INDIAN SCHOOL MUSCAT

FINAL TERM EXAMINATION

SET A

FEBRUARY 2019

CLASS XI

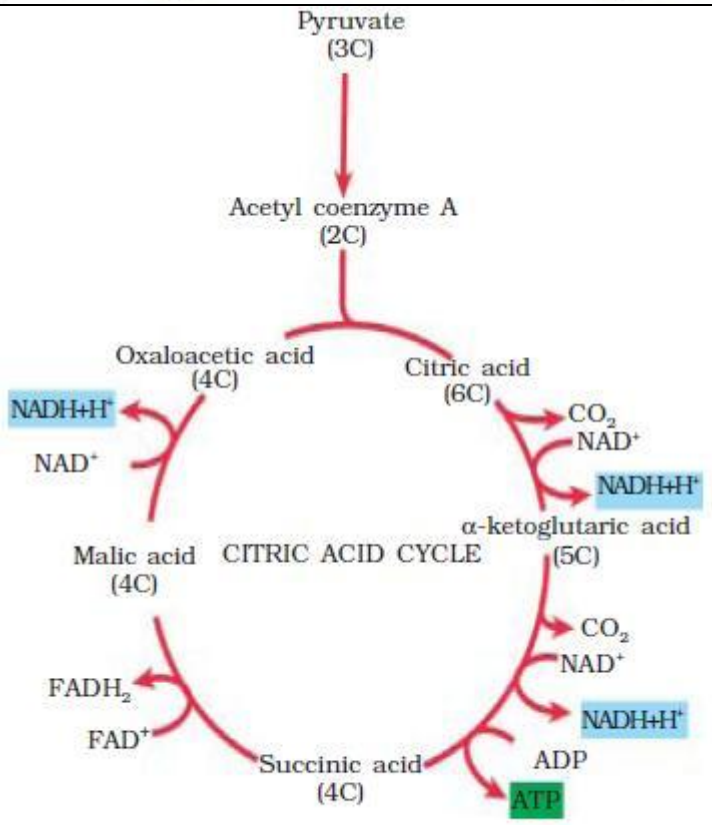
Marking Scheme – BIOLOGY [THEORY]

Q.NO.	Answers	Marks (with split up)
1.	Sclerenchyma/ sclereids.	1
2.	centriole or lecithin	1
3.	The concentration of the essential element below which plant growth is retarded.	1
4.	Sterile stamen	1
5.	ABA stimulates the closure of stomata in the epidermis and increases the tolerance of plants to various kinds of stresses. OR Solute potential and pressure potential.	1
6.	extreme salty areas (halophiles), hot springs (thermoacidophiles) and marshy areas (methanogens).	2
7.	Special type of diffusion in which water is absorbed by solids-colloids-causing them to enormously increase in volume. Helps in germination/helpful in splitting rocks and boulders. (any one) OR For elements that are actively mobilized within the plants and exported to yound developing tissues and the seficiency symptoms tend to appear first in the older tissues. Whenever the elements are relatively immobile and are not transported out of the mature organs, the deficiency symptoms tend to appear first in the young tissues.	2
8.	Gemmae are green, multicellular, asexual buds, which develop in small receptacles called gemma cups located on the thalli. The gemmae become detached from the parent body and germinate to form new individuals. They are found in liverworts.	2
9.	a) Cardiac, fundus and pyloric b) Nucleosidases OR IRV – Additional volume of air person can inspire by a forcible inspiration. 2500-3000ml ERV- Additional volume of air a person can expire by a forcible expiration. 1000ml - 1100ml	2
10.	Leaf/ nitrogen requirement is met	2
11.	Vessel are present in angiosperm and absent in Gymnosperms. Gymnosperms have albuminous cells and sieve cells, they lack sieve tubes and companion cells.	2
12.	The JGA plays a complex regulatory role. A fall in glomerular blood flow/glomerular blood pressure/GFR can activate the JG cells to release renin which converts angiotensinogen in blood	2

