

SHRI VIDHYABHARATHI MATRIC HR.SEC.SCHOOL

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COMMON HALF YEARLY EXAMINATION 2018

STD: XII-PURE SCIENCE

DATE : 19.12.2018

SUBJECT: BOTANY

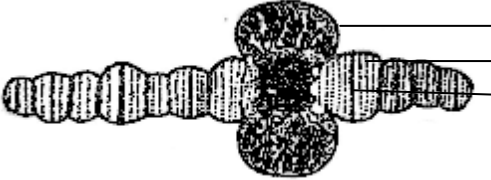
ANSWER KEY

MARKS : 70

Q .NO	CONTENT	15X1=15								
1.	A) Artificial system	1								
2.	b) Rubia tinctoria	1								
3.	c) Endodermis	1								
4.	b) Xylem vessels	1								
5.	b) Neurospora	1								
6.	d) Secondary constriction	1								
7.	a) Bacteria only	1								
8.	b) Renin inhibitors	1								
9.	a) Polyethylene glycol	1								
10.	a) Kuhne	1								
11.	a) Mg	1								
12.	b) Sunflower	1								
13.	d) Cissus quadrangularis	1								
14.	c) Basidiomycetes	1								
15.	d) Bacillus thuringiensis	1								
SECTION -II		6X2=12								
Answer any six questions (Q. No 23 is compulsory)										
16.	Tautonym: If the generic and specific epithets are the same, it is called tautonym. eg <i>Sassafras sassafras</i> . Such names are not accepted in the system of nomenclature .	2								
17.	a) Lady's finger : <i>Abelmoschus esculentus</i> b) Keezhanelli : <i>Phyllanthus amarus</i>	1 1								
18.	Fibres , Sclereids-differences (Any two points)	2								
	<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Fibres</th> <th style="width: 50%;">Sclereids</th> </tr> </thead> <tbody> <tr> <td>1. Fibres are longer cells</td> <td>Sclereids are shorter cells</td> </tr> <tr> <td>2. They contain less number of pits</td> <td>They contain numerous pits</td> </tr> <tr> <td>3. They contain only simple pits</td> <td>They contain simple or branched pits</td> </tr> </tbody> </table>		Fibres	Sclereids	1. Fibres are longer cells	Sclereids are shorter cells	2. They contain less number of pits	They contain numerous pits	3. They contain only simple pits	They contain simple or branched pits
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	4. They are narrow with pointed ends	The vary in their shape. ie. isodiametrical, rod shaped or bone shaped.	
	5. The secondary wall is evenly thickened with lignin	The lignified wall is very thick and shows lamellation	
	6. It has narrow lumen	Lumen is very much reduced.	
	7. Provide mechanical strength to the plants	Responsible for the rigidity of the seed coat.	
19.	Passage cells: In Root the endodermal cells which are located opposite to the protoxylem elements. These thin walled cells without casparian strips are called passage cells through which water and mineral salts are conducted from the cortex to the xylem elements.		2
20.	Translation : ❖ According to genetic information present in the mRNA, specific aminoacids are assembled to form polypeptide chain. ❖ The process of translating the nucleotide sequence of mRNA into the aminoacid sequence of a polypeptide is called translation i.e. it means decoding the message for protein synthesis.		1 1
21.	Totipotency The inherent potential of any living plant cell to develop into entire organism is called totipotency. This is unique to plant cells.		2
22.	Respiratory quotient Respiratory quotient may be defined as “the ratio between the volume of carbon dioxide given out and oxygen consumed during respiration”. This value depends upon the nature of the respiratory substrate and its rate of oxidation. (or) $\text{Respiratory quotient} = \frac{\text{volume of } CO_2 \text{ evolved}}{\text{volume of } O_2 \text{ consumed}}$		2
23.	Undergoes senescence result in reduced rate of photosynthesis(Compulsory questions) Among leaf factors, such as leaf age, leaf angle and leaf orientation, leaf age has the most prominent effect on photosynthesis. If leaf undergoes, senescence, loss of chlorophyll occurs. The photosynthetic enzymes also get inactivated resulting in reduced rate of photosynthesis.		2

