+ 9ADP + 6NADP^+ + 8Pi$

Analyse the above reaction and answer the following questions:

a. How many molecules of ATP and NADPH are required to fix one molecule of C02?

b. Where in the chloroplast does this process occur?

Ans: a. Three molecules of ATP and two molecules of NADPH are required to fix one molecule of C02

b. Stroma of chloroplast

Q7. Does moonlight support photosynthesis? Find out.

Ans: As the intensity of moonlight is much less than the sunlight, so it does not support photosynthesis.

Q8. Some of these terms/chemicals are associated with the C_4 Explain.

a. Hatch and Slack pathway

b. **Calvin cycle**

c. PEP carboxylase

d. **Bundle sheath cells**

Ans: Though C_4 plants have C_4 oxaloacetic acid as is the first CO_2 fixation product they use the C_3 pathway or Calvin cycle as the main biosynthetic pathway. C_4 pathway is also called Hatch and Slack Pathway

- 1° CO_2 acceptor in C_4 plants is a 3-C molecule PEP (phosphoenol pyruvate) and is present in the mesophyll cells. The enzyme responsible for the fixation is PEPcase (PEP carboxylase) is found only in mesophyll cells. Bundle sheath cells lack PEPcase enzyme.
- C_4 acid (OAA) is formed by carboxylation is mesophyll cells; therefore, initial carboxylation reaction occurs in mesophyll cells (also in C_3 pathway). OAA forms other 4-C compounds like malic acid or aspartic acid in the mesophyll cells itself, which are transported to the bundle sheath cells.
- CO_2 released in the bundle sheath cells enters the C_3 or the Calvin pathway, a pathway common to all plants. The bundle sheath cells are rich in RuBisCO enzyme (necessary for the C_3 or the Calvin cycle), but lack PEPcase.
- Calvin pathway in C_4 plants takes place only in bundle sheath cells (because RuBisCO is present) but does not take place in the mesophyll cells because lack of RuBisCO enzyme in mesophyll cells of C_4 plants like maize, sorghum, sugarcane, Jowar, Euphorbia, Atriplex,

Chapter 14 (RESPIRATION IN PLANTS)

Multiple Choice Questions

Q1. The ultimate electron acceptor of respiration in an aerobic **organism is**

(a) Cytochrome (b) Oxygen

(c) Hydrogen (d) Glucose

Ans: (b) The ultimate electron acceptor of respiration in an aerobic organism is oxygen.

Q2. Phosphorylation of glucose during glycolysis is catalyzed **by**

(a) Phosphoglucomutase (b) Phosphoglucoisomerase

(c) Hexokinase (d) Phosphorylase

Ans: (c) Phosphorylation of glucose during glycolysis is catalyzed by hexokinase.

Q3. Pyruvic acid, the key product of glycolysis can have many metabolic fates. Under aerobic condition **it forms**

(a) Lactic acid

(b) C02 + H20

(c) Acetyl CoA + C02

(d) Ethanol + CO

Ans: (c) Pyruvic acid, the key product of glycolysis can have many metabolic fates. Under aerobic condition it forms Acetyl CoA + CO2.

Q4. Electron Transport System (ETS) is located in mitochondrial

(a) Outer membrane

(b) Inter membrane space

(c) Inner membrane

(d) Matrix

Ans: (c) Electron Transport System (ETS) is located in mitochondrial inner membrane.

Q5. Which of the following exhibits the highest rate of respiration? .

(a) Growing shoot apex

(b) Germinating seed

(c) Root tip

(d) Leaf bud

Ans: (b) Germinating seed exhibits the highest rate of respiration.

Q6. Mitochondria are called powerhouses of the cell. Which of the following observations support this statement?

(a) Mitochondria synthesise ATP

(b) Mitochondria have a double membrane .

(c) The en2ymes of the Krebs' cycle and the cytochromes are found in mitochondria

(d) Mitochondria are found in almost all plant and animal cells

Ans: (a) Mitochondria are called powerhouses of the cell because mitochondria synthesise ATP.

Q7. The end product of oxidative phosphorylation is

(a) NADH

(b) Oxygen

(c) ADP

(d) ATP + H20

Ans: (d) The end product of oxidative phosphorylation is$ATP+H_2o$.

Q8. Match the following and choose the correct option from those given below.

Column A		Column B	
A.	Molecular oxygen	(i)	a-Ketoglutaric acid
B.	Electron acceptor	(ii)	Hydrogen acceptor
C.	Pyruvate dehydrogenase	(iii)	Cytochrome C
D.	Decarboxylation	(iv)	Acetyl Co A

(a) A–(ii), B–(iii), C–(iv), D–(i)

(b) A–(iii), B–(iv), C–(ii), D–(i)

(c) A–(ii), B–(i), C–(iii), D–(iv)

(d) A–(iv), B–(iii), C–(i), D–(ii)

Ans. (a)

A.	Molecular oxygen	(ii)	Hydrogen acceptor

Chapter 15 (PLANT GROWTH AND DEVELOPMENT)

Multiple Choice Questions

Q1. Ethylene is used for

(a) Retarding ripening of tomatoes

(b) Hastening of ripening of fruits

(c) Slowing down ripening of apples

(d) Both (b) and (c)

Ans: (b) Ethylene is used for hastening of ripening of fruits.

Q2. Coconut water contains

(a) ABA

(b) auxin

(c) cytokinin

(d) gibberellin

Ans: (c) Coconut water contains cytokinin.

Q3. The effect of apical dominance can be overcome by which of the following hormone?

(a) IAA

(b) Ethylene

(c) Gibberellin

(d) Cytokinin

Ans: (d) The effect of apical dominance can be overcome by cytokinin hormone.

Q4. Match the following:

A.	IAA	(0	Herring sperm DNA
B.	ABA	(ii)	Bolting
C.	Ethylene	(iii)	Stomatal closure
D.	GA	(iv)	Weed-free lawns
E.	Cytokinins	(v)	Ripening of fruits

Ans: (a)

A.	IAA	(iv)	Weed-free lawns
B.	ABA	(iii)	Stomatal closure
C.	Ethylene	(v)	Ripening of fruits
D.	GA	(ii)	Bolting
E.	Cytokinins	(i)	Herring sperm DNA

Q5. Apples are generally wrapped in waxed paper to
(a) prevent sunlight for changing its colour
(b) prevent aerobic respiration by checking the entry of 02
(c) prevent ethylene formation due to injury
(d) make the apples look attractive
Ans: (b) Apples are generally wrapped in waxed paper to prevent aerobic respiration by checking the entry of 02.

Q6. Growth can be measured in various ways. Which of these can be used as parameters to measure growth?
(a) Increase in cell number
(b) Increase in cell size
(c) Increase in length and weight
(d) All the above
Ans: (d) Growth can be measured in various ways. Increase in cell number, increase in cell size and increase in length and weight are used as parameters to measure growth.

Q7. The term synergistic action of hormones refers to
(a) when two hormones act together but bring about opposite effects
(b) when two hormones act together and contribute to the same function
(c) when one hormone affects more than one function
(d) when many hormones bring about any one function
Ans: (b) The term synergistic action of hormones refers to when two hormones act together and contribute to the same function.

