INDIAN SCHOOL AL WADI AL KABIR
MARKING SCHEME (2023-24)
Class XI
Biology (Final Examination)
SET I

Q. No.	Answer	Marks
	Section - A	
1	d) Gain or release of energy	1
2	c) They possess a purely cellulosic cell wall	1
3	d) Bryophytes	1
4	c) Platyhelminthes	1
5	d) Endosperm	1
6	a) Maturation	1
7	a) Organism which cannot regulate its body temperature	1
8	a) Ribosomes	1
9	d) Carbohydrates	1
10	d) Thylakoid membranes	1
11	b) Abscisic acid	1
12	d) All of the above	1
13	a) Both A and R are true, and R is the correct explanation of A c) A is true but R is false.	1
14	c) A is true but R is false.	1
15	a) Both A and R are true, and R is the correct explanation of A	1
16	b) Both A and R are true, and R is not the correct explanation of A	1

Section – B		
17	A virus contains DNA or RNA as the genetic material and a protein coat whereas the viroid do not have a protein coat but RNA as genetic material.	2
18	Anisogamy is a type of sexual reproduction that involves the fusion of two motile gametes that are dissimilar in size. Ex: Sperm and egg Isogamy is a form of sexual reproduction, which involves the fusion of morphologically similar gametes, having similar shapes and sizes. Example: Chlamydomonas	2

19	The open circulatory system is found in all invertebrates. In this system of circulation, the blood flows freely into cavities, as there are no blood vessels to conduct the blood. The closed circulatory system is found in all vertebrates and in few invertebrates like earthworms. In this system of circulation, the presence of blood vessels helps in circulating blood throughout the body.	2
20	The maize grain is a ripened ovary with a ripened ovule. That is why it is considered a fruit and not as a seed. The fruit is known as a caryopsis. In this, the pericarp is fused with the seed coat.	2
21	The cycle of enzyme action can be explained as follows: • The substrate binds to the active site of the enzyme first, that fits into the active site • This binding causes the enzyme to change its shape, leading it to fit more tightly around the substrate. • Near the substrate, the active site of the enzyme breaks the chemical bonds of the substrate leading to the formation of the new enzyme-product complex. • Products of the reaction are released by the enzyme. The free enzyme is now available to bind to another such molecule of the substrate and enter into the next catalytic cycle. **OR** Enzymes usually operate in a narrow range of pH. Most of them indicate their highest activity at a pH known as the optimum pH and decline above and below this value. Extremely low or high pH normally leads to complete loss of activity for most of the enzymes. The graph indicates the maximum activity of the enzymes at the optimum pH.	2
Section – C		

22 **ANY SIX DIFFERENCES** 3

C3 Plant	C4 Plant
1. Found in all plants.	1. Tropical plants like maize, sorghum.
2.First stable compound is 3C compound	2. First stable carbon compound is a 4C molecule.
3. Primary acceptor is RUBP, a 5C molecule.	3. Primary acceptor is a PEP, 3C molecule.
4. Single carbon fixation occurs.	4. Double carbon fixation occurs.
5. Carried out by mesophyll cells.	5. Both mesophyll and bundle sheath are involved.
6. This process is inhibited by the presence of O2.	6. No inhibition.
7. Carbon fixation is slow and less efficient.	7. Carbon fixation is fast and efficient.
8. optimum temperature is 20-25degree Celsius.	8. optimum temperature is 30-45degree Celsius.

