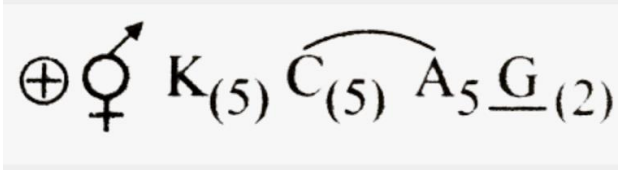


ANSWER KEY – CLASS II – BIOLOGY – AT - 2 – SET I – 2023 – 24

1	a) <i>Mangifera indica</i>	1
2	d) Unit of classification	1
3	c) Monera, Protista, Fungi, Plantae, Animalia	1
4	a) Mycorrhiza	1
5	c) Luciferin	1
6	b) Epiphyllous	1
7	b) Coleoptile and Coleorhiza	1
8	d) Tissues which include Vascular bundles, Pith, Pericycle.	1
9	a) Vasa efferentia	1
10	b) Nucleolus and chromatin	1
11	b) Sub-metacentric	1
12	d) Antibodies, Ribosomes, Hemoglobin	1
13	c) A is true but R is false	1
14	d) A is false but R is true	1
15	a) Both A and R are true, and R is the correct explanation of A.	1
16	a) Both A and R are true, and R is the correct explanation of A.	1

Section – B

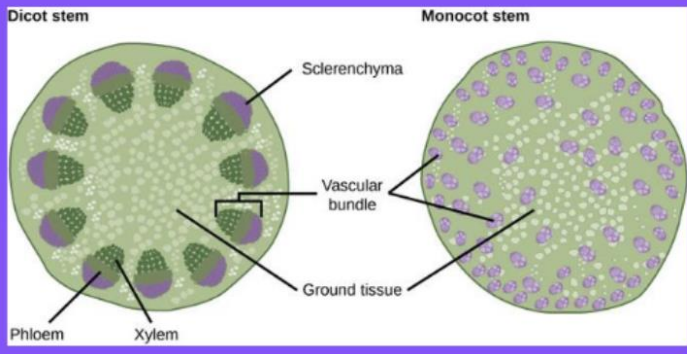
17	 <p>Ex: tomato, Potato, Brinjal.</p>	2
----	---	---

	<p>OR</p> <p>Zygomorphic: plant is Bilaterally symmetrical. It cannot be cut into two identical halves from any plane.</p> <p>Entire leaf: does not have any serrations and doesn't have the margin of a saw-like teeth.</p> <p>Sessile: The leaf stalk is attached to the main stem continuously. The petiole is not very visible and is very short.</p> <p>Syncarpous: The carpels are fused and are synced.</p>	
18	In Lichens the fungal and the algal components are in a symbiotic relation. The fungal component is called as the Mycobiont, and the algal component is called the Phycobiont.	2

19	<p>The key difference between angiosperms and gymnosperms is how their seeds are developed. The seeds of angiosperms develop in the ovaries of flowers and are surrounded by a protective fruit. Gymnosperm seeds are usually formed in unisexual cones, known as strobili, and the plants lack fruits and flowers.</p> <p>Additionally, all but the most ancient angiosperms contain conducting tissues known as vessels, while gymnosperms do not. Angiosperms have greater diversity in their growth habits and ecological roles than gymnosperms.</p>	2
20	Gas bladder or air bladder is a gas-filled sac present in fishes. It helps in maintaining buoyancy. Thus, it helps fishes to ascend or descend and stay in the water current.	2
21	$ \begin{array}{c} \text{COOH} \\ \\ \text{H} - \text{C} - \text{NH}_2 \\ \\ \boxed{\text{CH}_3} \\ \text{Alanine} \end{array} $	2

Section – C

22	<p>i) In Metaphase, chromosomes are transported to the spindle equator.</p> <p>ii) In Anaphase, centrosomes split, and chromatids separate.</p> <p>iii) In meiosis, the pairing of homologous chromosomes occurs in the Zygotene stage of prophase 1.</p> <p>OR</p> <p>During this period, the cell is constantly synthesizing RNA, producing protein and growing. By studying molecular events in cells, scientists have determined that interphase can be divided into 4 steps: Gap 0 (G0), Gap 1 (G1), S (synthesis) phase, Gap 2 (G2).</p> <p>During interphase, G1 involves cell growth and protein synthesis, the S phase involves DNA replication and the replication of the centrosome, and G2 involves further growth and protein synthesis.</p>	3
23	<p>Inflorance – Arrangement of flowers on the floral axis. There are two types of inflorances: Cymose and Racemose.</p> <p>Cymose: Basipetal, Ex: Ixora, Calotropis, Jasmin</p> <p>Racemose: Acropetally arranges, Ex: Tulsi, Neem, Mango</p>	3