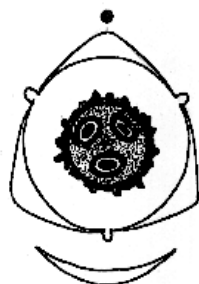
24.	<p>Bio - fertilizer</p> <p>The term 'biofertilizer' denotes all the nutrient inputs of biological origin for plant growth. Biological origin refers to microbes producing nitrogen compounds. Bacteria and cyanobacteria are known to fix atmospheric nitrogen and are known as biofertilizers. Nitrogen fixing bacteria like Azotobacter, Bacillus and Rhizobium</p>	2
<p>SECTION -III</p> <p>Answer any six questions only (Q.No 31 compulsory)</p>		6x3=18
25.	<p>Significance of Herbarium (Any three points)</p> <ul style="list-style-type: none"> ❖ Herbarium is a source of knowledge about the flora of a region or a locality or a country. ❖ It is a data store in which the information on plants are available. ❖ The type specimens help in the correct identification of plants. ❖ It provides materials for taxonomic and anatomical studies. ❖ Typical pollen characters have been well emphasized in taxonomy. Morphological characters of the pollen remain unaltered even after storage upto nearly 200 years. ❖ It is very much useful in the study of cytology, structure of DNA, numerical taxonomy, chaemotaxonomy, etc. It acts as a reservoir of gene pool studies. ❖ Because of its importance, several herbaria have been established at the national and international centres 	3
26.	<p>Cladode</p> <p>In several species of Euphorbia, the stem is modified to perform photosynthesis. This modified stem is called cladode and it resembles cactus.</p> <p>eg. E. tirucalli and E. antiquorum (Sadhurakkalli).</p>	2 1
27	<p>Comparison between Heart Wood and sapwood (Any 3 points)</p> <ul style="list-style-type: none"> ❖ The centre part of the wood, which is darker in colour, is called heartwood or duramen. ❖ As vessels of the heartwood is blocked by tyloses, water is not conducted through them. ❖ The tyloses contain oils, gums, tannins, resins and other coloured substances. ❖ Due to the presence of these substances, the heartwood becomes the hardest part of the wood. From economic point of view the heartwood is more useful than sapwood. ❖ The timbers from the heartwood are more durable and more resistant to the attack of microorganisms and insects than those from sapwood. 	3

28.	<p>Structure of polytene chromosome</p>  <p>Chromosomal puff Inter band Dark band</p> <p>(Diagram 2 +Labeling 1)</p>	3
29.	<p>Cloning vector</p> <p>The DNA of donor organism or gene of interest is isolated and cut into fragments using restriction endonucleases. They are attached to a suitable replicon. Such replicon is known as vector or cloning vehicle, which is nothing but the extra chromosomal circular DNA found in the cytoplasm of Escherichia coli is called plasmid. The plasmids are the most suitable vectors.</p>	3
30.	<p>Bolting:</p> <p>Rosette plants usually show reduced internodal growth. These plants exhibit excessive internodal growth when they are treated with gibberellins. This sudden elongation of stem followed by flowering is called bolting.</p>	3
31.	<p>The remedy of the sea polluted by crude oil without affecting the environment(Compulsory)</p> <p>In this way, pollution of land and water due to the oil slicks can be remedied and the phenomenon is called bioremediation. It is defined as the use of living microorganisms to degrade environmental pollutant or prevent pollution.</p>	3
32.	<p>Advantages of vernalization</p> <ul style="list-style-type: none"> ❖ Crops can be produced earlier by vernalization. ❖ They can be cultivated in places where they naturally do not grow. ❖ Vernalization helps to accelerate the plant breeding. 	3
33.	<p>Aim of plant breeding (Any 3 points)</p> <ul style="list-style-type: none"> ❖ Bringing wild food crops to cultivation. (wheat, oats and many cereal crops were once wild plants which had now been domesticated). ❖ Obtaining genes from desirable plants or related species (eg. as seeds from various parts of the world). ❖ Introduction of plants from nearby regions or even from other countries for improvement of the crop. (eg. cauliflower, tomato, potato and soyabeans). 	3

