



**SHRI VIDHYABHARATHI MAT.HR.SEC.SCHOOL**  
**SAKKARAMPALAYAM, ELACHIPALAYAM, AGARAM(PO),**  
**TIRUCHENGODE(TK), NAMAKKAL(DT) – 637 202.**

**PUBLIC EXAMINATION – MARCH - 2023**  
**XII – BIO-BOTANY – TENTATIVE ANSWER KEY**

MARK : 35

**I. Answer all the questions.**

**Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.**

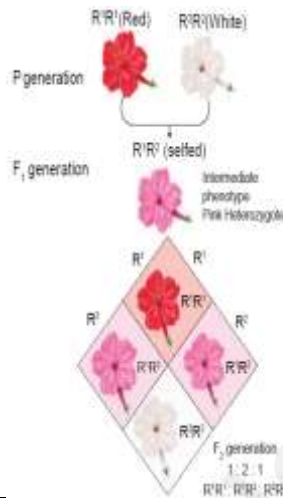
| SECTION - I                       |   |                              |  | 8 x 1=8 |
|-----------------------------------|---|------------------------------|--|---------|
| TYPE – A                          |   | TYPE - B                     |  |         |
| 1.                                | b) Quick nutrient cycling   | a) M.S. Swaminathan          |  | 1       |
| 2.                                | d) Zingiberaceae  | c) Green manure              |  | 1       |
| 3.                                | a) Loamy soil   | d) Embryo sac                |  | 1       |
| 4.                                | a) Meristem culture   | d) Zingiberaceae             |  | 1       |
| 5.                                | a) M.S. Swaminathan   | b) Quick nutrient cycling    |  | 1       |
| 6.                                | c) Green manure   | d) Agrobacterium tumefaciens |  | 1       |
| 7.                                | d) Embryo sac   | a) Meristem culture          |  | 1       |
| 8.                                | d) Agrobacterium tumefaciens  | a) Loamy soil                |  | 1       |
| SECTION - II                      |   |                              |  | 4X2=8   |
| <b>Answer any four questions.</b> |   |                              |  |         |
| 9.                                | <b>Stomium:</b><br>The cells along the junction of the two sporangia of an anther lobe lack these thickenings. This region is called <b>stomium</b> . This region along with the hygroscopic nature of endothecium helps in the dehiscence of anther at maturity. |                              |  | 2       |
| 10.                               | ❖ <b>Procentric synapsis:</b> Pairing starts from middle of the chromosome<br>❖ <b>Proterminal synapsis :</b> Pairing starts from the telomeres<br>❖ <b>Random synapsis :</b> Pairing may start from anywhere   |                              |  | 2       |
| 11.                               | <b>Chemical mediated gene transfer:</b><br>❖ Certain chemicals like polyethylene glycol (PEG)<br>❖ <b>Dextran sulphate</b> induce DNA uptake into plant protoplasts.  |                              |  | 2       |
| 12.                               | The amount of light available for photosynthesis of plants is called <b>Photosynthetically Active Radiation (PAR)</b> which is between the range of 400-700 nm wave length.   |                              |  | 2       |

