

## HIGHER SECONDARY FIRST YEAR PUBLIC EXAMINATION – MAY -2022

## BIO-BOTANY –ANSWER KEY

## SECTION - I

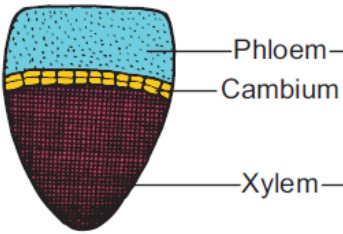
I. Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer. 8X1=8

TYPE - A			TYPE - B			MARK
Q.NO	OPTION	ANSWER	Q.NO	OPTION	ANSWER	1
1	(a)	While lipids can rarely flip-flop proteins cannot	1	(d)	(ii) and (iii) only	1
2	(a)	Denitrification	2	(a)	(i) and (iii) only	1
3	(c)	Methanobacterium	3	(a)	Denitrification	1
4	(b)	Mn prevent the uptake of Fe, Mg but not Ca	4	(a)	While lipids can rarely flip-flop proteins cannot	1
5	(c)	Amphoteric	5	(c)	G <sub>0</sub> Phase	1
6	(c)	G <sub>0</sub> Phase	6	(c)	Amphoteric	1
7	(d)	(ii) and (iii) only	7	(c)	Methanobacterium	1
8	(a)	(i) and (iii) only	8	(b)	Mn prevent the uptake of Fe, Mg but not Ca	1

## SECTION - II

Note: Answer any four of the following questions.

4X2=8

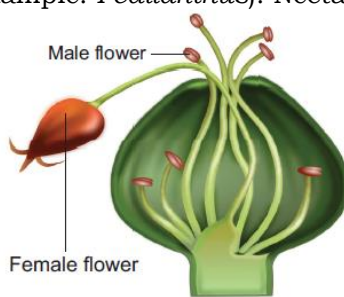
9	Virion is an intact infective virus particle which is non-replicating outside a host cell.	2
10	<b>Primary functions of stem:</b> <ol style="list-style-type: none"> <li>It provides support and bears leaves, flowers and fruits.</li> <li>It transports water and mineral nutrients to other parts from the root.</li> <li>It transports food prepared by leaves to other parts of the plant body.</li> </ol>	1+1=2
11		1+1=2
12	Based on the position of centromere, chromosomes are called <b>telocentric</b> (terminal centromere), <b>acrocentric</b> (terminal centromere capped by telomere), <b>sub metacentric</b> (centromere subterminal) and <b>metacentric</b> (centromere median).	$4 \times \frac{1}{2} = 2$
13	Water potential ( $\Psi$ ) can be determined by, <ol style="list-style-type: none"> <li>Solute concentration or Solute potential (<math>\Psi_s</math>)</li> <li>Pressure potential (<math>\Psi_p</math>)</li> </ol>	1 1
14	Suppression of growth in lateral bud by apical bud due to auxin produced by apical bud is termed as <b>apical dominance</b> .	2

## SECTION - III

Note: Answer any three of the following questions. Question No. 19 is compulsory.

3X3=9

15	<b>Importance of Mycorrhizae</b> <ul style="list-style-type: none"> <li>Helps to derive nutrition in <i>Monotropa</i>, a saprophytic angiosperm,</li> <li>Improves the availability of minerals and water to the plants.</li> <li>Provides drought resistance to the plants</li> <li>Protects roots of higher plants from the attack of plant pathogens</li> </ul>	1 1 1
16	Taxonomic entities are classified in three ways. They are <ul style="list-style-type: none"> <li>artificial classification,</li> <li>natural classification and</li> <li>phylogenetic classification.</li> </ul>	1 1 1
17	<b>Functions of Epidermal Tissue System (any 3)</b> <ol style="list-style-type: none"> <li>This system in the shoot checks excessive loss of water due to the presence of cuticle.</li> <li>Epidermis protects the underlying tissues.</li> </ol>	1 1