Q8. Plasticity in plant growth means that
(a) plant roots are extensible

(b) plant development is dependent on the environment

(c) stems can extend

(d) none of the above

Ans: (b) Plasticity in plant growth means that plant development is dependent on the environment.

Q9. To increase sugar production in sugarcanes, they are sprayed with

(a) IAA

(b) cytokinin

(c) gibberellin

(d) ethylene

Ans: (c) To increase sugar production in sugarcanes, they are sprayed with gibberellin.

Q10. ABA acts antagonistic to

(a) ethylene

(b) cytokinin

(c) gibberellic acid

(d) IAA

Ans: (c) ABA acts antagonistic to gibberellic acid.

Q11. Monocarpic plants are those which

(a) bear flowers with one ovary

(b) flower once and die

(c) bear only one flower

(d) all of the above

Ans: (b) Monocarpic plants are flower once and die.

Q12. The photoperiod in plants is perceived at

(a) meristem

(b) flower

(c) floral buds

(d) leaves

Ans: (d) The photoperiod in plants is perceived at leaves.

Very Short Answer type Questions

Q1. Fill in the places with appropriate word/words.

a. A phase of growth which is maximum and fastest is .

b. Apical dominance as expressed in dicotyledonous plants is due to the presence of more ____ in the apical bud than in the lateral ones.

c. In addition to auxin, a _____ must be supplied to culture **medium to obtain a good callus in plant tissue culture.**

d. _____of a vegetative plants are the sites of photoperiodic perception.

Ans: a. Exponential/log phase of an S-curve.

b. Auxin/IAA

c. Cytokinin|Kinetin|6 BAP/Zeatin|etc.

Chapter 16 (DIGESTION AND ABSORPTION)

Multiple Choice Questions

Q1. Select what is not true of intestinal villi among the following

(a) They possess microvilli

(b) They increase the surface area

(c) They are supplied with capillaries and the lacteal vessels (d_) They only participate in digestion of fats

Ans: (d) They only participate in digestion of fats.

Q2. Hepato-pancreatic duct opens into the duodenum and carries

(a) Bile (b) Pancreatic juice

(c) Both bile and pancreatic juice (d) Saliva

Ans: (c) Hepatc-pancreatic duct opens into the duodenum and carries bcth bile and pancreatic juice.

Q3. One of the following is not a common disorder associated with digestive system

(a) Tetanus (b) Diarrhoea (c) Jaundice (d) Dysentery

Ans: (a) Tetanus is nct a common disorder asscciated with digestive system.

Q4. A gland not associated with the alimentary canal is

(a) Pancreas (b) Adrenal

(c) Liver (d) Salivary glands

Ans: (b) A gland nct associated with the alimentary canal is adrenal (this is endocrine gland).

Q5. Match the two columns and select the correct among options given

	Column I		Column II
A.	Biomacromolecules	(i)	Alimentary canal and of food associated gland
B.	Human digestive system	(ii)	Embedded in jawbones
C.	Stomach	(iii)	Outer wall of visceral organs

D.	Thecodont	(iv)	Converted into simple substances
E.	Serosa	(v)	U-shaped bag like structure

Options:

(a) A–(ii), B–(i), C–(v), D–(iii), E–(iv)

(b) A–(iv), B–(i), C–(v), D–(ii), E–(iii)

(c) A–(i), B–(ii), C–(iii), D–(iv), E–(v)

(d) A–(i), B–(iii), C–(ii), D–(iv), E-(v)

Ans. (b)

A.	Biomacromolecules	(iv)	Converted into simple substances
B.	Human digestive	(i)	Alimentary canal and of food associated
	system		gland
C.	Stomach	(v)	U-shaped bag like structure
D.	Thecodont	(ii)	Embedded in jawbones
E.	Serosa	(iii)	Outer wall of visceral organs

6. Match the two columns and select the right one among options given

Column I		Column II	
A.	Duodenum	(i)	A cartilagenous flap
B.	Epiglottis	(ii)	Small blind sac
C.	Glottis	(Hi)	'C' shaped structure emerging from the stomach
D.	Caecum	(iv)	Opening of wind pipe

(c) A–(iii), B–(i), C–(iv), D–(ii)
(d) A–(ii), B–(iv), C–(i), D–(iii)

A.	Duodenum	(iii)	'C' shaped structure emerging from the stomach
B.	Epiglottis	(i)	A cartilagenous flap
C.	Glottis	(iv)	Opening of wind pipe
D.	Caecum	(ii)	Small blind sac

Q7. Match the enzymes with their respective substrates choose the right one among options given.

Column I		Column II	
A.	Lipase	(i)	Dipeptides
B.	Nuclease	(ii)	Fats
C.	Carboxypeptidase	(iii)	Nucleic acids
D.	Dipeptidases	(iv)	Proteins, peptones and proteoses

Options:
(a) A–(ii), B–(iii), C–(i), D–(iv)
(b) A–(iii), B–(iv), C–(ii), D–(i)
(c) A–(iii), B–(i), C–(iv), D–(ii)
(d) A–(ii), B–(iii), C–(iv), D–(i)

A.	Lipase	(ii)	Fats
B.	Nuclease	(iii)	Nucleic acids
C.	Carboxypeptidase	(iv)	Proteins, peptones and proteoses
D.	Dipeptidases	(i)	Dipeptides

Ans. (d)

(a) $\frac{3223}{3223}$ (b) $\frac{2123}{2123}$ (c) $\frac{1232}{1232}$ (d) $\frac{2233}{2233}$

Ans. (b) Dental formula in human beings is $\frac{2123}{2123}$.

Q9. Liver is the largest gland and is associated with functions, choose one which is not correct

(a) Metabolism of carbohydrate

(b) Digestion of fat

(c) Formation of bile

(d) Secretion of hormone called gastrin

Ans: (d) Liver is the largest gland and is associated with functions metabolism of carbohydrate, digestion of fat and formation of bile.

Q10. Mark the right statement among the following

(a) Trypsinogen is an inactive enzyme

(b) ' Trypsinogen is secreted by intestinal mucosa

(c) Enterokinase is secreted by pancreas

(d) Bile contains trypsin

Ans: (a)

$$\textbf{Trypsinogen} \xrightarrow[\text{(Intestinal Juice)}]{\text{Enterokinase}} \textbf{Trypsin}$$

Very Short Answer Type Questions

Q1. The food mixes thoroughly with the acidic gastric juice of the stomach by the churning movements of its muscular wall. What do we call the food then?

Ans: Chyme

Q2. Trypsinogen is an inactive enzyme of pancreatic juice. An enzyme, enterokinase, activates it. Which tissue/cells secrete this enzyme?/ How is it activated?

Ans: Intestinal mucosa

Q3. In which part of alimentary canal does absorption of water, simple sugars and alcohol takes **place?**

Ans: Stomach

Q4. Name the enzymes involved in the breakdown of nucleotides into sugars and bases.

Ans: Nucleotidases and Nucleosidases

Q5. Define digestion in one sentence.

Ans: The process of conversion of complex food substances in the digestive system to simple absorbable forms is called digestion.