	<ul style="list-style-type: none"> ❖ By employing certain plant breeding techniques, new varieties are developed. eg. maize, sorghum, cotton and sunflower. ❖ Auto and Allopolyploid breeding. ❖ By inducing mutations using physical and chemical mutagens. ❖ Production of haploids by the application of plant tissue culture of anther and ovary. 	
	SECTION -IV Answer the following questions	5x5=25
34	<p>Female flower of Ricinus communis</p> <p style="text-align: center;">Vegetative characters</p> <p>Habit Perennial shrub.</p> <p>Root Branched tap root system.</p> <p>Stem Aerial, erect, herbaceous but woody below, branched and hollow. Young branches are covered with hair like outgrowth. Latex is present.</p> <p>Leaf Petiolate, exstipulate, alternate, deeply palmately lobed with 7 or more lobes. Venation is palmately reticulate divergent.</p> <p style="text-align: center;">Floral characters</p> <p>Inflorescence Compound raceme or panicle and terminal. Male flowers are seen below and female flowers near the apex.</p> <p>Female Flower Bracteate, ebracteolate, pedicellate, actinomorphic, incomplete and hypogynous.</p> <p>Perianth Tepals 3 arranged in single whorl and gamophyllous showing valvate aestivation.</p> <p>Androecium Absent but staminode is present.</p> <p>Gynoecium Ovary superior, tricarpeal and syncarpous. Ovary trilobular with one ovule in each locule on axile placentation. Styles 3, deep red and long. Bifid with feathery stigma.</p> <p>Fruit Fruit is called regma. It is covered by spinous outgrowths. The fruit splits into three one seeded cocci.</p>	<p>1</p> <p>2 ½</p>

Seed

Endospermous.

Floral FormulaBr., Ebrl., ⊕, ♀, P₍₃₎, A₀, G₍₃₎.**Floral diagram**

1/2

1

(OR)

Classification of meristem

Based on its position, the meristem is divided into three types – apical meristem, intercalary meristem and lateral meristem.

Apical meristem

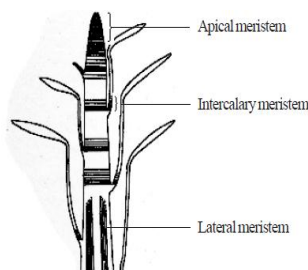
Apical meristem is found at the tips of roots, stem and branches. It is responsible for increase in length of plant. It is divided into three zones protoderm, procambium and ground meristem. Protoderm gives rise to epidermal tissue; procambium gives rise to primary vascular tissues and ground meristem gives rise to cortex and pith.

Intercalary meristem

It is present in the nodal region and is prominently found in monocotyledons, **eg. grasses**. As the name indicates, it is present in between the permanent tissues. It is derived from the apical meristem and is responsible for the elongation of internodes.

Lateral meristem

The meristem that is present along the longitudinal axis of stem and root is called lateral meristem. **Vascular cambium and cork cambium (phellogen)** are examples for lateral meristem. It produces secondary permanent tissues, which result in the thickening of stem and root.

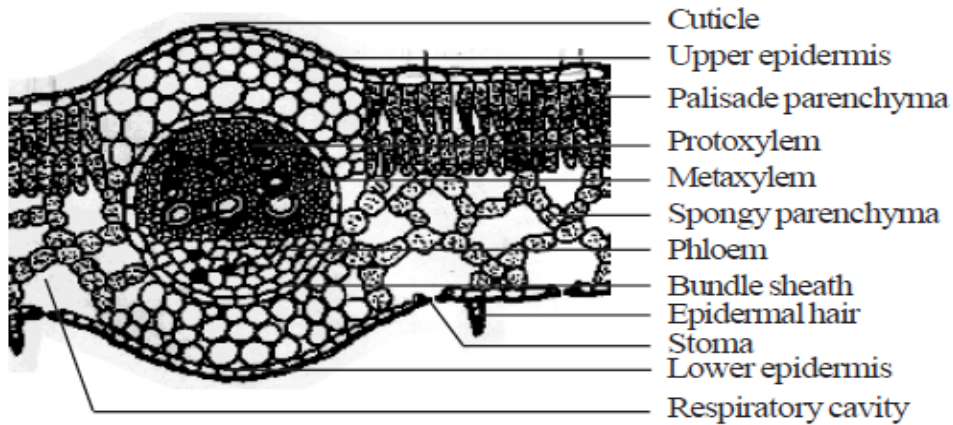


4

1

Fig. 2.1. L.S of shoot - showing the positions of meristems

35. T.S of dicot leaf



(Diagram 3 + Parts 2)