	to angiotensin I and further to angiotensin II. Angiotensin II, being a powerful vasoconstrictor, increases the glomerular blood pressure and thereby GFR. Angiotensin II also activates the adrenal cortex to release Aldosterone. Aldosterone causes reabsorption of Na+ and water from the distal parts of the tubule. This also leads to an increase in blood pressure and GFR. This complex mechanism is generally known as the Renin-Angiotensin mechanism.	
13.	<table><tr><th>BONY FISH</th><th>CARTILAGINOUS FISH</th></tr><tr><td>(i) Bony fish are found in freshwater as well as in seawater. (ii) Mouth is terminal in position. (iii) Endoskeleton consists of bones. (iv) Body is usually spindle shaped. e.g.,Labeo, Anabas, etc.</td><td>(i) They are mostly marine. (ii) Mouth is usually ventral. (iii) Endoskeleton consists of cartilage. (iv) Body is dorsov- entrally flattened. e.g.,Torpedo, Sc- oliodon, etc.</td></tr></table>	3
14.	Each compound eye consists of about 2000 hexagonal ommatidia (sing.: ommatidium). With the help of several ommatidia, a cockroach can receive several images of an object. This kind of vision is known as mosaic vision /with more sensitivity but less resolution, being common during night (hence called nocturnal vision). OR In alternate type of phyllotaxy, a single leaf arises at each node in alternate manner, as in china rose, mustard and sun flower plants. In opposite type, a pair of leaves arise at each node and lie opposite to each other as in Calotropis and guava plants. If more than two leaves arise at a node and form a whorl, it is called whorled, as in Alstonia.	3
15.	In grapevine and pumpkin tendrils are stem modification/same structure / in pea they are leaf modification/different structure but same function. In some leguminous plants the leafbase become swollen, called pulvinus.	3
16.	The electron microscopic study of a cilium or the flagellum show that they are covered with plasma membrane. /Their core called the axoneme, possesses a number of microtubules running parallel to the long axis. /The axoneme usually has nine pairs of doublets of radially arranged peripheral microtubules, and a pair of centrally located microtubules. Such an arrangement of axonemal microtubules is referred to as the 9+2 array. /The central tubules are connected by bridges and is also enclosed by a central sheath, which is connected to one of the tubules of each peripheral doublets by a radial spoke. /Thus, there are nine radial spokes. /The peripheral doublets are also interconnected by linkers. / Flagellum emerges from centriole-like structure called the basal bodies.	3 6 x ½
17.	cofactors are non-protein constituents bound to the enzyme to make the enzyme catalytically active. Prosthetic groups are organic compounds and are distinguished from other cofactors in that they are tightly bound to the apoenzyme. Co-enzymes are also organic compounds but their association with the apoenzyme is only transient, usually occurring during the course of catalysis.	3
18.		3

19.		3x1

	Non- cyclic Photophosphorylation	Cyclic Photophosphorylation
1.	Photolysis of water takes place.	No photolysis of water occurs.
2.	Both PS I and PS II are involved.	Only PS 1 is involved.
3.	Electrons are not cycled.	The electrons released by PS I come back to PS I itself.
4.	Both ATP and NADPH are produced.	Only ATP is formed.
5.	Oxygen is liberated	Oxygen is not liberated.

20.	 **Figure 14.3** The Citric acid cycle	
21.	**Auxin** Apical dominance/ parthenocarpy **Gibberellins** Increase in length of stem/ delay senescence **Cytokinin** overcome apical dominance/ promote nutrient mobilization/delay leaf senescence.	3
22.	When a stimulus is applied at a site (e.g., point A) on the polarised membrane, the membrane at the site A becomes freely permeable to Na+./ This leads to a rapid influx of Na+ followed by the reversal of the polarity at that site, i.e., the outer surface of the membrane becomes negatively charged and the inner side becomes positively charged/. The polarity of the membrane at the site A is thus reversed and hence depolarised. The electrical potential difference across the plasma membrane at the site A is called the action potential, which is in fact termed as a nerve impulse.	3x1
23.	The thyroid gland is composed of two lobes which are located on either side of the trachea .	6 x ½

