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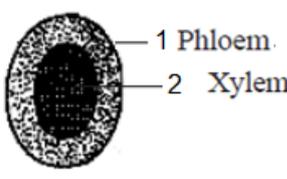
COMMON HALF YEARLY EXAMINATION 2018

STD: XII

DATE: 19.12.2018

SUBJECT: BIO-BOTANY

MARKS : 35

Q. NO	ANSWER KEY	MARKS
SECTION - I		
1.	b) Sterlitzia reginae	1
2.	c) Pericycle	1
3.	a) 631	1
4.	d) Cola nitida	1
5.	b) 1966	1
6.	b) Protoplasmic fusion	1
7.	a) 5 carbon atom	1
8.	d) Euphorbia splendens	1
SECTION - II ANSWER ANY FOUR QUESTIONS		Marks
9.	Systematic position o Solanaceae: Class: Dicotyledonae Sub-class: Gamopetalae Series: Bicarpellatae Order: Polemoniales Family: Solanaceae	2
10.	Dimorphic Chloroplasts: The C₄ plants contain dimorphic chloroplasts i.e. chloroplasts in mesophyll cells are granal (with grana) whereas in bundle sheath chloroplasts are agranal (without grana).	1 1
11.	Identification : Amphicribal Vascular bundle  1 Phloem. 2 Xylem	1 1
(Diagram ½ + Parts ½)		
12.	Photoperiodism: The response of a plant to the relative lengths of light and dark periods is known as photoperiodism. It has been first observed in Maryland Mammoth variety of tobacco (Nicotiana tabacum).	2
13.	Bordeaux Mixture Composition: Copper sulphate - 9 Kgs. Quick lime - 9 Kgs. Water - 250 litres.	2

17. **Identification :**
Inversion Chromosomal aberrations:

It is another chromosomal abnormality in which, the order of genes in a chromosomal segment is reversed by an angle of 180°. For example, the order of genes in a chromosome is a, b, c, d, e, f, g and h. Due to aberration, the sequence of genes becomes, a, b, c, d, g, f, e and h. There are two types of inversion – pericentric and paracentric inversion.

In pericentric inversion, the inverted segment of the chromosome contains centromere. Sometimes, it is responsible for evolution of the organism. For example the **17th human chromosome is acrocentric**, while in **Chimpanzee** the corresponding chromosome is **metacentric**. In paracentric inversion, the inverted segment of the chromosome has no centromere.



Inversion

18. **ATP Production in Aerobic Respiration:**

Table showing details of ATP production in aerobic respiration

Sl. No.	Stages of respiration	Number of molecules of			Total number of ATP obtained
		ATP	NADH ₂	FADH ₂	
1.	Glycolysis	2	2	–	8
2.	Oxidative decarboxylation of pyruvic acid	–	2	–	6
3.	Krebs cycle	2	6	2	24
	Total	4	30 ATP	4 ATP	38

19. **Economic importance of Teak: (Any three points)**

- Teak wood is durable and it is an important timber in the tropics. As the seasoned teak, timber does not shrink, crack or alter its shape, it is extensively used in making household furnitures.
- It is also used in ship building, boats, etc.
- It is used for interior decoration.
- It is used for the manufacture of boards.

SECTION -IV

Answer the following questions

2x5=10

20.

Hibiscus rosa-sinesis in botanical terms :

Vegetative Characters

Habit : Perennial shrub.

Root : Tap root system.

Stem : Aerial, erect, cylindrical, woody and branched.

Leaf : Simple, Alternate, petiolate, stipulate, serrate, glabrous, apex acuminate with multicostate reticulate venation.

Floral Characters

Inflorescence : Solitary cyme and axillary.

Flower : Pedicel jointed, bracteate, bracteolate, bisexual, large, showy, pentamerous, dichlamydeous, actinomorphic, complete and hypogynous and mucilage is present in floral parts.

Epicalyx : 5 to 8 bracteoles outer to the calyx. They are green and free.

Calyx : Sepals 5, green, gamosepalous showing valvate aestivation and odd sepal is posterior in position.

Corolla : Petals 5, variously coloured, polypetalous but fused at the base and showing twisted aestivation.