OR

Any six of the following differences

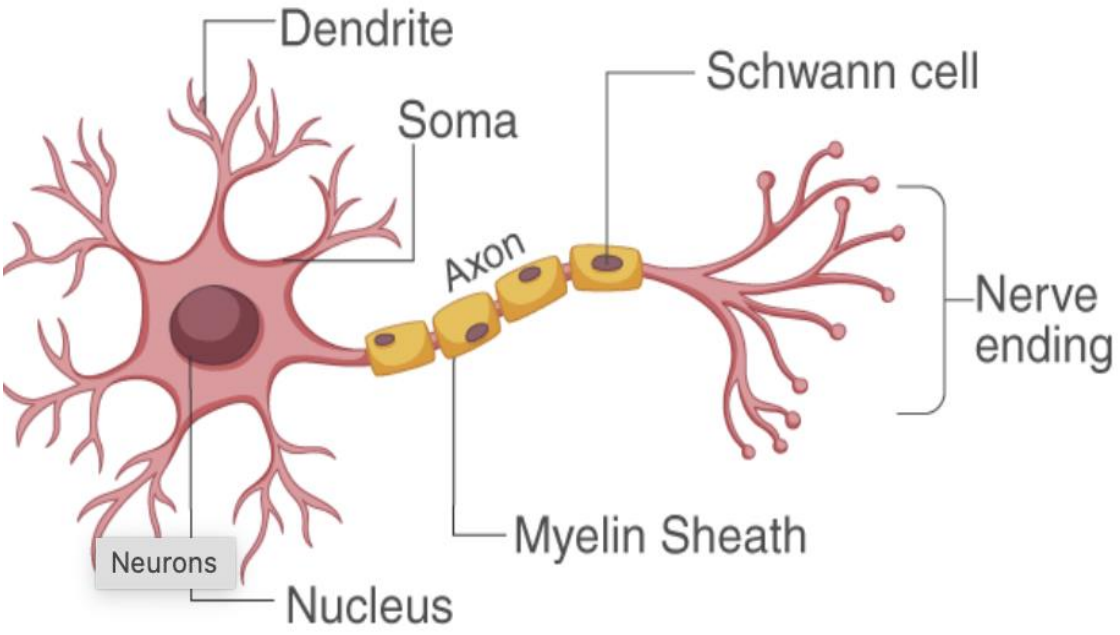
Cyclic Photophosphorylation	Non-Cyclic Photophosphorylation
1. PS I only involved	1. PS I and PS II involved
2. Reaction centre is P700	2. Reaction centre is P680
3. Electrons released are cycled back	3. Electron released are not cycled back
4. Photolysis of water does not take place	4. Photolysis of water takes place
5. Only ATP synthesized	5. ATP and NADPH + $H^+$are synthesized
6. Phosphorylation takes place at two places	6. Phosphorylation takes place at only one place
7. It does not require an external electron donor	7. Requires external electron donor like H_2O or H_2S
8. It is not sensitive to di chloro di methyl urea (DCMI)	8. It is sensitive to DCMI and inhibits electron flow

23 3

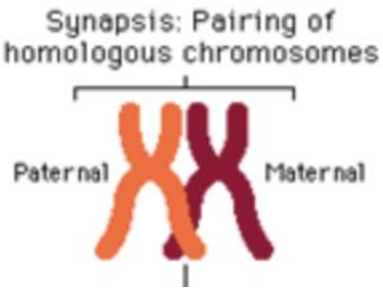
Monocot leaf	Dicot leaf
1. Parallel venation.	1. Reticulate venation.
2. Isobilateral leaves.	2. Dorsoventral leaves.

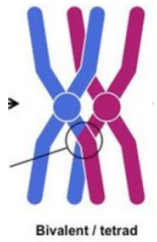
3. Both sides are similar, same number of stomata on both sides.	3. upper and lower sides have different number of stomata.	
4. Mostly linear leaves.	4. Different shaped leaves.	
5. Leaf blade is flat and thin.	5. Leaf blade is broad.	
6. Guard cells are dumbbell shaped.	6. guard cells are kidney shaped.	
7. Bulliform cells are present.	7. NO bulliform cells are there.	
8. Mesophyll cells are not distinguished.	8. Distinguished into palisade, spongy mesophylls.	
9. Silica depositions are present.	9. Silica depositions are absent.	