Q6. What do we call the type of teeth attachment to j aw bones in which each tooth is

Chapter 17 (BREATHING AND EXCHANGE OF GASES)

Multiple Choice Questions

Q1. Respiration in insects is called direct because '

(a) The cells exchange $0_2/C0_2$ directly with the air in the tubes
(b) The tissues exchange $0_2/C0_2$ directly with coelomic fluid
(c) The tissues exchange $0_2/C0_2$ directly with the air outside through body surface
(d) " Tracheal tubes exchange $0_2/C0_2$ directly with the haemocoel which then exchange with tissues

Ans: (d) Respiration in insects is called direct because tracheal tubes exchange $0_2/C0_2$ directly with the haemocoel which then exchange with tissues.

Q2.A person suffers punctures in his chest cavity in an accident, without any damage to the lungs, its effect could be
(a) Reduced breathing rate
(b) Rapid increase in breathing rate
(c) No change in respiration
(d) Cessation of breathing

Ans: (d)A person suffers punctures in his chest cavity in an accident, without any damage to the lungs, its effect could be cessation of breathing.

Q3. It is known that exposure to carbon monoxide is harmful to animals because
(a) It reduces $C0_2$ transport
(b) It reduces 0_2 transport
(c) It increases $C0_2$ transport
(d) It increases 0_2 transport

Ans: (b) CO is a poisonous gas which binds with Hb more rapidly than 0_2 to form carboxyhaemoglobin. CO makes .the most stable combination with the Hb of blood. CO has 200-250 times more affinity for Hb as compared to 0_2. When the inhaled air contains CO gas then a person suffers from suffocation because product cannot dissociate so decreases free oxygen. So it reduces 0_2 transport.

Q4. Mark the true statement among the following with reference to normal breathing.

(a) Inspiration is a passive process whereas expiration is active

(b) Inspiration is an active process whereas expiration is passive

(c) Inspiration and expiration are active processes

(d) Inspiration and expiration are passive processes

Ans: (b) Inspiration is an active process whereas expiration is passive.

Q5. Mark the incorrect statement in context to 0_2 binding to Hb.

(a) Lower pH

(b) Lower temperature

(c) Lower $pC0_2$

(d) Higher $p0_2$

Ans: (a) 0_2 binding to Hb occurs in the following conditions: lower temperature, lower $pC0_2$ and higher $p0_2$.

Q6.Mark the correct pair of muscles involved in the normal breathing in humans

(a)External and internal intercostal muscles

(b)Diaphragm and abdominal muscles

(c)Diaphragm and external intercostal muscles

(d) Diaphragm and intercostal muscles

Ans: (d) Diaphragm and intercostal muscles involved in the normal breathing in humans. ,

Q7. Incidence of Emphysema—a respiratory disorder is high in cigarette smokers. In such cases

(a) The bronchioles are found damaged

(b) The alveolar walls are found damaged

(c) The plasma membrane is found damaged

(d) The respiratory muscles are found damaged

Ans: (b) Emphysema is a chronic disorderin which alveolar walls are damaged due to which respiratory surface is decreased.

Q8. Respiratory **process is regulated by certain specialised centres in the brain. One of the following listed centres can reduce the inspiratory duration upon stimulation**

(a) Medullary inspiratory centre (b) Pneumotaxic centre

(c) Apneustic centre (d) Chemosensitive centre

Ans: (b) Pneumotaxic centre can reduce the inspiratory duration upon stimulation.

Q9. CO_2 dissociates from carbaminohaemoglobin when

(a) pCO_2 is high and pO_2 is low

(b) pO_2 is high and pCO_2 is low

(c) pCO_2 and pO_2 are equal

(d) None of the above

Ans: (b) CO_2 dissociates from carbaminohaemoglobin when pO_2 is high and pCO_2 is low.

Q10. In breathing movements, air volume can be estimated by .

(a) Stethoscope

(b) Hygrometer

(c) Sphygmomanometer

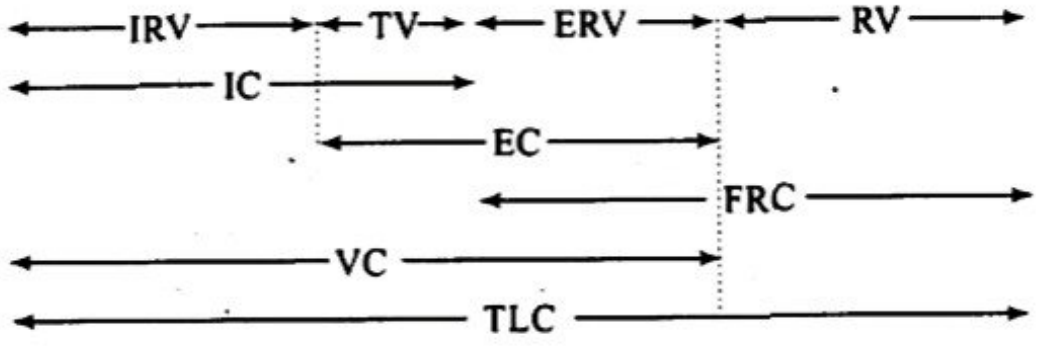
(d) Spirometer

Ans: (d) In breathing movements, air volume can be estimated by spirometer.

Q11.From the following relationships between respiratory volumes and capacities, mark the correct option.

(a)	(i) Incorrect	(ii) Incorrect	(iii) Incorrect	(iv) Corre
(b)	(i) Incorrect	(ii) Correct	(iii) Incorrect	(iv) Correct
(c)	(i) Correct	(ii) Correct	(iii) Incorrect	(iv) Correct
(d)	(i) Correct	(ii) Incorrect	(iii) Correct	(iv) Incorrect

Ans. (b)



i. Inspiratory Capacity (IC) = Tidal Volume + Inspiratory Residual Volume (IRV) ,

iii. Residual Volume (RV) = TLC − VC

Q12. The oxygen-haemoglobin dissociation curve will show a right shift in case of

(a) High pCO_2

(b) HighpO_2

(c) Low pCO_2

(d) Less H^+ concentration

Ans: (a) Curve shift is right in following conditions: (1) Decrease in pO_2, (2) Increase in pCO_2 (Bohr effect), (3) Increase in body temperature, (4) Increase in H^+ ion concentration, (5) Decrease in pH, (6) Increase in 2, 3 diphosphoglycerate.

Q13. Match the following and mark the correct option.

(a) High pCO_2

(b) High$p0_2$

(c) Low pCO_2

(d) Less H^+ concentration

Ans: (a) Curve shift is right in following conditions: (1) Decrease in $p0_2$, (2) Increase in pCO_2 (Bohr effect), (3) Increase in body temperature, (4) Increase in H^+ ion concentration, (5) Decrease in pH, (6) Increase in 2, 3 diphosphoglycerate.