24	<p>Monocot stems are a circular-shaped stem with lateral branches and are bounded with a layer of the dermis. Dicot stems have a well-defined epidermis with cuticle, a layer of dermis along with multicellular stem hair.</p> <p>Differences Between Monocot And Dicot Stem</p>  <p>The diagram illustrates the structural differences between dicot and monocot stems. On the left, a dicot stem cross-section shows a ring of vascular bundles, each containing phloem and xylem, surrounded by sclerenchyma. On the right, a monocot stem cross-section shows scattered vascular bundles throughout the stem. Labels include Sclerenchyma, Vascular bundle, Ground tissue, Phloem, and Xylem.</p>	3
----	---	---

25	<table border="1"> <thead> <tr> <th data-bbox="196 197 571 226">Characteristics</th> <th data-bbox="571 197 776 226">C₃ Plants</th> </tr> </thead> <tbody> <tr> <td data-bbox="196 226 571 317">1. Cells in which the Calvin Cycle/Dark reaction takes place.</td> <td data-bbox="571 226 776 317">Mesophyll</td> </tr> <tr> <td data-bbox="196 317 571 407">2. Which is the primary CO₂ acceptor molecule?</td> <td data-bbox="571 317 776 407">RUBP</td> </tr> <tr> <td data-bbox="196 407 571 497">3. Number of Carbons in the primary CO₂ acceptor.</td> <td data-bbox="571 407 776 497">5</td> </tr> <tr> <td data-bbox="196 497 571 588">4. Which is the primary CO₂ fixation product?</td> <td data-bbox="571 497 776 588">PGA (3 phosphoglycerate)</td> </tr> <tr> <td data-bbox="196 588 571 678">5. Number of Carbons in the primary CO₂ fixation product.</td> <td data-bbox="571 588 776 678">3</td> </tr> <tr> <td data-bbox="196 678 571 768">6. Does the plant have RuBisCO?</td> <td data-bbox="571 678 776 768">Yes</td> </tr> </tbody> </table>	Characteristics	C ₃ Plants	1. Cells in which the Calvin Cycle/Dark reaction takes place.	Mesophyll	2. Which is the primary CO ₂ acceptor molecule?	RUBP	3. Number of Carbons in the primary CO ₂ acceptor.	5	4. Which is the primary CO ₂ fixation product?	PGA (3 phosphoglycerate)	5. Number of Carbons in the primary CO ₂ fixation product.	3	6. Does the plant have RuBisCO?	Yes	3
Characteristics	C ₃ Plants															
1. Cells in which the Calvin Cycle/Dark reaction takes place.	Mesophyll															
2. Which is the primary CO ₂ acceptor molecule?	RUBP															
3. Number of Carbons in the primary CO ₂ acceptor.	5															
4. Which is the primary CO ₂ fixation product?	PGA (3 phosphoglycerate)															
5. Number of Carbons in the primary CO ₂ fixation product.	3															
6. Does the plant have RuBisCO?	Yes															
26	He has difficulty in breathing as the altitude increases. The pressure decreases, hence, the O ₂ is less available in the air. This will lead difficulty in breathing which can cause unconsciousness, nausea or dizziness in the human being.	3														

27	<p>Cardiac Cycle: The complete cycle of events in the heart from the beginning of a heartbeat to the beginning of the next one.</p> <p>Cardiac Output: Total amount of blood pumped by the heart into circulation per minute. (5L/min)</p> <p>Cardiac Arrest: Cardiac arrest, also known as sudden cardiac arrest, is when the heart stops beating suddenly. The lack of blood flow to the brain and other organs can cause a person to lose consciousness, become disabled or die if not treated immediately.</p>	3
----	--	---