	<p>3. Stomata is involved in transpiration and gaseous exchange.</p> <p>4. Trichomes are also helpful in the dispersal of seeds and fruits, and provide protection against animals.</p> <p>5. Prickles also provide protection against animals and they also check excessive transpiration</p> <p>6. In some rose plants they also help in climbing.</p> <p>7. Glandular hairs repel herbivorous animals.</p>	<b>1</b>														
<b>18</b>	<table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: center;">Sap Wood (Alburnum)</th> <th style="text-align: center;">Heart Wood (Duramen)</th> </tr> </thead> <tbody> <tr> <td>Living part of the wood.</td> <td>Dead part of the wood.</td> </tr> <tr> <td>It is situated on the outer side of wood</td> <td>It is situated in the centre part of wood</td> </tr> <tr> <td>It is pale coloured</td> <td>It is dark coloured</td> </tr> <tr> <td>Very soft in nature</td> <td>Hard in nature</td> </tr> <tr> <td>Tyloses are absent</td> <td>Tyloses are present</td> </tr> <tr> <td>It is not durable and not resistant to microorganisms</td> <td>It is more durable and resists microorganisms</td> </tr> </tbody> </table>	Sap Wood (Alburnum)	Heart Wood (Duramen)	Living part of the wood.	Dead part of the wood.	It is situated on the outer side of wood	It is situated in the centre part of wood	It is pale coloured	It is dark coloured	Very soft in nature	Hard in nature	Tyloses are absent	Tyloses are present	It is not durable and not resistant to microorganisms	It is more durable and resists microorganisms	<b>6x1/2=3</b>
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<b>19</b>	<p><b>Cyathium:</b> Cyathium inflorescence consists of small unisexual flowers enclosed by a common involucre which mimics a single flower. Male flowers are organised in a scorpioid manner. Female flower is solitary and centrally located on a long pedicel. Male flower is represented only by stamens and female flower is represented only by a pistil. Cyathium may be actinomorphic (Example: <i>Euphorbia</i>) or zygomorphic (Example: <i>Pedilanthus</i>). Nectar is present in involucre</p> 	<b>2+1=3</b>														

**SECTION - IV****Note: Answer all the questions.****2X5=10**

<b>20</b> <b>(a)</b>	<p><b>Physiological effect of cytokinin: (any 5)</b></p> <ul style="list-style-type: none"> <li>• Cytokinin promotes cell division in the presence of auxin (IAA).</li> <li>• Cytokinin induces cell enlargement associated with IAA and gibberellins</li> <li>• Cytokinin can break the dormancy of certain light-sensitive seeds like tobacco and induces seed germination.</li> <li>• Cytokinin promotes the growth of lateral bud in the presence of apical bud.</li> <li>• Application of cytokinin delays the process of aging by nutrient mobilization. It is known as Richmond Lang effect.</li> <li>• Cytokinin (i) increases rate protein synthesis (ii) induces the formation of inter-fascicular cambium (iii) overcomes apical dominance (iv) induces formation of new leaves, chloroplast and lateral shoots.</li> <li>• Plants accumulate solutes very actively with the help of cytokinins.</li> </ul>	<p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p>
<b>(b)</b>	<p>Glycolysis is a linear series of reactions in which 6-carbon glucose is split into two molecules of 3-carbon pyruvic acid. The enzymes which are required for glycolysis are present in the cytoplasm</p> <p>It is the first and common stage for both aerobic and anaerobic respiration. It is divided into two phases.</p> <ol style="list-style-type: none"> <li>1. <b>Preparatory phase</b> or endergonic phase or hexose phase (steps 1-5).</li> <li>2. <b>Pay off phase</b> or oxidative phase or exergonic phase or triose phase (steps 6-10).</li> </ol> <p><b>1. Preparatory phase</b></p> <p>Glucose enters the glycolysis from sucrose which is the end product of photosynthesis. Glucose is phosphorylated into glucose-6- phosphate by the enzyme hexokinase, and subsequent reactions are carried out by different enzymes .</p>	<b>10x1/2=5</b>

At the end of this phase fructose-1, 6 - bisphosphate is cleaved into glyceraldehyde-3-phosphate and dihydroxy acetone phosphate by the enzyme aldolase. These two are isomers. Dihydroxy acetone phosphate is isomerised into glyceraldehyde-3- phosphate by the enzyme triose phosphate isomerase, now two molecules of glyceraldehyde 3 phosphate enter into pay off phase. During preparatory phase two ATP molecules are consumed in step-1 and step-3