Q13. Match the following and mark the correct options

Animal		Respiratory organ	
A.	Earthworm	(0	Moist cuticle
B.	Aquatic Arthropods	(ii)	Gills
C.	Fishes	(iii)	Lungs
D.	Birds/Reptiles	(iv)	Trachea

(a) A–(ii), B–(i), C–(iv), D–(iii)

(b) A–(i), B–(iv), C–(ii), D–(iii)

(c) A–(i), B–(iii), C–(ii), D–(iv)

(d) A–(i), B–(iv), C–(ii), D–(iii)

Ans: (d)

Animal		Respiratory organ	
A.	Earthworm	0)	Moist cuticle
B.	Aquatic Arthropods	(iv)	Trachea
C.	Fishes	(ii)	Gills
D.	Birds/Reptiles	(iii)	Lungs

Fluids and Circulation

Multiple Choice Questions

Q1. Which of the following cells does not exhibit phagocytic activity?

(a) Monocytes (b) Neutrophil (c) Basophil (d) Macrophage

Ans: (c) Basophils secrete histamine, serotonin, heparin, etc., and are involved in inflammatory reactions.

Q2. One of the common symptoms observed in people infected with Dengue fever is

(a) significant decrease in RBC count

(b) significant decrease in WBC count

(c) significant decrease in platelets count

(d) significant increase in platelets count

Ans: (c) One of the common symptoms observed in people infected with Dengue fever is significant decrease in platelets count.

Q3. Which among the followings is correct during each cardiac cycle?

(a) The volume of blood pumped out by the Rt and Lt ventricles is same

(b) The volume of blood pumped out by the Rt and Lt ventricles is different

(c) The volume of blood received by each atrium is different

(d) The volume of blood received by the aorta and pulmonary artery is different

Ans: (a) The volume of blood pumped out by the Rt and Lt ventricles is same.

Q4. The cardiac activity could be moderated by the autonomous neural system. Tick the correct answer

(a) The parasympathetic system stimulates heart rate and stroke volume

(b) The sympathetic system stimulates heart rate and stroke volume

(c) The parasympathetic system decreases the heart rate but increas volume

(d) The sympathetic system decreases the heart rate but increase stroke volume

Ans: (b) A special neural centre in the medulla oblongata can moderate the cardiac function through autonomic nervous system (ANS). Neural signals through the sympathetic nerves (part of ANS) can increase the rate of heart beat, the strength of ventricular contraction and thereby the cardiac output. On the other hand, parasympathetic neural signals (another component of ANS) decrease the rate of heart beat, speed of conduction of action potential and thereby the cardiac output.

Q5. Mark the pair of substances among the following which is essential for coagulation of blood.

(a) Heparin and calcium ions (b) Calcium ions and platelet factors

(c) Oxalates and citrates (d) Platelet factors and heparin

Ans: (b) Calcium ions and platelet factors are essential for coagulation of blood.

Q6. ECG depicts the depolarisation and repolarisation processes during the cardiac cycle. In the ECG of a normal healthy individual one of the following waves is not represented.

(a) Depolarisation of atria **(b) Repolarisation of atria**

(c) Depolarisation of ventricles (d) Repolarisation of ventricles

Ans: (b) ECG depicts the depolarisation and repolarisation processes during the cardiac cycle. In the ECG of a normal healthy individual repolarisation of atria is not represented.

Q7. Which one of the following types of cells lack nucleus in humans

(a) RBC (b) Neutrophils (c) Eosinophils (d) Erythrocytes

Ans: (a and d) RBCs or erythrocytes lack nucleus in humans.

Q8. Which one of the following blood cells is involved in antibody production?

(a) B-lymphocytes (b) T-Lymphocytes

(c) RBC **(d) Neutrophils**

Ans: (a) B-lymphocytes cells are involved in antibody production.

Q9. The cardiac impulse is initiated and conducted further up to ventricle. The correct sequence of conduction of impulse is

3

(a) S A Node → A V Node Purkinje fiber → A

(b) S A Node → Purkinje fiber → A V Node →

(c) S A Node → A V Node → A V Bundle Purkinje fiber

(d) S A Node → Purkinje fiber → A V Bundle → A V Node

Ans. (c) S A Node → A V Node → A V Bundle → Purkinje fiber

Q10. Agranulocytes responsible for immune response of the body are

(a) Basophils (b) Neutrophils (c) Eosinophils (d) Lymphocytes

Ans: (d) Lymphocytes (20-25%) are of two major types—'B' and 'T' forms. Both B and T lymphocytes are responsible for immune responses of the body.

Q11. The second heart sound (dub) is associated with the closure of

(a) Tricuspid valve (b) Semilunar valves

(c) Bicuspid valve (d) Tricuspid and bicuspid valves

Ans: (b) The first heart sound (lub) is associated with the closure of the tricuspid and bicuspid valves whereas the second heart sound (dub) is associated with the closure of the semilunar valves.

Q12. Which of the following correctly explains a phase/event in cardiac cycle in a standard electrocardiogram?

(a) QRS complex indicates atrial contraction

(b) QRS complex indicates ventricular contraction

(c) Time between S and T represents atrial systole

(d) P-wave indicates beginning of ventricular contraction

Ans: (b)

- P-wave—Atrial depolarisation (atrial systole/contraction)
- QRScomplex—Ventriculardepolarisation(ventricularsystole/contraction)

- T-wave—Ventricular repolarisation (ventricular relaxation)

Q13. Which of the following statements is incorrect?

(a) A person of 'O' blood group has anti 'A' and anti 'B' antibodies in his blood plasma

(b) A person of 'B' blood group cannot donate blood to a person of 'A' blood group

(c) Blood group is designated on the basis of the presence of antibodies in the blood plasma

(d) A person of AB blood group is universal recipient

Ans: (c) Blood group is designated on the basis of the antigen is present on the RBCs surface

Q14. What would be the cardiac output of a person having 72 heart beats per minute and a stroke volume of 50 mL?

(a) 360 mL (b) 3600 mL (c) 7200 mL (d) 5000 mL

Ans: (b) Cardiac output = Stroke volume x Heart rate = 50 x 72 = 3600 mL/min

Q15. Match the terms given under Column 'A' with their functions given under Column 'B' and select the answer from the options given below:

	Column A		**Column B**
A.	Lymphatic system	**(i)**	Carries oxygenated blood
B.	Pulmonary vein	**(ii)**	Immune Response
C.	Thrombocytes	**(iii)**	To drain back the tissue fluid to the circulatory system
D.	Lymphocytes	**(iv)**	Coagulation of blood

(a) A—(ii), B—(i), C—(iii), D—(iv)

(b) A—(iii), B—(i), C—(iv), D—(ii)

(c) A—(iii), B—(i), C—(ii), D—(iv)

(d) A—(ii), B—(i), C—(iii), D—(iv)

Ans: (b)

A.	Lymphatic System	**(iii)**	To drain back the tissue fluid to the circulatory syste
B.	Pulmonary vein	**(i)**	Carries oxygenated blood
C.	Thrombocytes	**(iv)**	Coagulation of blood
D.	Lymphocytes	**(ii)**	Immune Response

Q16. Read the following statements and choose the correct option.

Statement 1: Atria receive blood from all parts of the body which subsequently flows to ventricles.

Statement 2: Action potential generated at sino-atrial node passes from atria to ventricles.

(a) Action mentioned in Statement 1 is dependent on action mentioned in Statement 2.

(b) Action mentioned in Statement 2 is dependent on action mentioned in Statement 1.

(c) Actions mentioned in Statements 1 and 2 are independent of each other.