24	**G_0 Phase:** -Cell is not dividing at this stage and is resting. Typically, outside the replicative phase. - the cell performs regulatory and its basic cellular functions. -Cells enter this phase when it is devoid of nutrients or necessary resources for proliferation. **Prophase I of Meiosis:** - This stage is characterized by five stages, namely leptotene, zygotene, pachytene, diplotene, and diakinesis, that make it up. - The nuclear envelope breaks down. The chromatin condenses into chromosomes. Homologous chromosomes containing the two chromatids come together to form tetrads, joining at their centromeres. -Recombination happens. **Metaphase II of Meiosis:** - when the chromosomes align themselves along the metaphase plate through the facilitation of the spindle fibers. - The spindle fibers are now attached to the two kinetochores contained in the centromere of each chromosome.	3
25	When the man is climbing up the hill the altitude increases and pressure decreases. Dissolved Oxygen reduces in the air and the man is unable to climb with ease. -The man should take breaks in between and rest. -He should carry enough water to substitute for the reduces oxygen level in air. -If he is asthmatic, he should carry inhalers and oxygen masks.	3

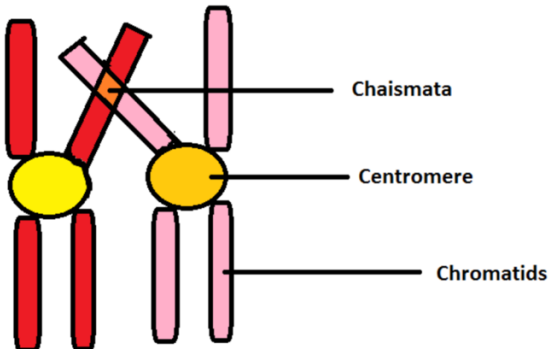
26	 . Unipolar - They have a single axon projecting from the spherical cell body, while other regions of the cell membrane are devoid of dendritic branches. Myelinated - Myelin is a thick sheath of lipoprotein that insulates the nerve fibers of the myelinated neurons. Non-myelinated – No myelin sheath is present.	3
27	Diabetes Mellitus: Insulin Goitre: Deficiency of thyroid hormone Thyroxine. Caused due to lessened iodine levels. Pituitary dwarfism: GH from pituitary gland.	3

28	Coagulation of blood takes place when there is an injury. Platelets encounter such regions and form a network pf thread like structures which helps in the clotting or prevent loss of blood. The thread like structures is called fibrins, which are formed by the conversion of inactive fibrinogens in the plasma by the enzyme thrombin. Thrombin in turn is formed from other inactive substance present in the plasma called prothrombin. Thrombokinase is required for the Reaction. Calcium plays a very important role in clotting.	3

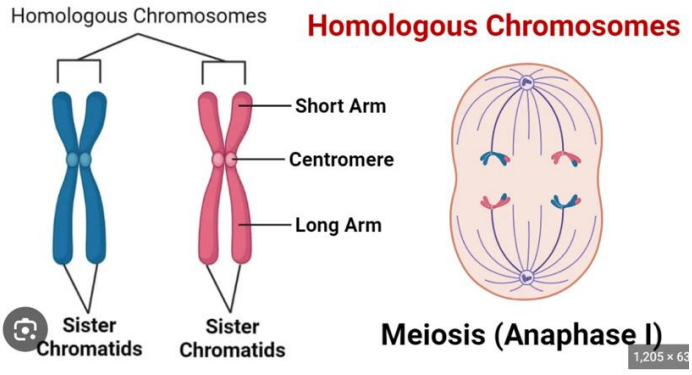
	Section – D	
29	i) a) Brain, Spinal Cord, and peripheral nerves ii) -To fight/flight reaction (emergency hormone), React to stimulus, increase blood sugar levels by breaking glycogen. iii) The developmental stage in frog contains an intermediate stage of tadpole which is succeeded by the adult form of frog. This change from one intermediate developmental stage to another is called metamorphosis. **OR** High number of eggs: For high survival rate.	4
30	i) b) Dedifferentiation ii) c) Redifferentiation iii) Development in plants is controlled by intrinsic and extrinsic factors. The intrinsic factor includes both intracellular (genetic) or intercellular factors (chemicals such as plant growth regulators). The extrinsic factors include light, temperature, water, oxygen, nutrition, etc. **OR** Root hair, main root cells, leaves, stem	4
	Section-E	
31	i) Synapsis: Chromosome start pairing together.  ii) Bivalent: complex formed by a pair of synapsed homologous chromosome is called a bivalent.	5