	/Both the lobes are interconnected with a thin flap of connective tissue called isthmus. /The thyroid gland is composed of follicles and /stromal tissues./ Each thyroid follicle is composed of follicular cells, enclosing a cavity. /These follicular cells synthesise two hormones, tetraiodothyronine or thyroxine (T4) and triiodothyronine (T3).	
24.		3
25.	The catalytic cycle of an enzyme action can be described in the following steps: 1. First, the substrate binds to the active site of the enzyme, fitting into the active site. 2. The binding of the substrate induces the enzyme to alter its shape, fitting more tightly around the substrate. 3. The active site of the enzyme, now in close proximity of the substrate breaks the chemical bonds of the substrate and the new enzyme- product complex is formed. 4. The enzyme releases the products of the reaction and the free enzyme is ready to bind to another molecule of the substrate and run through the catalytic cycle once again. With the increase in substrate concentration, the velocity of the enzymatic reaction rises at first. The reaction ultimately reaches a maximum velocity (Vmax) which is not exceeded by any further rise in concentration of the substrate. OR During **leptotene** stage the chromosomes become gradually visible under the light microscope. The compaction of chromosomes continues throughout leptotene. **zygotene**. During this stage chromosomes start pairing together and this process of association is called synapsis. Such paired chromosomes are called homologous chromosomes. Electron micrographs of this stage indicate that chromosome synapsis is accompanied by the formation of complex structure called synaptonemal complex. The complex formed by a pair of synapsed homologous chromosomes is called a bivalent or a tetrad. However, these are more clearly visible at the next stage. **pachytene.** During this stage bivalent chromosomes now clearly appears as tetrads. This stage is characterised by the appearance of recombination nodules, the sites at which crossing over occurs between non-sister chromatids of the homologous chromosomes. Crossing over is the exchange of genetic material between two homologous chromosomes. Crossing over is also an enzyme-mediated process and the enzyme involved is called recombinase. Crossing over leads to recombination of genetic material on the two chromosomes. The beginning of **diplotene** is recognised by the dissolution of the synaptonemal complex and the tendency of the recombined homologous chromosomes of the bivalents to separate from each other except at the sites of crossovers. These X-shaped structures, are called chiasmata. The final stage of meiotic prophase I is **diakinesis.** This is marked by terminalisation of chiasmata.	5 x 1
26.	The Calvin cycle proceeds in three stages : (1) carboxylation, during which CO2 combines with ribulose-1,5-bisphosphate; (2) reduction, during which carbohydrate is formed at the expense of the photochemically made ATP and NADPH; and (3) regeneration during which the CO2 acceptor ribulose1,5-bisphosphate is formed again so that the cycle continues	

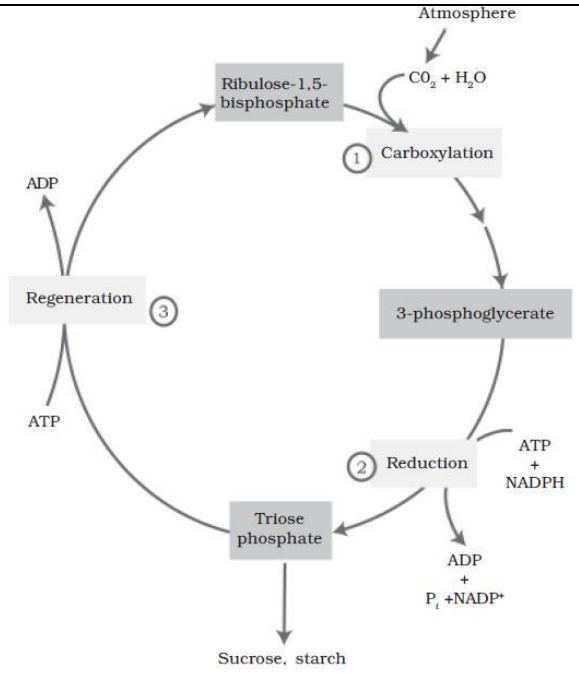
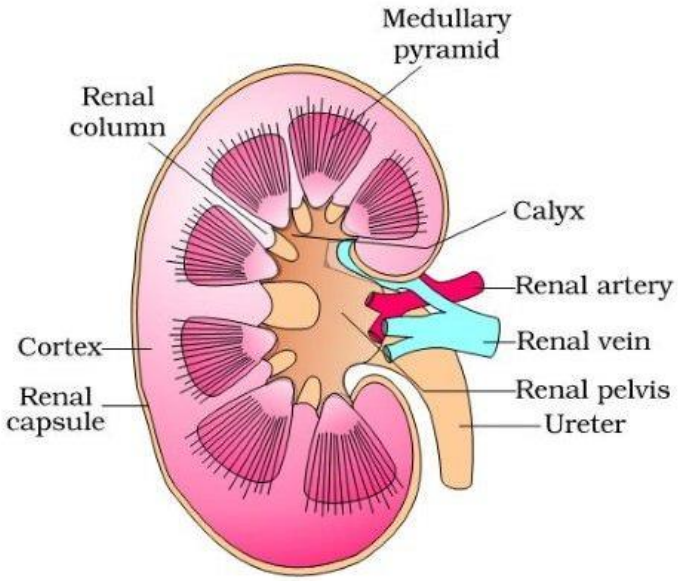