(d) Actions mentioned in Statements 1 and 2 are synchronous.

Ans: (b) Statement 1: Atria receive blood from all pans of the body which subsequently flows to ventricles.

Statement 2: Action potential generated at sino-atrial node passes from atria to ventricles.

Action mentioned in Statement 2 is dependent on action mentioned in Statement 1.

Very Short Answer Type Questions

Q1. Name the blood component which is viscous and straw coloured fluid.

Ans: Plasma .

Q4. Name the vascular connection that exists between the digestive tract and liver.

Ans: Hepatic portal system

Q5. Given below are the abnormal conditions related to blood circulation. Name the disorders.

a. Acute chest pain due to failure **of 0_2 supply to heart muscles**

b. Increased systolic pressure

Ans: a. Acute chest pain due to failure of 0_2 supply to heart muscles—Angina\

b. Increased systolic pressure—Hypertension/high blood pressure

Q6. Which is coronary artery diseases caused due to narrowing of the lumen of arteries?

Ans: Atherosclerosis

Q7. Define the following terms and give their-locations**?**

a. Purkinje fibre

b. Bundle of His

Ans: a. Purkinje fibre—Right and left bundles give rise to minute fibres throughout the ventricular musculature of the respective sides and are called purkinje fibres. .
b. Bundle of His—Purkinje fibres alongwith right and left bundles are known as bundle of His and present in ventricles.

Q8. State the functions of the following in blood:

a. Fibrinogen b. Globulin

c. Neutrophils d. Lymphocytes

Ans: a. Fibrinogen—Fibrinogens are needed for clotting or coagulation of blood.

b. Globulin—Globulins primarily are involved in immunity, i.e., defense mechanisms of the body.

c. Neutrophils—Phagocytosis

d. Lymphocytes—Immunity

Excretory Products and Their Elimination

Multiple Choice Questions

Q1. The following substances are the excretory products in animals. Choose the least toxic from among them.

(a) Urea (b) Uric acid

(c) Ammonia (d) Carbon dioxide

Ans: (b) Ammonia is the most toxic form and requires large amount of water for its elimination, whereas uric acid, being the least toxic, can be removed with a minimum loss of water.

Q2. Filtration of the blood takes place at

(a) PCT (b) DCT

(c) Collecting ducts (d) Malpighian body

Ans: (d) Filtration of the blood takes place at malpighian body.

Q3. Which of the following statements is incorrect?

a. ADH—prevents conversion of angiotensinogen in blood to angiotensin

b. Aldosterone—facilitates water reabsorption

c. ANF—enhances sodium reabsorption

d. Renin—causes vasodilation

Ans: (a) ADH is a hormone released from the posterior pituitary gland that causes an increase in blood pressure through reabsorption of water.

Q4. A large quantity of one of the following is removed from our body by lungs

(a) C02 only (b) H20 only

(c) C02 and H20 (d) Ammonia

Ans: (a) A large quantity of C02 is removed from our body by lungs.

Q5. The pH of human urine is approximately

(a) 6.5 (b) 7 (c) 6 (d) 7.5

Ans: (c) The pH of human urine is approximately 6.

Q6. Different types of excretory structures and animals are given below. Match them appropriately and mark the correct answer from among those given below

Excretory structure/ organ		Animals	
A.	Protonephridia	**(i)**	Prawn
B.	Nephridia	**(ii)**	Cockroach
C.	Malpighian tubules	**(iii)**	Earthworm
D.	Green gland or Antennal gland	**(iv)**	Flatworms

Options:

(a) D—(i), (C)—(ii), B—(iii), A—(iv)

(b) B— (i), (C)—(ii), A—(iii), B—(iv)

(c) D—(i), (C)—(ii), A—(iii), B-(iv)

(d) B—(i), (C)—(ii), B—(iii), D—(iv)

Ans. (a)

Excretory structure/ organ		Animals	
A.	Protonephridia	**(iv)**	Flatworms
B.	Nephridia	**(iii)**	Earthworm
C.	Malpighian tubules	**(ii)**	Cockroach
D.	Green gland or Antennal gland	**(i)**	Prawn

Q7. Which one of the following statements is incorrect?

(a) Birds and land snails are uricotelic animals.

(b) Mammals and frogs are ureotelic animals.

(c) Aquatic amphibians and aquatic insects are ammonotelic animals.

Ans: (d) Reptiles (snakes and lizards), birds, land snails and insects excrete nitrogenous wastes as uric acid in the form of pellet or paste with a minimum loss of water and are called uricotelic animals.

Q8. Which of the following pairs is wrong?

(a) Uricotelic — Birds (b) Ureotelic — Insects

(c) Ammonotelic — Tadpole (d) Ureotelic — Elephant

Ans: (b) Insects — Uricotelic

Q9. Which one of the following statements is incorrect?

(a) The medullary zone of kidney **is divided into a few conical masses called medullary pyramids projecting into the calyces.**

(b) Inside the kidney **the cortical region extends in between the medullary pyramids as renal pelvis**

(c) Glomerulus along with Bowman's capsule is called the renal corpuscle

(d) Renal corpuscle, proximal convoluted tubule (PCT) and distal convoluted tubule (DCT) of the nephron are situated in the cortical region of kidney

Ans: (b) The cortex extends in between the medullary pyramids as renal columns called Columns of Bertini.

Q10. The condition of accumulation of urea in the blood is termed as

(a) Renal Calculi (b) Glomerulonephritis

(c) Uremia (d) Ketonuria

Ans: (c) The condition of accumulation of urea in the blood is termed as uremia.

Q11. Which one of the following is also known as antidiuretic **hormone?**

(a) Oxytocin (b) Vasopressin (c) Adrenaline (d) Calcitonin

Ans: (b) Vasopressin is also known as antidiuretic hormone (ADH).

Q12. Match the terms given in Column I with their physiological processes given in Column II and choose the correct answer

Column I		**Column II**	
A.	Proximal convoluted tubule	**(i)**	Formation of concentrated urine
B.	Distal convoluted tubule	**(ii)**	Filtration of blood

C.	Henle's loop	(iii)	Reabsorption of 70-80% of electrolytes
D.	Counter-current mechanism	(iv)	Ionic balance
E.	Renal corpuscle	(v)	Maintenance of concentration gradient in medulla

Options:

(a) A—(iii), B—(v), C—(iv), D—(ii), E—(i)

(b) A—(iii), B—(iv), C—(i), D—(v), E—(ii)

(c) A—(i), B—(iii), C—(ii), D—(v), E—(iv)

(d) A—(iii), B—(i), C—(iv), D—(v), E—(ii)

Ans: (b)

A.	Proximal convoluted tubule	(iii)	Reabsorption of 70-80% of electrolytes
B.	Distal convoluted tubule	(iv)	Ionic balance
C.	Henle's loop	(i)	Formation of concentrated urine
D.	Counter-current mechanism	(v)	Maintenance of concentration gradient in medulla
E.	Renal corpuscle	(ii)	Filtration of blood

Q13. Match the abnormal conditions given in Column A with their explanations given in Column B and choose the correct option.