5

(or)

Difference between Ray and Disc florest

Ligulate (or) Ray florests	Tubular (or) Disc florests
Petals- 5 irregular and ligulate (or) bilabiate.	petals -5 regular and tubular
Stamens are absent	Stamens 5, syngenesious
Incomplete, pistillate	Flowers are complete
Neutral and zygomorphic flowers	bisexual and Actionmomorphic flowers
Present in marginal position	Present in central part of the inflorescences

5

36. **Physiological effect of(ethylene) gaseous hormone**
(Any five points)

- ❖ Ethylene prevents elongation of stem and root in longitudinal direction. Simultaneously, the tissue enlarges radially resulting in thickening of plant parts.
- ❖ Ethylene promotes positive geotropic growth of roots.
- ❖ Ethylene inhibits the growth of lateral buds in pea seedlings.
- ❖ Ethylene is involved in the ripening of fruits.
- ❖ Ethylene stimulates the formation of abscission zone in leaves, flowers and fruits. This causes leaves, flowers and fruits to shed prematurely.
- ❖ Flowering can be induced by application of ethylene in plants like pineapple and mango.
- ❖ Ethylene stimulates rooting of cuttings, initiation of lateral roots and growth of root hair.
- ❖ Ethylene is responsible for breaking the dormancy of buds and seeds.

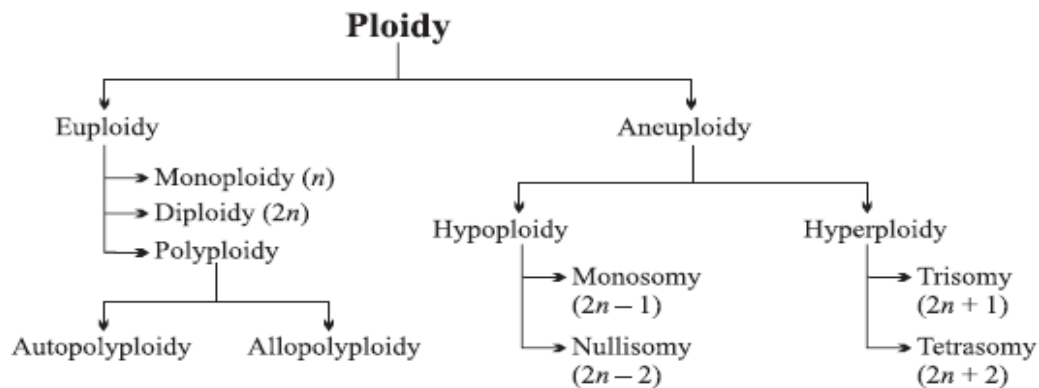
5

(or)

Numerical chromosomal aberration

Definition- Each species of an organism has a specific number of chromosomes in its somatic cells. These chromosomes are found in pairs. At the time of formation of gametes the chromosome number is reduced. Hence, the gametes carry haploid set of chromosomes. Alterations in the number of chromosomes from the diploid set is called **numerical chromosomal aberration**. It is also known as ploidy. There are **two types of ploidy** – euploidy and aneuploidy.