| 13.  | <p><b>Primary introduction and Secondary introduction</b></p> <table border="1" data-bbox="256 152 1321 589"> <thead> <tr> <th data-bbox="256 152 788 203">Primary introduction</th> <th data-bbox="788 152 1321 203">Secondary introduction</th> </tr> </thead> <tbody> <tr> <td data-bbox="256 203 788 589">When the introduced variety is well adapted to the new environment without any alternation to the original genotype</td> <td data-bbox="788 203 1321 589">When the introduced variety is subjected to selection to isolate a superior variety and hybridized with a local variety to transfer one or a few characters to them.<br/><br/>Example : Tea varieties collected from China and North East India initially grown in Botanical Garden of Kolkata</td> </tr> </tbody> </table>                                      | Primary introduction | Secondary introduction | When the introduced variety is well adapted to the new environment without any alternation to the original genotype  | When the introduced variety is subjected to selection to isolate a superior variety and hybridized with a local variety to transfer one or a few characters to them.<br><br>Example : Tea varieties collected from China and North East India initially grown in Botanical Garden of Kolkata | 2 |
|--|--|----------------------|------------------------|--|--|---|
| Primary introduction   | Secondary introduction   |                      |                        |  |  |   |
| When the introduced variety is well adapted to the new environment without any alternation to the original genotype  | When the introduced variety is subjected to selection to isolate a superior variety and hybridized with a local variety to transfer one or a few characters to them.<br><br>Example : Tea varieties collected from China and North East India initially grown in Botanical Garden of Kolkata   |                      |                        |  |  |   |
| 14.  | <p><b>Co-evolution:</b> The interaction between organisms, when continues for generations, involves reciprocal changes in genetic and morphological characters of both organisms. This type of evolution is called Co-evolution. It is a kind of co- adaptation and mutual change among interactive species.<br/>Examples:<br/>• Corolla length and proboscis length of butterflies and moths ( <i>Habenaria</i> and Moth )</p>  | 2                    |                        |  |  |   |
| <b>SECTION -III</b>  |  | <b>3X3=9</b>         |                        |  |  |   |
| <b>Question no. 19 compulsory</b>  |  |                      |                        |  |  |   |
| 15.  | <p><b>Differentiate between Grafting &amp; Layering:</b></p> <table border="1" data-bbox="256 1099 1321 1458"> <thead> <tr> <th data-bbox="256 1099 788 1151">Grafting</th> <th data-bbox="788 1099 1321 1151">Layering</th> </tr> </thead> <tbody> <tr> <td data-bbox="256 1151 788 1458">In this, parts of two different plants are joined so that they continue to grow as one plant. Of the two plants, the plant which is in contact with the soil is called <b>stock</b> and the plant used for grafting is called <b>scion</b></td> <td data-bbox="788 1151 1321 1458">In this method, the stem of a parent plant is allowed to develop roots while still intact. When the root develops, the rooted part is cut and planted to grow as a new plant.<br/>Examples: <i>Ixora</i> and <i>Jasminum</i>.</td> </tr> </tbody> </table> | Grafting             | Layering               | In this, parts of two different plants are joined so that they continue to grow as one plant. Of the two plants, the plant which is in contact with the soil is called <b>stock</b> and the plant used for grafting is called <b>scion</b> | In this method, the stem of a parent plant is allowed to develop roots while still intact. When the root develops, the rooted part is cut and planted to grow as a new plant.<br>Examples: <i>Ixora</i> and <i>Jasminum</i> .  | 3 |
| Grafting   | Layering   |                      |                        |  |  |   |
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| 16.  | <p><b>Significance of Ploidy:</b></p> <ul style="list-style-type: none"> <li>• Many polyploids are more vigorous and more adaptable than diploids.</li> <li>• Many ornamental plants are autotetraploids and have larger flower and longer flowering duration than diploids.</li> <li>• Autopolyploids usually have increase in fresh weight due to more water content.</li> <li>• Aneuploids are useful to determine the phenotypic effects of loss or gain of different chromosomes.</li> <li>• Many angiosperms are allopolyploids and they play a role in an evolution of plants.</li> </ul>   | (Any3)<br>3          |                        |  |  |   |
| 17.  | Some of the major species cultivated in commercial Agroforestry include <i>Casuarina</i> , <i>Eucalyptus</i> , Malai Vembu, Teak and Kadambu trees   | 3                    |                        |  |  |   |

|                     |   |               |
|---------------------|---|---------------|
| 18.                 | <i>Spirulina</i> can be grown easily on materials like waste water from potato processing plants (containing starch), straw, molasses, animal manure and even sewage, to produce large quantities .   | 3             |
| 19.                 | <p><b>Biomonitoring :</b></p> <p>The act of observing and assessing the current state and ongoing changes in ecosystem, biodiversity components, landscape including natural habitats, populations and species.</p> <p>An agricultural drone is an unmanned aerial vehicle applied to farming in order to help increased crop production and monitor crop growth.</p> <p>Agricultural drones let farmers see their fields from the sky.</p> <p>This bird's eye-view can reveal many issues such as irrigation problems, soil variation and pest and fungal infestations. It is also used for cost effective safe method of spraying pesticides and fertilizers, which proves very easy and non-harmful</p>  | 3             |
| <b>SECTION - IV</b> |   | <b>2X5=10</b> |
| 20.                 | <p><b>Anemophilous plants have the following characteristic features:</b></p> <ul style="list-style-type: none"> <li>❖ The flowers are produced in pendulous, catkin-like or spike inflorescence.</li> <li>❖ The axis of inflorescence elongates so that the flowers are brought well above the leaves.</li> <li>❖ The perianth is absent or highly reduced.</li> <li>❖ The flowers are small, inconspicuous, colourless, not scented, do not secrete nectar.</li> <li>❖ The stamens are numerous, filaments are long, exerted and versatile.</li> <li>❖ Anthers produce enormous quantities of pollen grains compared to number of ovules available for pollination</li> <li>❖ They are minute, light and dry so that they can be carried to long distances by wind.</li> <li>❖ In some plants anthers burst violently and release the pollen into the air. Example: <i>Urtica</i>.</li> <li>❖ Stigmas are comparatively large, protruding, sometimes branched and feathery, adapted to catch the pollen grains. Generally single ovule is present.</li> <li>❖ Plant produces flowers before the new leaves appear, so the pollen can be carried without hindrance of leaves.</li> </ul> | (Any5)<br>5   |
| (OR)                | <p><b>Incomplete dominance – No blending of genes</b></p> <p><b>The German Botanist Carl Correns's (1905) Experiment -</b> In 4 O' clock plant, <i>Mirabilis jalapa</i> homozygous white (R<sup>2</sup>R<sup>2</sup>), the phenotype of the F<sub>1</sub> hybrid is heterozygous pink (R<sup>1</sup>R<sup>2</sup>).</p> <p>The F<sub>1</sub> heterozygous phenotype differs from both the parental homozygous phenotype. When one allele is not completely dominant to another allele it shows incomplete dominance.</p> <p>. F<sub>1</sub> generation produces intermediate phenotype pink coloured flower.</p> <p>When pink coloured plants of F<sub>1</sub> generation were interbred in F<sub>2</sub> both</p>  |               |