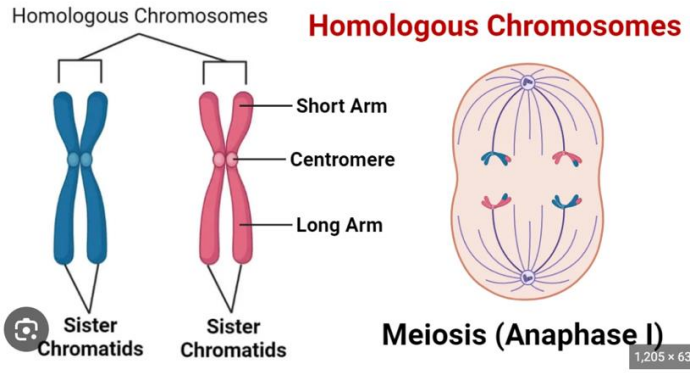
iii) Chiasmata: beginning of diplotene phase. The homologous chromosomes separate out each other except at the site of crossover.



iv) Homologous chromosome: made up of chromosome pairs of approximately the same length, centromere position, and staining pattern, for genes with the same corresponding loci.



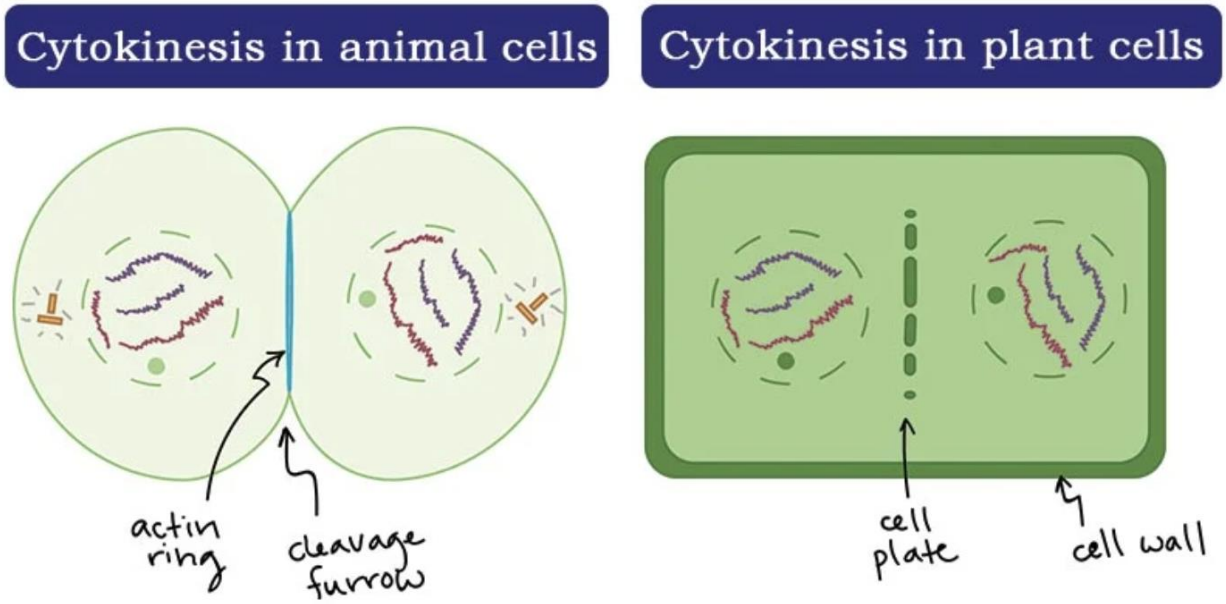
v) Sister Chromatids: the identical copies (chromatids) formed by the DNA replication of a chromosome, with both copies joined together by a common centromere.