Figure 13.8 The Calvin cycle proceeds in three stages : (1) carboxylation, during which CO_2 combines with ribulose-1,5-bisphosphate; (2) reduction, during which carbohydrate is formed at the expense of the photochemically made ATP and NADPH; and (3) regeneration during which the CO_2 acceptor ribulose-1,5-bisphosphate is formed again so that the cycle continues

OR

Glycolysis with all relevant steps.

27.

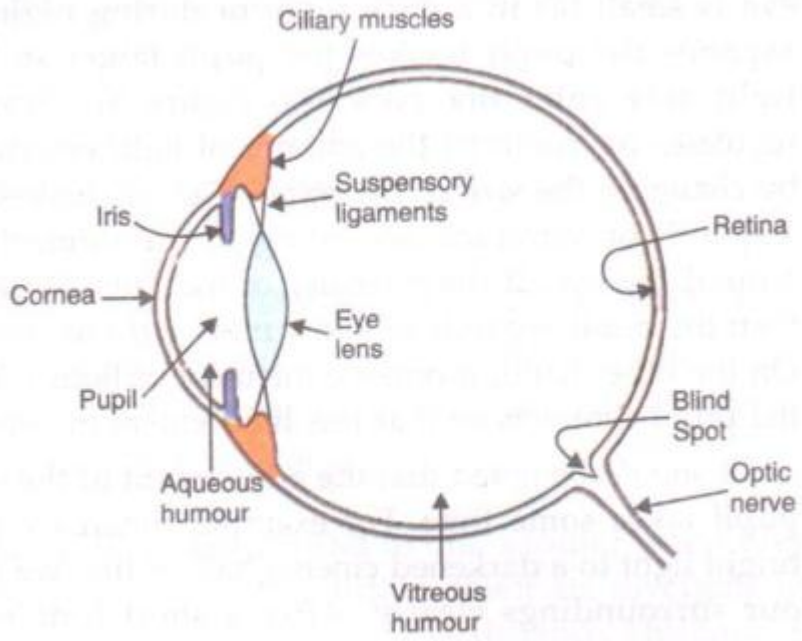


Longitudinal section (Diagrammatic) of Kidney

5

c) In majority of nephrons, the loop of Henle is too short and extends only very little into the medulla. Such nephrons are called cortical nephrons. In some of the nephrons, the loop of Henle is very long and runs deep into the medulla. These nephrons are called juxta medullary nephrons.

OR



The structure of human eye.

The light rays in visible wavelength focussed on the retina through the cornea and lens generate potentials (impulses) in rods and cones.

The photosensitive compounds (photopigments) in the human eyes is composed of opsin (a protein) and retinal (an aldehyde of vitamin A). Light induces dissociation of the retinal from opsin resulting in changes in the structure of the opsin.

This causes membrane permeability changes. As a result, potential differences are generated in the photoreceptor cells.

This produces a signal that generates action potentials in the ganglion cells through the bipolar cells.

These action potentials (impulses) are transmitted by the optic nerves to the visual cortex area of the brain, where the neural impulses are analysed and the image formed on the retina is recognised based on earlier memory and experience.