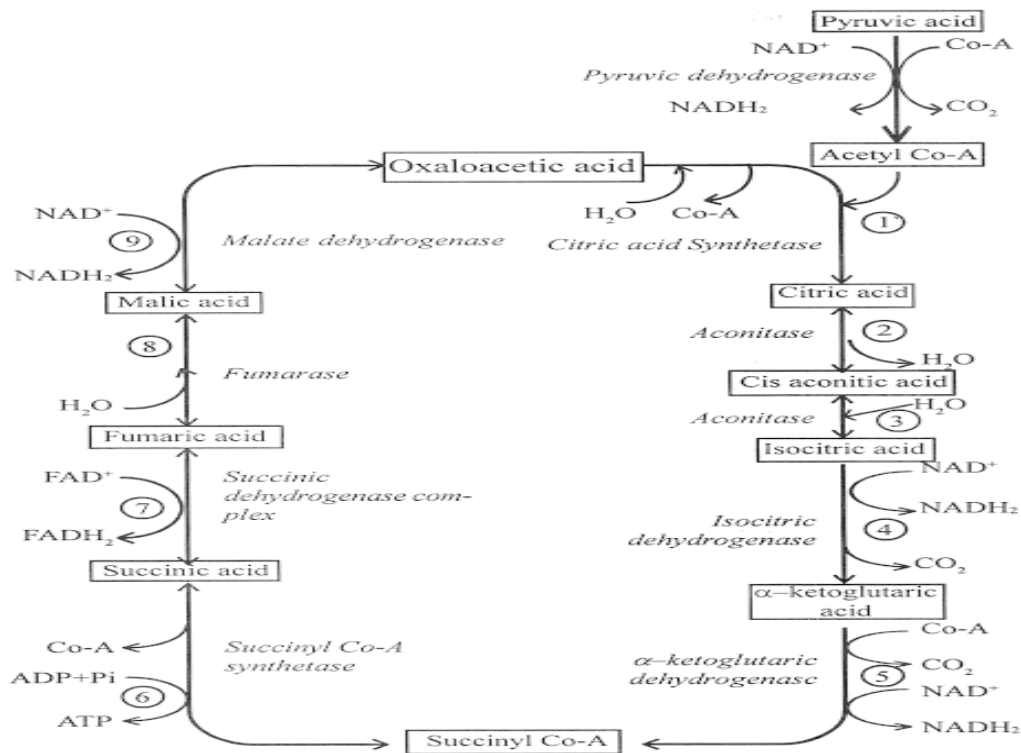
2



3

Kreb's cycle (Flow chart)

37.



5

(or)

Single cell protein and the uses

❖ The term 'single cell protein' was coined in 1966. The dried cells of microorganisms used as food or feed for animals and they are collectively known as Microbial proteins. This term was replaced by a new term 'single cell protein'. The isolated protein or the total cell material is called the SCP.

2

Uses of SCP

- ❖ It is a rich source of proteins(60 to 72 per cent), vitamins, amino acids, minerals and crude fibres.
- ❖ It is a popular health food. Nowadays, Spirulina tablets are prescribed as enriched vitamin for most people.
- ❖ It provides valuable protein-rich supplement in human diet.
- ❖ It lowers blood sugar level of diabetics due to the presence of gammalinolenic acid and prevents the accumulation of cholesterol in human body.

3

38. **Economic importance of cotton (Any five points)**

- ❖ It is a cash crop.
- ❖ It gives three important products: fibre, food and cattle feed.
- ❖ Lint fibre is for clothing which is very much useful in the textile industries.
- ❖ Seed is used for extracting oil. This is also used as vanaspathi.
- ❖ Cotton flour prepared from the seed is used for bread and biscuit making.
- ❖ Cotton seed cake is used as a good organic manure.
- ❖ Fatty acids obtained from oil is used in the preparation of insecticide, fungicides and plastics, etc.

5

(or)

Application of plant tissue culture (Any five points)

- ❖ Several commercial establishments now routinely use micro propagation for different foliage and ornamental plants.
- ❖ Through tissue culture methods using bud proliferation and multiple shoot formation, ornamental plants are produced in large numbers.
- ❖ Virus free germplasm are produced through apical meristem culture eg. **banana**.
- ❖ Artificial synthetic seeds are produced through somatic embryogenesis.
- ❖ Plant tissue culture is an important technique for the production of secondary metabolites in large quantities.

- ❖ Tissue culture helps in induction of haploidy in anther culture ie. useful for mutation breeding, triploidy through endosperm culture for inducing parthenocarpic fruits and polyploidy for increase in biomass or yield.
- ❖ Embryo culture technique is applied to overcome embryo abortion, seed dormancy and self-sterility in seeds.
- ❖ In recent years, plant tissue culture methods are employed in plants for the introduction of foreign gene into plant cells through DNA coated micro particles and delivering these particles into a host cell by using a gene gun.
- ❖ Protoplasmic fusion encourages genomes of incompatible crops to come together to form somatic hybrids.
- ❖ Plant tissue culture is applied in the area of plant physiological and biochemical research to study the cell cycle, metabolism in cells, nutritional, morphogenetical and developmental studies in plants.
- ❖ By plant tissue culture techniques, a plant cell of potato and tomato were brought together through protoplasmic fusion and the hybrid cell was made to develop into a pomato plant. In pomato, the stem bears the tubers and the branches produced tomatoes.

5

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