OR

Cytokinesis is the division of the cytoplasmic content during the process of cell division. Karyokinesis is the division of nucleus when the cell is dividing.

Cytokinesis in plants is Centrifugal whereas in animals it is centripetal. In Animal cell division, there is no formation of cell plate like in plants. There is furrow formation by the end of division in animal cell.



32	Amphibolic pathway: A biochemical pathway, which involves both catabolism and anabolism is known as an amphibolic pathway. The amphibolic pathway can be best explained by Krebs' cycle. Respiration is the breakdown of the complex compounds into simple ones to produce energy molecule, ATP. Hence the process is called catabolic process and the pathway is termed as a catabolic pathway.	5

When the body requires fatty acids or proteins, respiratory pathway stops, and the same acetyl-CoA is utilized, and fatty acids are manufactured. This process of synthesis is termed as anabolism.

Respiratory Quotient: the volume of carbon dioxide released over the volume of oxygen absorbed during respiration. RQ = (V_{CO2}/V_{O2}).

Fats and proteins require more oxygen than carbohydrates for their complete oxidation. Carbohydrates have an RQ value of 1, thus fats and proteins have an RQ value of less than one.

OR

Glycolysis: the process in which glucose is broken down to produce energy.

It produces two molecules of pyruvate, ATP, NADH and water.

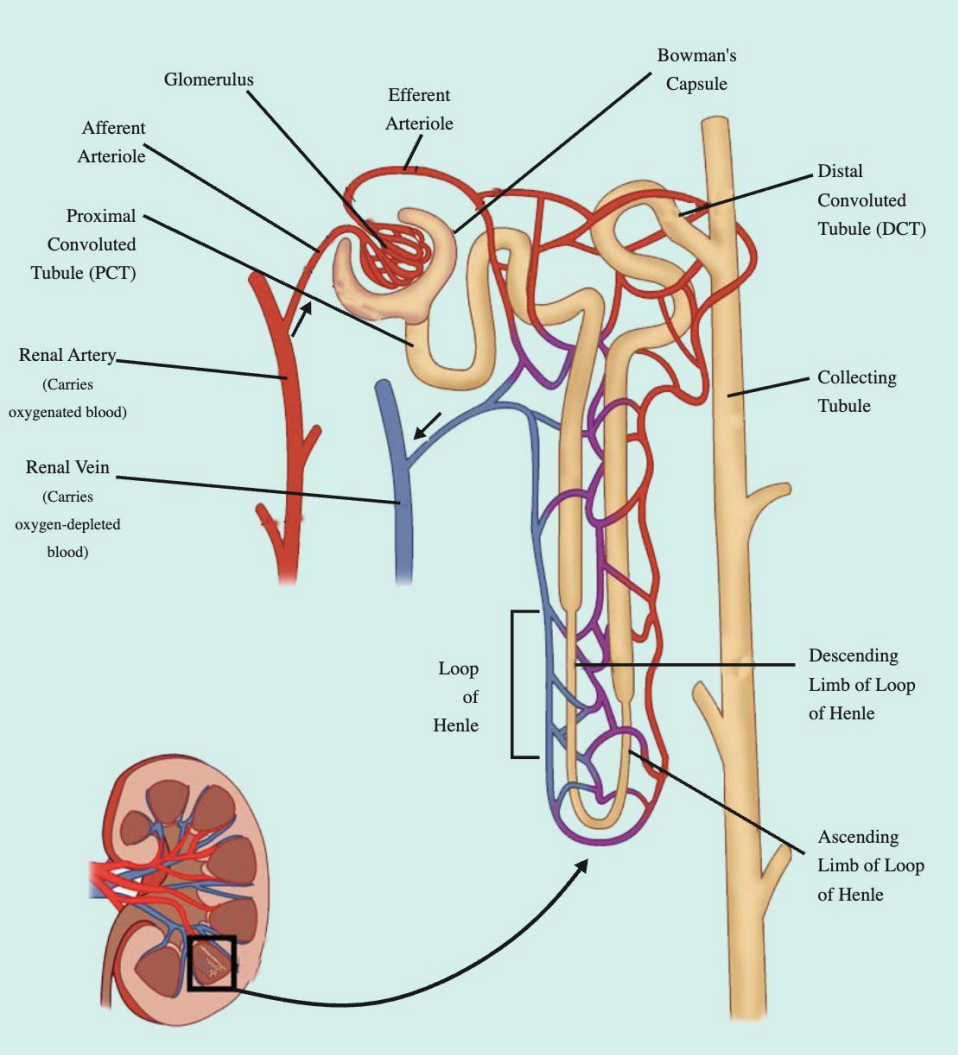
The process takes place in the cytoplasm of a cell and does not require oxygen. It occurs in both aerobic and anaerobic organisms.