Column A		Column B	
A.	Glycosuria	(i)	Accumulation of uric acid in joints
B.	Renal calculi	(ii)	Inflammation in glomeruli
C.	Glomerulonephritis	(iii)	Mass of crystallised salts within the kidney
D.	Gout	(iv)	Presence of glucose in urine

Options:

(a) A—(i), B—(iii), C—(ii), D—(iv)

(b) A—(iii), B—(ii), C—(iv), D—(i)

(c) A—(iv), B—(iii), C—(ii), D—(i)

(d) A—(iv), B—(ii), C—(iii), D—(i)

Ans. (c)

A.	Glycosuria	**(iv)**	Presence of glucose in urine
B.	Renal calculi	**(iii)**	Mass of crystallised salts within the kidney
C.	Glomerulonephritis	**(ii)**	Inflammation in glomeruli
D.	Gout	**(i)**	Accumulation of uric acid in joints

Q14. We can produce concentrated/dilute urine. This is facilitated by a special mechanism. Identify the mechanism.

(a) Reabsorption from PCT

(b) Reabsorption from collecting duct

(c) Reabsorption/secretion in DCT

(d) Counter current mechanism in Henle's loop/Vasa recta

Ans: (d) We can produce concentrated/dilute urine. This is facilitated by a special mechanism called counter current mechanism in Henle's loop/Vasa recta.

Q15. Dialysing unit (artificial kidney) contains a fluid which is almost same as plasma except that it has

(a) High glucose

(b) High urea

(c) No urea

(d) High uric acid

Ans: (c) Dialysing fluid = Plasma – nitrogenous wastes (urea)

Very Short Answer Type Questions

Q1. Where does the selective reabsorption of Glomerular filtrate take place?

Ans: DCT

Q2. What is the excretory product from kidneys of reptiles?

Ans: Uric acid

Q3. What is the composition of sweat produced by sweat glands?

Ans: Water, minerals, lactic acid and urea.

Q4. Identify the glands that perform the excretory function in prawns.

Ans: Antennal glands or green glands

Q5. What is the excretory structure in amoeba?

Ans: Contractile vacuole

Q6. The following abbreviations are used in the context of excretory functions what do they stand for?

a. ANF

b. ADH

c. GFR

d. DCT

Ans: a. ANF—Atrial Natriuretic factor

b. ADH—Antidiuretic hormone

c. GFR—Glomerular Filtration Rate

d. DCT—Distal Convoluted Tubule

Q7. Differentiate Glycosuria from Ketonuria.

Ans: Glycosuria—Presence of glucose in urine.

Ketonuria—Presence of ketone bodies in urine.

Q8. What is the role of sebaceous glands?

Ans: Sebaceous glands eliminate certain substances like sterols, hydrocarbons an waxes through sebum. This secretion provides a protective oily covering for the ski

Q9. Name two actively transported substances in Glomerular filtrate.

Locomotion and Movement

Multiple Choice Questions

Q1. Match the following and mark the correct option.

Column I		Column II	
A.	Fast muscle fibres	**(i)**	Myoglobin
B.	Slow muscle fibres	**(ii)**	Lactic acid
C.	Actin filament	**(iii)**	Contractile unit
D.	Sarcomere	**(iv)**	I-band

Options:

(a) A—(i), B—(ii), C—(iv), D—(iii)

(b) A—(ii), B—(i), C—(iii), D—(iv)

(c) A—(ii), B—(i), C—(iv), D—(iii)

(d) A—(iii), B—(ii), C—(iv), D—(i)

Ans. (c)

A.	Fast muscle fibres	**(ii)**	Lactic acid
B.	Slow muscle fibres	**(i)**	Myoglobin
C.	Actin filament	**(iv)**	I-band
D.	Sarcomere	**(iii)**	Contractile unit

Q2. Ribs are attached to

(a) Scapula (b) Sternum (c) Clavicle (d) Ilium

Ans: (b) Ribs are attached to sternum.

Q3. What is the type of movable joint present between the atlas and axis?

(a) Pivot (b) Saddle (c) Hinge (d) Gliding

Ans: (a) Pivot joint: Between atlas and axis called atlanto-axial joint.

Q4. ATPase of the muscle is located in

Q4. ATPase of the muscle is located in

(a) Actinin (b) Troponin (c) Myosin (d) Actin

Ans: (c) ATPase of the muscle is located in head of myosin.

Q5. Intervertebral disc is found in the vertebral column of

(a) Birds (b) Reptiles (c) Mammals (d) Amphibians

Ans: (c) Intervertebral disc is found in the vertebral column of mammals.

Q6. Which one of the following is showing the correct sequential order of vertebrae in the vertebral column of human beings? '

(a) Cervical — lumbar — thoracic — sacral — coccygeal

(b) Cervical — thoracic — sacral — lumbar — coccygeal

(c) Cervical — sacral — thoracic — lumbar — coccygeal

(d) Cervical — thoracic — lumbar — sacral — coccygeal

Ans: (d) Cervical—thoracic—lumbar—sacral—coccygeal is the correct sequentia of vertebrae in the vertebral column of human beings.

Q7. Which one of the following options is incorrect?

(a) Hinge joint—between humerus and pectoral girdle

(b) Pivot joint—between atlas, axis and occipital condyle

(c) Gliding joint—between the carpals

(d) Saddle joint—between carpel and metacarpals of thumb

Ans: (a) Hinge joint—Knee joint and elbow joint

Q8. Knee joint and elbow joints are examples of

(a) Saddle joint (b) Ball and socket joint

(c) Pivot joint (d) Hinge joint

Ans: (d) Knee joint and elbow joints are examples of hinge joint.

Q9. Macrophages and leucocytes exhibit

(a) Ciliary movement

(b) Flagellar movement

(c) Amoeboid movement

(d) Gliding movement

Ans: (c) Amoeboid movements: Some specialised cells in our body like macrophages and leucocytes in blood exhibit amoeboid movement. It is effected by pseudopodia formed by the streaming of protoplasm (as in Amoeba). Cytoskeletal elements like microfilaments are also involved in amoeboid movement.

Q10. Which one of the following is not a disorder of bone?

(a) Arthritis

(b) Osteoporosis

(c) Rickets

(d) Atherosclerosis

Ans: (d) Atherosclerosis is a disorder of circulatory system.

Q11. Which one of the following statement is incorrect?

(a) Heart muscles are striated and involuntary

(b) The muscles of hands and legs are striated and voluntary

(c) The muscles located in the inner walls of alimentary canal are striated and involuntary

(d) Muscles located in the reproductive tracts are unstriated and involuntary

Ans: (c) The muscles located in the inner walls of alimentary canal are non- striated and involuntary.

Q12. Which one of the following statements is-true?

(a) Head of humerus bone articulates with acetabulum of pectoral girdle

(b) Head of humerus bone articulates with glenoid cavity of pectoral girdle

(c) Head of humerus bone articulates with a cavity called acetabulum of pelvic girdle

(d) Head of humerus bone articulates with a glenoid cavity of pelvic girdle

Ans: (b) Below the acromion is a depression called the glenoid cavity which articulates with the head of the humerus to form the shoulder joint.