28	<table border="0"> <tr> <td>a) Eosinophils</td> <td>iii) Resist Infection</td> </tr> <tr> <td>b) RBC</td> <td>vi) Gas Transport</td> </tr> <tr> <td>c) AB Blood Group</td> <td>ii) Universal Recipient</td> </tr> <tr> <td>d) Platelets</td> <td>i) Coagulation</td> </tr> <tr> <td>e) Systole</td> <td>iv) Contraction of Heart</td> </tr> <tr> <td>f) O Group</td> <td>v) Universal Donor</td> </tr> </table>	a) Eosinophils	iii) Resist Infection	b) RBC	vi) Gas Transport	c) AB Blood Group	ii) Universal Recipient	d) Platelets	i) Coagulation	e) Systole	iv) Contraction of Heart	f) O Group	v) Universal Donor	3
a) Eosinophils	iii) Resist Infection													
b) RBC	vi) Gas Transport													
c) AB Blood Group	ii) Universal Recipient													
d) Platelets	i) Coagulation													
e) Systole	iv) Contraction of Heart													
f) O Group	v) Universal Donor													

Section – D

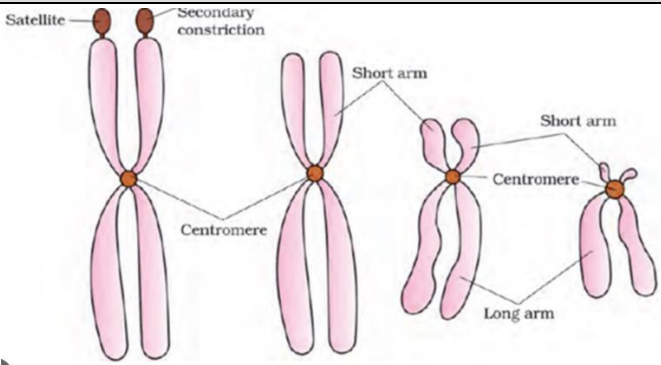
29	<p>1. PSI: 700nm and PSII:680nm</p> <p>2. cyclical photophosphorylation happens when PSI is excited and gives out the electron which, electron is accepted by an electron acceptor. The electron is further transported to an Electron transport system which further reaches back to the chloroplast.</p> <p>Non-cyclic photophosphorylation takes place when PS2 is activated, and the electron jumps out of its orbit and is received by the electron acceptor. The electron is further passed onto the ETS and reaches the LHC at PSI gets excited and gives our electron which is further received by the electron acceptor. This is Z-Scheme, the electron does not reach back the LHC.</p> <p>3. Z-Scheme</p> <p>4. No. Only ATP.</p> <p style="text-align: center;">OR</p> <p>1. Chl a : chief pigment , accessory pig : chl b, carotenoids and flavonoids. Function : protect the chief pigment.</p> <p>2. ATP and NADPH.</p> <p>3. Rate of photosynthesis increases with temperature rise as the C4 plants require higher temperature and C3 plants require much less temperature. Temperature will increase the activity of enzymes for the rate of photosynthesis.</p> <p>4.) both have their own DNA and Protein. Hence, semi-autonomous.</p>	4
----	---	---

30	<p>Mimicry, slime skin yes, to camouflage into the environment.</p> <p>3) The tympanum is a membrane present behind the eyes. They function as a membrane which h</p> <p>Both sexes are present in different organisms. Humans.</p> <p> </p> <p>OR</p> <p>s</p> <p>) Microvilli and villi are finger like projections which help in increase of surface area. Increases absorption and assimilation of food.</p> <p>HCl, Gastric juices, bile juice.</p> <p>Small Intestine.</p> <p>It helps in the storage of urine and fecal matter. It is also a passage for reproductive cells such as eggs and sperms.</p> <p> </p>	4
----	---	---

Section-E

31

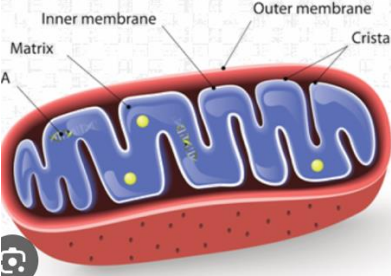
5



Types of chromosomes based on the position of centromere

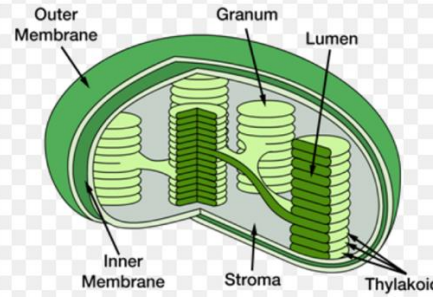
OR

MITOCHONDRION



BIEN11006413

Chloroplast



825

32

During inspiration, the diaphragm contracts and the space in the thoracic cavity increases. Along with this, there is contraction of the external intercostal muscles. This results in the outward movement of the ribs and the sternum. This increases the volume of the thoracic

c

h

In contrast, expiration is a passive process. As the diaphragm and intercostal muscles relax, the lungs and thoracic tissues recoil, and the volume of the lungs decreases. This causes the pressure within the lungs to increase above that of the atmosphere, causing air to leave the lungs.