Androecium : Numerous stamens, monadelphous, filaments are fused to form a staminal tube around the style. Staminal tube is red. Anthers are monotheous, reniform, yellow, transversely attached to the filament, dehisce transversely and extrorse.

Gynoecium : Ovary superior, pentacarpellary and syncarpous. Ovary pentalocular with many ovules per locule on axile placentation. Style simple, long, slender and passes through the staminal tube. Stigma 5, capitate and coloured.

Fruit : Mostly abortive.

Floral Formula

Br., Brl., ⊕, ♀, K₍₅₎, C₅, A_(∞), G₍₅₎

Floral Diagram:



Floral diagram

1

2 ½

½

1

(OR)

Phloem

Like xylem, phloem is also a complex tissue. It conducts food materials to various parts of the plant.

Sieve elements

Sieve elements are the conducting elements of the phloem. They have thick primary walls. Their end walls are transverse or oblique. The end wall contains a number of pores and it looks like a sieve. So it is called a sieve plate. The sieve elements are arranged one above the other and form

vertical sieve tubes. In matured sieve tube, nucleus is absent. It contains a lining layer of cytoplasm. This is an important feature of sieve elements. A special protein called slime body is seen in it. The conduction of food material takes place through cytoplasmic strands. They are distinguished into sieve cells and sieve tubes. Sieve cells occur in pteridophytes and gymnosperms, while sieve tubes occur in angiosperms.

1½

They are associated with the companion cells. In mature sieve elements, sometimes the pores in the sieve plate are blocked by a substance called callose.

Companion cells

The thin-walled, elongated, specialised parenchyma cells, which are associated with the sieve elements, are called companion cells. In contrast to sieve elements, the companion cells have cytoplasm and a prominent nucleus. They are connected to the sieve tubes through pits found in the lateral walls. The companion cells are present only in angiosperms and absent in gymnosperms and pteridophytes. They assist the sieve tubes in the conduction of food materials.

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Phloem parenchyma

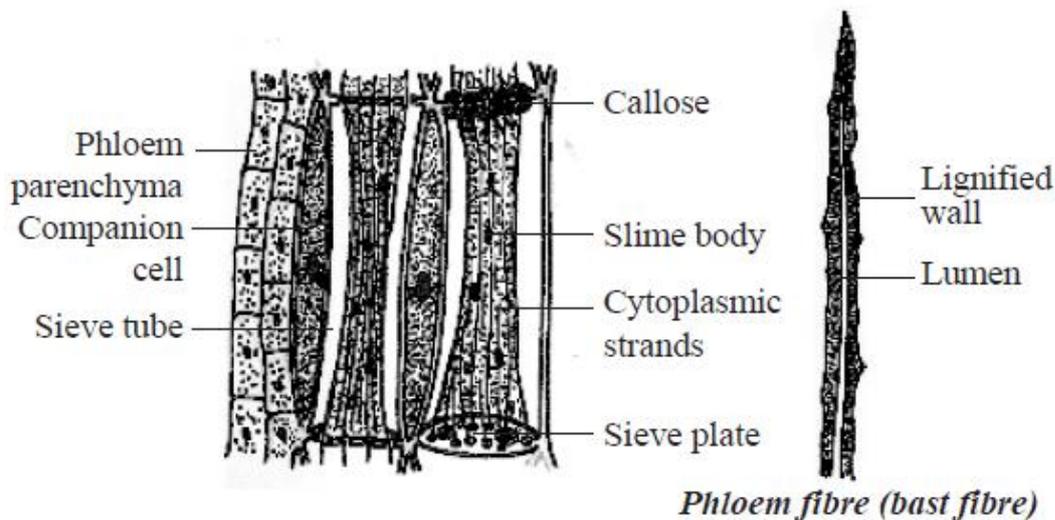
The parenchyma cells associated with the phloem are called phloem parenchyma. These are living cells. They store starch and fats. They also contain resins and tannins in some plants. They are present in all, pteridophytes, gymnosperms and dicots. In monocots, usually phloem parenchyma is absent.