Q13. Muscles with characteristic striations and involuntary are

(a) Muscles in the wall of alimentary canal

(b) Muscles of the heart

(c) Muscles assisting locomotion

(d) Muscles of the eyelids

Ans: (b) Muscles with characteristic striations and involuntary are muscles of the heart (Cardiac muscles).

Q14. Match the followings and mark the correct option.

Column I		**Column II**	
A.	Sternum	**(i)**	Synovial fluid
B.	Glenoid cavity	**(ii)**	Vertebrae
C.	Freely movable joint	**(iii)**	Pectoral girdle
D.	Cartilaginous joint	**(iv)**	Flat bones

Options:

(a) A—(ii), B—(i), C—(iii), D—(iv)

(b) A—(iv), B—(iii), C—(i), D—(ii)

(c) A—(ii), B—(i), C—(iv), D—(iii)

(d) A—(iii), B—(i), C—(ii), D—(iv)

Ans. (b)

A.	Sternum	**(iv)**	Flat bones
B.	Glenoid cavity	**(iii)**	Synovial fluid
C.	Freely movable joint	**(i)**	Pectoral girdle
D.	Cartilaginous joint	**(ii)**	Yertebrae

Very Short Answer Type Questions

Q1. Name the cells/tissues in human body which

a. exhibit amoeboid movement

b. exhibit ciliary movement

Ans: a. Macrophages and leucocytes

b. Trachea, fallopian tube and bronchiole

Q2. Locomotion requires a perfect coordinated activity of muscular _____, _____ , systems.

Ans: Skeletal and Neural

Neural Control and Coordination

Multiple Choice Questions

Q1. Chemicals which are released at the synaptic junction are called

(a) Hormones

(b) Neurotransmitters

(c) Cerebrospinal fluid

(d) Lymph

Ans: (b) Chemicals released at the synaptic junction are called neurotransmitters.

Q2. Potential difference across resting membrane is negatively charged. This is due to differential distribution of the following ions

(a)Na^+ and K^+ ions

(b) $C0^{3++}$and Cl^- ions

(c) Ca^{++} and Mg^{++} ions

(d) Ca^{+4} and CL ions

Ans: (a) Potential difference across resting membrane is negatively charged. This is due to differential distribution of Na^+ and K^+ ions.

Q3. Resting membrane potential is maintained by

(a) Hormones **(b) Neurotransmitters**

(c) Ion pumps **(d) None of the above**

Ans: (c) Resting membrane potential is maintained by ion pumps.

Q4. The function of our visceral organs is controlled by

(a) Sympathetic and somatic neural system

(b) Sympathetic and parasympathetic neural system

(c) Central and somatic neural system.

(d) None of the above

Ans: (b) The function of our visceral organs is controlled by sympathetic and parasympathetic neural systems.

Q5. Which of the following is not involved in knee-jerk reflex?

(a) Muscle spindle (b) Motor neuron

(c) Brain (d) Intemeurons

Ans: (c) Brain is not involved in knee-jerk reflex.

Q6. An area in the brain which is associated with strong emotions is

(a) Cerebral cortex (b) Cerebellum

(c) Limbic system (d) Medulla

Ans: (c) An area in the brain is associated with strong emotions is limbic system.

Q7. Mark the vitamin present in rhodopsin.

(a) VitA (b) Vit B (c) VitC (d) VitD

Ans: (a) Vit A is present in rhodopsin.

Q8. Human eyeball consists of three layers and it encloses

(a) Lens, iris, optic nerve

(b) Lens, aqueous humor and vitreous humor

(c) Cornea, lens, iris

(d) Cornea, lens, optic nerve

Ans: (b) Human eyeball consists of three layers and it encloses lens, aqueous humor and vitreous humor.

Q9. Wax gland present in the ear canal is called

(a) Sweat gland

(b) Prostate gland

(c) Cowper's gland –

(d) Sebaceous gland/ceruminous gland

Ans: (d) Wax gland present in the ear canal is called sebaceous gland/ceruminous gland.

Q10. The "part of internal ear responsible for hearing is

(a) Cochlea (b) Semicircular canal

(c) Utriculus (d) Sacculus

Ans: (a) The part of internal ear responsible for hearing is cochlea.

Q11. The organ of Corti is a structure present in

(a) External ear **(b) Middle ear**

(c) Semicircular canal **(d) Cochlea**

Ans: (d) The organ of Corti is a structure present in cochlea.

Q12. While travelling to higher altitudes, people can feel pain in the ear and dizziness.

Which part, among the following is involved?

(a) Cochlea, ear ossicles

(b) Tympanic membrane

(c) Eustachian tube, utricle, saccule and semicircular canals

(d) None of the above

Ans: (c)

Very Short Answer Type Questions

Q1. Rearrange the following in the correct order of involvement in electrical impulse movement: Synaptic knob, dendrites, cell body, Axon terminal, Axon

Ans: Dendrites—Cell body—Axon—Axon terminal—Synaptic knob.

Q2. Comment upon the role of ear in maintaining the balance of the body and posture.

Ans: The crista and macula are the specific receptors of the vestibular apparatus esponsible for maintenance of balance of the body and posture.

Q3. Which cells of the retina enable us to see coloured objects around us?

Ans: Cone cells of the retina enable us to see the coloured objects around us.

Q4. Arrange the following in the order of reception and transmission of sound wave from the ear drum:
Cochlear nerve, external auditory canal, ear drum, stapes, incus, malleus, cochlea.

Ans: Ear drum, malleus, incus, stapes, cochlea, chochlear nerve.

Q5. During resting potential, the axonal membrane is polarised, indicate the movement of +ve and -ve ions leading to polarisation diagrammatically.

Ans: Neurons are excitable cells because their membranes are in a polarised state. Different types of ion channels are present on the neural membrane. These ion channels are selectively permeable to different ions. When a neuron is not conducting

Chemical Coordination and Integration

Multiple Choice Questions

Q1. Select the right match of endocrine gland and their hormones among the options given below.

A.	**Pineal**	**(i)**	**Epinephrine**
B.	**Thyroid**	**(ii)**	**Melatonin**
C:	**Ovary**	**(iii)**	**Estrogen**
D.	**Adrenal medulla**	**(iv)**	**Tetraiodothyronine**

Options:

(a) A—(iv), B—(ii), C—(iii), D—(i)
(b) A—(ii), B—(iv), C—(i), D—(iii)
(c) A—(iv), B—(ii), C—(i), D—(iii)
(d) A—(ii), B—(iv), C—(iii), D—(i)

Ans:(d)

A.	Pineal	**(ii)**	Melatonin
B.	Thyroid	**(iv)**	Tetraiodothyronine
C.	Ovary	**(iii)**	Estrogen
D.	Adrenal medulla	**(i)**	Epinephrine

Q2. Which of the following hormones is not secreted by anterior pituitary?

(a) Growth hormone (b) Follicle stimulating hormone

(c) Oxytocin (d) Adrenocorticotrophic hormone

Ans: (c) The pars distalis region of pituitary, commonly called anterior pituitary, produces 6 Growth Hormone (GH), Prolactin (PRL), Thyroid Stimulating Hormone (TSH), Adrenocorticotrophic Hormone (ACTH), Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH). Neurohypophysis (pars nervosa) also known as posterior pituitary, stores and releases two hormones called oxytocin and vasopressin, which are actually synthesised by the hypothalamus and are transported axonally to neurohypophysis.