r

OR

n

- In the lungs, the gaseous exchange occurs through alveoli in the lungs and blood capillaries.
- The oxygen inhaled through the air in the lungs moves from the alveoli to the blood in the capillaries through the process of diffusion as the oxygen concentration is high in the alveoli and low in the blood capillaries.
- Similarly, carbon dioxide from the blood capillaries moves to the alveoli in the lungs and is released into the air through exhalation.
- This occurs because the carbon dioxide concentration is high in the blood capillaries and low in the alveoli.

t

h

e

d

o

r

s

5

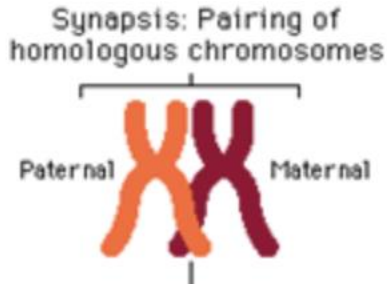
33

Anaphase of Mitosis	Anaphase-I of Meiosis
Each chromosome arranged at the metaphase plate, splits simultaneously and the two daughter chromatids migrate towards the two opposite poles.	The spindle fibres contract and pull the centromeres of homologous chromosomes towards the opposite poles. So, each chromosome goes to opposite pole.
The centromere of each chromosome is towards the pole with arms of chromosome trailing behind.	The centromere is not divided, so half set of the chromosomes of parent nucleus go to one pole and the remaining half set in the opposite pole.
During this stage, (i) Centromeres split and chromatids separate. (ii) Chromatids move to opposite poles.	During this stage, (i) Homologous chromosomes separate. (ii) Sister chromatids remain associated at their centromere.

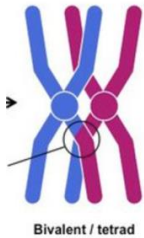
5

OR

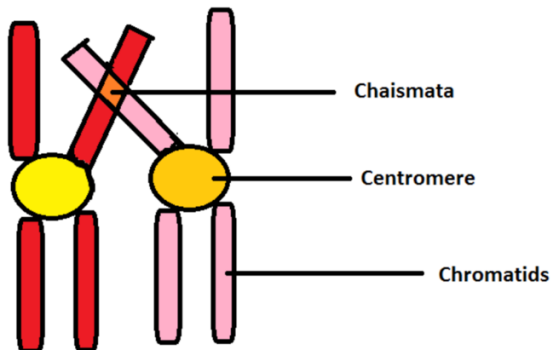
i) Synapsis: Chromosome start pairing together.



ii) Bivalent: complex formed by a pair of synapsed homologous chromosome is called a bivalent.



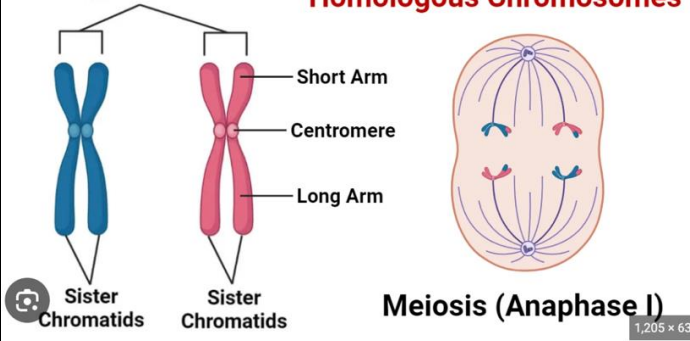
iii) Chiasmata: beginning of diplotene phase. The homologous chromosomes separate out each other except at the site of crossover.



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.

Homologous Chromosomes

Homologous Chromosomes



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

Homologous Chromosomes

Homologous Chromosomes