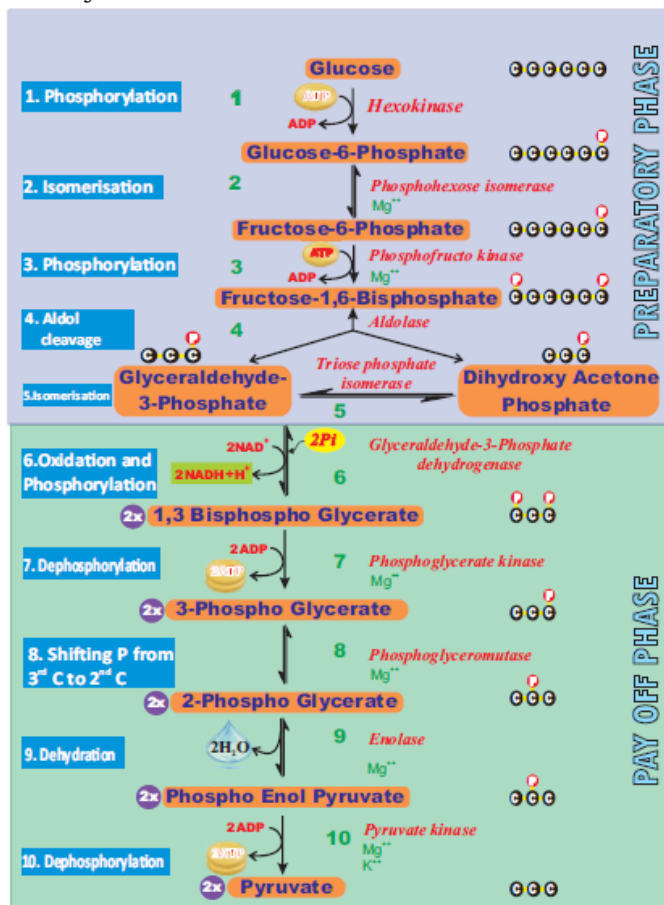
## 2. Pay off phase

Two molecules of glyceraldehyde-3- phosphate oxidatively phosphorylated into two molecules of 1,3 - bisphospho glycerate.

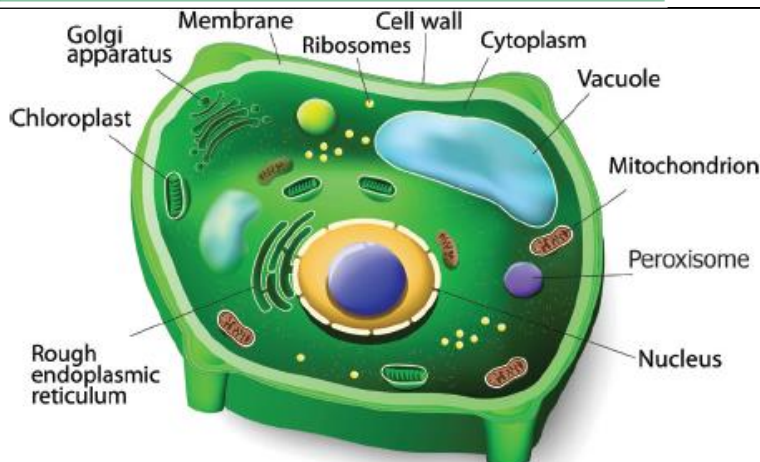
During this reaction  $2\text{NAD}^+$  is reduced to  $2\text{NADH} + \text{H}^+$  by glyceraldehyde- 3- phosphate dehydrogenase at step 6.

Further reactions are carried out by different enzymes and at the end two molecules of pyruvate are produced. In this phase,  $2\text{ATPs}$  are produced at step 7 and  $2\text{ATPs}$  at step10. Direct transfer of phosphate moiety from substrate molecule to ADP and is converted into ATP is called **substrate phosphorylation**

or **direct phosphorylation** or **trans phosphorylation**. During the reaction at step 9, 2 phospho glycerate dehydrated into Phospho enol pyruvate. A water molecule is removed by the enzyme enolase.



21  
(a)



2+3=5

<b>Plant cell</b>		
1	Usually they are larger than animal cells	
2	Cell wall present in addition to plasma membrane and consists of middle lamellae, primary and secondary walls	
3	Plasmodesmata present	
4	Chloroplast present	
5	Vacuole large and permanent	
6	Tonoplast present around vacuole	
7	Centrioles absent except motile cells of lower plants	
8	Nucleus present along the periphery of the cell	
9	Lysosomes are rare	
10	Storage material is starch grains	
<b>(b)</b>	<p>yes, shape of chloroplast is unique for algae. Variation among the shape of the chloroplast is found in members of algae.</p> <ul style="list-style-type: none"> <li>• cup shaped (<i>Chlamydomonas</i>),</li> <li>• discoid (<i>Chara</i>),</li> <li>• girdle shaped, (<i>Ulothrix</i>),</li> <li>• reticulate (<i>Oedogonium</i>),</li> <li>• spiral (<i>Spirogyra</i>),</li> <li>• stellate (<i>Zygnema</i>)</li> <li>• plate like (<i>Mougeoutia</i>).</li> </ul>	<b>5</b>

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