Differences between Fermentation and Aerobic respiration (Any 6 points).

FERMENTATION	AEROBIC RESPIRATION
Chemical breakdown of organic substrate into ethanol or lactic acid by microorganisms in the presence of oxygen.	Set of chemical reactions involved in the production of energy by completely oxidizing food.
Occurs in Cytoplasm.	Occurs in both cytoplasm and mitochondria.
Occurs in yeast, parasites, and bacteria.	Occurs in higher animals and plants.
Does not require oxygen.	Uses oxygen as electron acceptor in the ETC.
Does not produce water.	Produces 6 water molecules per glycose molecule.
Only 2 ATP is produced.	38/36 ATP is produced per 1 glucose molecule.
Incomplete breakdown of glucose into ethanol and lactic acid.	Glucose is completely broken down into carbon dioxide and oxygen.

	ATP is not produced during the NAD+ regeneration.	ATP is produced during the NAD+ regeneration.

33



5

<u>Counter-Current Mechanism</u>: The countercurrent mechanism is used to concentrate urine in the kidneys by the nephrons of the human excretory system.

The nephrons involved in the formation of concentrated urine extend all the way from the cortex of the kidney to the medulla and are accompanied by vasa recta. The filtrate flows into the two limbs of the Henle's loop in the opposite directions and therefore, the flow of blood cells in vasa recta is also in the opposite directions.

The concentrated urine is formed in the following ways:

-NaCl is transported from the ascending limb of the Henle's loop to the descending limb of the vasa recta.

-The ascending limb of the vasa recta, in turn, transports NaCl to the interstitium (the tissue between the loop of Henle and the vasa recta). Thus, a concentration gradient of 300 mm in the cortex to 1200 mm in the medulla is created (milliosmoles or mOsm is a unit of osmolarity i.e., the concentration of osmotically active substances).

-Urea contributes to this process by being transported by the descending limb of the loop of Henle to the interstitium.

-As urine flows downwards in the collecting tubule, it encounters higher and higher concentrations of solutes in the interstitium. Hence it goes on losing water due to osmosis. This is how urine is concentrated.

OR

ADH: ADH facilitates water reabsorption from latter parts of the tubule, thereby preventing diuresis. It constricts the blood vessels and increase in blood pressure. An increase in blood pressure can lead to an increase a glomerular blood flow and thereby affecting the GFR.

RENIN: Converts Angiotensinogen to Angiotensin I and further to angiotensin II. Angiotensin being a powerful vasoconstrictor increases the glomerular blood pressure and thereby increases the GFR. Angiotensin also stimulates the release of aldosterone which causes the resorption of Na+ and water from the distal parts of the tubule. This also increases the blood pressure and further increase the GFR.

ANF: Atrial Natriuretic Factor is a vasodilator released by the heart, which can dilate the blood vessels and thereby decrease the blood pressure. ANF mechanism therefore acts as a check on the renin-angiotensin mechanism.

Glycosuria: a condition characterized by an excess of sugar in the urine, typically associated with diabetes or kidney disease.

Glomerulonephritis: It is inflammation and damage to the filtering part of the kidneys (glomerulus).

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