Q3. Mary is about to face an interview. But during the first five minutes before the interview she experiences sweating, increased rate of heart beat, respiration, etc. Which hormone is responsible for her restlessness?

(a) Estrogen and progesterone (b) Oxytocin and vasopressin

(c) Adrenaline and noradrenaline (d) Insulin and glucagon

Ans:(c) Mary is about to face an interview. But during the first five minutes before the interview she experiences sweating, increased rate of heart beat, respiration, etc. Adrenaline and non-adrenaline hormone are responsible for her restlessness.

Q4. The steroid responsible for balance of water and electrolytes in our body is

(a) Insulin (b) Melatonin (c) Testosterone (d) Aldosterone

Ans: (d) Vasopressin acts mainly at the kidney and stimulates resorption of water and electrolytes by the distal tubules and thereby reduces loss of water through urine (diuresis). Hence, it is also called as anti-diuretic hormone (ADH).

Q5. Thymosin is responsible for

(a) Raising the blood sugar level **(b) Raising the blood calcium level**

(c) Differentiation of T lyipphocytes **(d) Decrease in blood RBC**

Ans: (c) Thymosin is responsible for differentiation of T-lymphocytes.

Q6. In the mechanism of action of a protein hormone, one of the second messengers is

(a) Cyclic AMP

(b) Insulin

(c) T_3

(d) Gastrin

Ans: (a) Hormones which interact with membrane-bound receptors normally do not enter the target cell, but generate secondary messengers (e.g., cyclic AMP, cGMP, DAG, IP_3, Ca^{++} etc.) which in turn regulate cellular metabolism.

Q7. Leydig cells produce a group of hormones called

(a) Androgens **(b) Estrogens**

(c) Aldosterone **(d) Gonadotropins**

Ans: (a) Leydig cells produce a group of hormones called androgens.

Q8. Corpus luteum secretes a

(a) Prolactin (b) Progesterone (c) Aldosterone (d) Testosterone

Ans: (b) Corpus luteum secretes progesterone.

Q9. Cortisol is secreted from gland called

(a) Pancreas (b) Thyroid (c) Adrenal (d) Thymus

Ans: (c) Cortisol is secreted from gland called adrenal.

Q10. A hormone responsible for normal sleep-wake cycle is

(a) Epinephrine (b) Gastrin (c) Melatonin (d) Insulin

Ans: (c) A hormone responsible for normal sleep-wake cycle is melatonin.

Q11. Hormones are called chemical signals that stimulate specific target tissues. Which is the correct location of these receptors in case of protein hormones?

(a) Extra cellular matrix

(b) Blood

(c) Plasma membrane

(d) Nucleus

Ans: (c) Protein hormone receptors present on the plasma membrane of the target cells are called membrane-bound receptors.

Q12. Choose the correct option among the following:

Column A		Column B	
A.	Epinephrine	(i)	Stimulates in muscle growth
B.	Testosterone	(ii)	Decrease in blood pressure
C.	Glucagon	(iii)	Decrease in liver glycogen conten
D.	Atrial natriuretic factor	(iv)	Increases heart beat

Options:

(a) A—(ii), B—(i), C—(iii), D—(iv)

(b) A—(iv), B—(i), C—(iii), D—(ii)

(c) A—(i), B—(ii), C—(iii), D—(iv)

(d) A—(i), B—(iv), C—(ii), D—(iii)

Ans. (b)

A.	Epinephrine	**(iv)**	Increases heart beat
B.	Testosterone	**(i)**	Stimulates in muscle growth
C.	Glucagon	**(iii)**	Decrease in liver glycogen content
D.	Atrial natriuretic factor	**(ii)**	Decrease in blood pressure

Very Short Answer Type Questions

Q1. There are many endocrine glands in human body. Name the glands which is absent in male and the one absent in female.

Ans: In Males—Ovary and in Females—Testis.

Q2. Which of the two adrenocortical layers, zona glomerulosa and zona reticularis lies outside enveloping the other?

Ans: Outer layer—Zona glomerulosa

Inner layer—Zona reticularis

Q3. What is erythropoiesis? Which hormone stimulates it?

Ans: Formation of RBC is known as erythropoiesis and the hormone erythropoietin stimulates the process.

Q4. Name the only hormone secreted by pars intermedia of the pituitary gland.
Ans: MSH or Intermedin

Q5. Name the endocrine gland that produces calcitonin and mention t
played by this hormone.

Ans: Thyroid gland also secretes a protein hormone called thyrocalcitoni'n (TCT) which regulates the blood calcium levels. TCT is secreted by 'C' cells of thyroid glands. TCT is a hypocalcaemic hormone which lower the blood calcium level by increasing calcium deposition in the bones, so checks osteoporosis.

Q6. Name the hormone that helps in cell-mediated immunity.

Ans: Thymosin.

Short Answer Type Questions

Q1. What is the role-played by luteinizing hormones in males and females respectively?

Ans: LH stimulates the synthesis and secretion of androgens called male hormones. In females, LH is essential for ovulation. In females, LH induces ovulation of fully mature follicles (graafian follicles) and maintains the corpus luteum formed from the remnants of the graafian follicles after ovulation.

Q2. What is the role of second messenger in hormone action?

Ans: Hormones which do not enter the target cell, interact with specific receptors located on the surface of the target cell membranes and generates second messengers (e.g., cAMP) on the inner side of plasma membrane. The second messenger, in turn, carries out all the hormonal functions.

Q3. On an educational trip to Uttaranchal, Ketki and her friends observe that many local people were having swollen necks. Please help Ketki and her friends to find out the solutions to the following questions.

a. Which probable disease are these people suffering from?

b. How is it caused?

c. What effect does this condition have on pregnancy?

Ans: a. Goitre '

b. Iodine deficiency in diet

c. Hypothyroidism during pregnancy causes defective development and maturation of the growing baby leading to stunted growth (cretinism), mental retardation, low intelligence quotient, abnormal skin, deaf- mutism, etc.

Q4. George comes on a vacation to India from US. The long journey disturbs his biological system and he suffers from jet lag. What is the cause of his discomfort?

Ans: George comes on a vacation to India from US. The long journey disturbs his biological system and he suffers from jet lag. It is due to the disturbance in diurnal rhythm. Melatonin plays a very important role in the regulation of a 24-hour (diurnal) rhythm of our body. For example, it helps in maintaining the normal rhythms of sleep-wake cycle, body temperature.

Q5. Inflammatory responses can be controlled by a certain steroid. Name the steroid, its source and also its other important functions.

Ans: Glucocorticoids, particularly cortisol, produces anti-inflammatory reactions and suppresses the immune response. Cortisol stimulates the RBC production. Glucocorticoids stimulate gluconeogenesis, lipolysis and proteolysis; and inhibit cellular uptake and utilisation of amino acids. Cortisol is also involved in maintaining the cardio-vascular system as well as the kidney functions.

Q6. Old people have weak immune system. What could be the reason?

Ans: Thymus is degenerated in old individual resulting in a decreased pro thymosins. As a result the immune responses of old persons become wea