

Meghalaya Board
Class XI
Bio-Botany
Sample Paper 1 – Solution

GROUP A

1. Macrosporangia are cones which bear megasporophylls containing ovules or megasporangia in gymnosperms.
2. In ground nut, the ovary is superior, monocarpellary and unilocular with many ovules. The gynoecium has a single style.
3. The cells of medullary rays which adjoin the intrafascicular cambium become meristematic and form interfascicular cambium and thus a continuous ring of cambium is formed.
4. Porin
5. He found that the green parts of the plant make glucose, and glucose is usually stored in the form of starch
6. Cytochrome bc_1 or complex III transfers electrons from ubiquinol to cytochrome c

GROUP – B

7. Proteins are first degraded into amino acids by enzyme proteases. The amino acids either enter the pathway immediately or first get degraded to pyruvate or acetyl CoA.

Or

The first step is the condensation step which involves the condensation of acetyl CoA with oxaloacetic acid to form citric acid in presence of water.

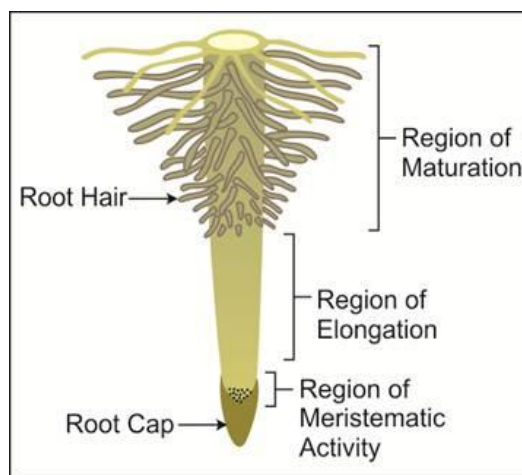
8. Gibberellins help in stem elongation in plants. In sugarcane, sugar is stored in stems. Use of gibberellin ensures an increase in the stem length of sugarcane; hence, the yield increases.
9. No. The plant cannot carry out photosynthesis without chlorophyll *a* because it is the reaction centre for photosynthesis.
Chlorophyll *b* and other accessory pigments absorb light at other wavelengths and pass it to the reaction centre for efficient photosynthesis.

- 10.** The process of conversion of nitrogen to ammonia is called nitrogen fixation. Ultraviolet radiation and lightning provide energy for nitrogen fixation.

GROUP - C

- 11.** In *Ulothrix*, reproduction may occur by the following methods:
 (a) Vegetative reproduction by fragmentation or by formation of different types of spores.
 (b) Asexual reproduction by flagellated zoospores.
 (c) Sexual reproduction by the isogamous, anisogamous or oogamous fusion of gametes.
- 12.** *Jasmine*: A slender lateral branch arises from the base of the main axis. After growing aurally for some time, it arches down to touch the ground.
Chrysanthemum: The lateral branches originate from the basal and underground portion of the main stem. It grows horizontally beneath the soil and comes out obliquely upwards to give rise to leafy shoots.

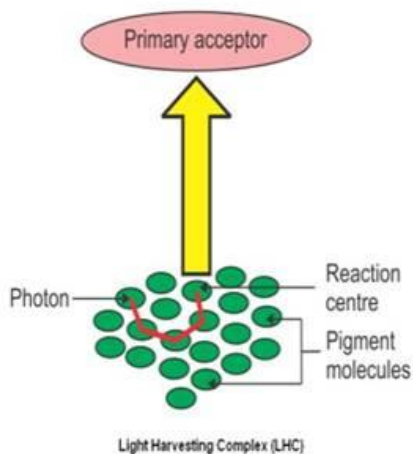
Or



- 13.** In hydroponics, a series of experiments are conducted in which roots of plants are immersed in a nutrient solution. Then an element is either added or removed or provided in varied concentration in the solution according to its suitability to the plant and its growth. Plants are grown in tubes or troughs placed at a slight incline. A pump is provided which circulates the solution from a reservoir to the elevated end of the tube. The solution flows down the tubes and returns back to the reservoir. The roots of the plants get bathed continuously in an aerated solution.

GROUP - D

14.



- (a) LHC is a group of pigment molecules which are associated with each other and help carry out photosynthesis.
- (b) LHC is made of hundreds of pigment molecules except for only one chlorophyll molecule forming a light-harvesting system also called antennae.
- (c) The single chlorophyll molecule forms the reaction centre, while the other pigments serve as accessory molecules and make photosynthesis more effective by absorbing light of different wavelengths.

Or

- (a) Hatch and Slack pathway is a cyclic pathway for CO₂ fixation.
- (b) The primary CO₂ acceptor is a 3-carbon compound phosphoenol pyruvate (PEP) which is present in mesophyll cells.
- (c) PEP in the mesophyll cells is converted to oxaloacetic acid (OAA), which is then further converted into a 4-carbon compound such as malic acid or aspartic acid, which is then transported to the bundle sheath cells.
- (d) In the bundle sheath cells, it is again broken down into a 3-carbon compound with the release of CO₂.
- (e) CO₂ released enters the Calvin cycle in the bundle sheath cells, while the 3-carbon compound is transported back to the mesophyll cells.
- (f) In the mesophyll cells, the 3-carbon compound is converted back to PEP, thus completing the cycle.

15.

- (a) During pollination, the pollen grains germinate on the stigma.
- (b) This results in the formation of pollen tube which grows through the style and reaches the ovule.
- (c) When the pollen tube enters the sac, two male gametes are discharged.
- (d) One male gamete fuses with the egg cell and forms a zygote.
- (e) The second male gamete fuses with the diploid secondary nucleus and produces the triploid primary endosperm nucleus (PEN).
- (f) Because the fusion occurs twice, it is called double fertilisation.
- (g) The zygote develops into an embryo, while the primary endosperm nucleus develops into endosperm.
- (h) The endosperm provides nourishment to the developing embryo.
- (i) The synergids and antipodals of the egg apparatus degenerate after fertilisation.
- (j) At the end of this cycle, ovules develop into seeds which give rise to a new plant (sporophyte) while ovaries develop into fruits.

16. The different regions of the root are as follows:

- (a) Root cap: It covers the apex of roots which grow through the soil.
- (b) Region of Meristematic Activity: This region is a few millimetres above the root cap. The cells are thin-walled and small with dense protoplasm. The cells divide repeatedly.
- (c) Region of Elongation: This region is proximal to the region of meristematic activity. The cells in this region undergo rapid elongation and enlargement. This zone is responsible for the growth in length of the root. These cells gradually differentiate and mature.
- (d) Zone of Maturation: The zone of maturation is proximal to the zone of elongation. Its epidermal cells give rise to root hair cells which absorb water from the soil.