phenotypic and genotypic ratios were found to be identical as 1 : 2 : 1 (1 red : 2 pink : 1 white). Genotypic ratio is 1 R<sup>1</sup>R<sup>1</sup> : 2 R<sup>1</sup>R<sup>2</sup> : 1 R<sup>2</sup>R<sup>2</sup>. From this we conclude that the alleles themselves remain discrete and unaltered proving the Mendel's Law of Segregation. The phenotypic and genotypic ratios are the same. There is no blending of genes. In the F<sub>2</sub> generation R<sup>1</sup> and R<sup>2</sup> genes segregate and recombine to produce red, pink and white in the ratio of 1 : 2 : 1. R<sup>1</sup> allele codes for an enzyme responsible for the formation of red pigment. R<sup>2</sup> allele codes for defective enzyme. R<sup>1</sup> and R<sup>2</sup> genotypes produce only enough red pigments to make the flower pink. Two R<sup>1</sup>R<sup>1</sup> are needed for producing red flowers. Two R<sup>2</sup>R<sup>2</sup> genes are needed for white flowers. If blending had taken place, the original pure traits would not have appeared and all F<sub>2</sub> plants would have pink flowers. It is very clear that Mendel's particulate inheritance takes place in this cross which is confirmed by the reappearance of original phenotype in F<sub>2</sub>.

4



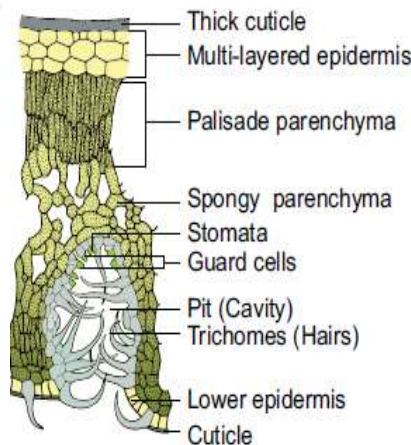
1

21.

**Anatomical adaptations**

- Presence of multilayered epidermis with heavy cuticle to prevent water loss due to transpiration.
- Hypodermis is well developed with sclerenchymatous tissues.
- Sunken shaped stomata are present only in the lower epidermis with hairs in the sunken pits.
- Scotoactive type of stomata found in succulent plants .
- Vascular bundles are well developed with several layered bundle sheath.
- Mesophyll is well differentiated into palisade and spongy parenchyma.
- In succulents the stem possesses a water storage region.

3



2

(OR)

Give an account of active principle and medicinal values of any two plants you have studied.

| Common name                 | Botanical name          | Family         | Active principle | Medicinal Value  |
|-----------------------------|-------------------------|----------------|------------------|--|
| Keezhanelli                 | Phyllanthus amarus      | Phyllanthaceae | Phyllanthin      | 1.Cure Jaundice<br>2. Extract of P. amarus Effective against Hepatitis B virus             |
| Nilavembu (King of Bitters) | Andrographis paniculata | Acanthaceae    | Andrographolides | 1. Used to treat liver disorders.<br>2.Nilavembu kudineer Used to treat malaria and dengue |

2½

2½

## MARK ANALYSIS

**(WITHOUT CHOICE)**

| PART        | Questions | Total Questions | Book Back Questions | Interior Questions |
|-------------|-----------|-----------------|---------------------|--------------------|
| I           | 1 Mark    | 8               | 3                   | 5                  |
| II          | 2 Marks   | 6               | 4                   | 2                  |
| III         | 3 Marks   | 5               | 3                   | 2                  |
| IV          | 5 Marks   | 4               | 3                   | 1                  |
| Total Marks |           | <b>55</b>       | <b>35</b>           | <b>20</b>          |
| Percentage  |           | 100 %           | 55%                 | 45 %               |

## DEPARTMENT OF BOTANY

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99%  
REVANTH S



98%  
SHANMUGAKARTHIK G

மாதத்தில் ஒவ்வொரு

சனி மற்றும் ஞாயிற்றுக்கிழமைகளில்

10 மற்றும் 11- ஆம் வகுப்பு சேர்க்கைக்கான

SCHOLARSHIP ENTRANCE EXAM நடைபெறும்

Time : 10.00am Onwards

Venue : SVB SCHOOL CAMPUS.