½

Phloem fibres

The fibres of sclerenchyma associated with phloem are called phloem fibres or bast fibres. They are narrow, vertically elongated cells with very thick walls and a small lumen (the cell cavity). Among the four kinds of phloem elements, phloem fibres are the only dead tissue. These are the strengthening and supporting cells.

½



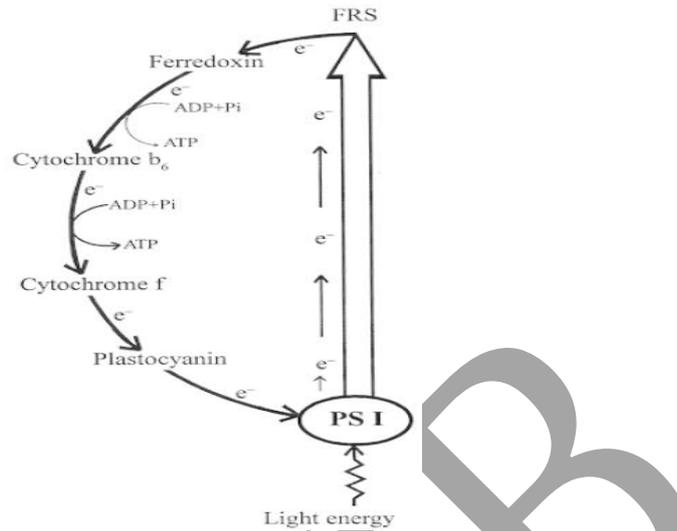
1+1=2

21.	<p>a) SCP: 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.</p> <p>b) People hesitate to use SCP as major food:</p> <ul style="list-style-type: none"> ➤ The high nucleic acid content (4 to 6 per cent in algae, 6 to 10 per cent in yeast of SCP) can cause health problems like uric acid formation, kidney stones and rheumatism in human beings. ➤ Toxic or carcinogenic (cancer causing) substances absorbed from the microbial growth substrate may be present. ➤ Slow digestion of microbial cell in the digestive tract may cause vomiting, indigestion and allergic reaction. ➤ High cost of production will also be a deciding factor in determining the ultimate place of SCP in the human or animal diet. <p>c) Organisms used for SCP production:</p> <p>Algae : Chlorella, Spirulina and Chlamydomonas.</p> <p>Fungi : Saccharomyces cerevisiae, Volvoriella and Agaricus campestris</p> <p>Bacteria : Pseudomonas and Alkaligenes</p> <p>Uses of SCP:(Any two points)</p> <ol style="list-style-type: none"> 1. It is a rich source of protein (60 to 72 per cent), vitamins, amino acids, minerals and crude fibres. 2. It is a popular health food. Nowadays, Spirulina tablets are prescribed as enriched vitamin for most people. 3. It provides valuable protein-rich supplement in human diet. 4. It lowers blood sugar level of diabetics due to the presence of gammalinolenic acid and prevents the accumulation of cholesterol in human body. 	<p>1</p> <p>4X$\frac{1}{2}$=2</p> <p>$\frac{1}{2} + \frac{1}{2} = 1$</p> <p>2X$\frac{1}{2}$=1</p>
	<p style="text-align: center;">(OR)</p> <p>Cyclic photophosphorylation Conditions :</p> <ol style="list-style-type: none"> (i) PS I only remains active (ii) photolysis of water does not take place (iii) requirement of ATP is more and (iv) nonavailability of NADP⁺ the cyclic photophosphorylation takes place. <p>Explanation:</p> <p>When the molecule in the PS I is excited, the electrons are released. The electrons are captured by ferredoxin through ferredoxin reducing substrate (FRS). Due to non-availability of NADP⁺, electrons from ferredoxin fall back to</p>	<p>1</p>

the molecules of PS I through the electron carriers - cytochrome b_6 , cytochrome f and plastocyanin. These electron carriers facilitate the down hill transport of electrons from FRS to PS I. During this transport of electrons, two phosphorylations take place - one between ferredoxin and cytochrome b_6 and the other between cytochrome b_6 and cytochrome f . Thus, two ATP molecules are produced in this cycle.

3

Flow chart:



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