

XIth 2023-24

Date : 09/10/2023

Botany Theory Round-01

 Max.Marks :- 35
 Time 90 Minutes.

General Instructions : The question paper is divided into four sections.

- (1) **Section A :** Q.No.1 contains Five Multiple choice type of question carrying **One** mark each.
 Q.No.2 contains Four very short answer type of questions carrying **One** mark each.
- (2) **Section B :** Q.No.3 to Q.8 are short answer type of question carrying **Two** marks each.
- (3) **Section C :** Q.No.9 to Q. No.14 are short answer type of questions carrying **Three** marks each
- (4) **Section D:** Q.No.15 to Q.No.18 are long answer type of questions carrying **Three** marks each.
- (5) Figures to the right indicate full marks

MODEL ANSWER KEY

Section -A

[05]

Q.1 Select and write the correct answer.

- i) During double fertilization second male gamete fuses with _____.
- (a) Antipodal Cell
 (b) Egg cell
(c) Secondary nucleus
 (d) Synergids
- ii) Which of the following is the first step in water absorption?
- (a) Imbibition**
 (b) Active Absorption
 (c) Passive absorption
 (d) Osmosis
- iii) The correct sequence of different phases of growth is
- (a) Elongation, Formation, Maturation
(b) Formation, Elongation, Maturation
 (c) Differentiation, Elongation, Maturation
 (d) Maturation, Formation, Elongation
- iv) The improved variety of wheat having high protein and high iron content is
- (a) Atlas-66**
 (b) Himgiri
 (c) Kalyansona
 (d) Sonalika
- v) The base of an upright ecological pyramid represents
- (a) Primary consumers
(b) Producers
 (c) Secondary consumers
 (d) Tertiary consumers

Q.2 Answer the following

[04]

(i) Define clones.

Ans : Morphologically and genetically identical individuals produced by asexual reproduction are called as clones.

(ii) If in a fully turgid cell, $T.P = O.P$, then what will be its DPD?

Ans : If in a fully turgid cell, $T.P - O.P$, than its DPD will be zero. (As, $DPD = O.P - T.P$)

(iii) What is biofortification?

Ans : The method of breeding crops to increase their nutritional value is called biofortification.

(iv) Can you tell?

Which plant organ does show both arithmetic and geometric growth?

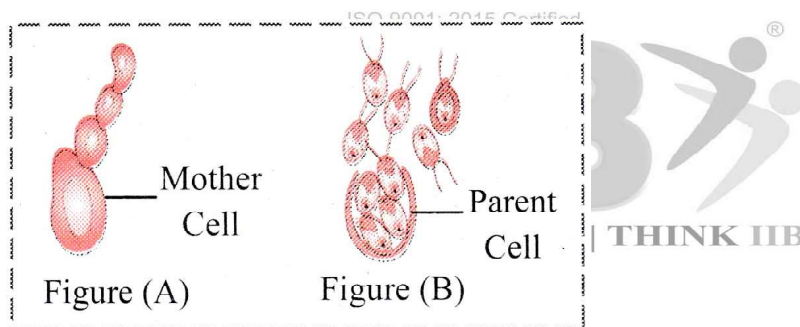
Ans : The development of embryo from zygote shows both arithmetic and geometric growth.

Section -B : Attempt any 4 (Q.3 to 8)

[08]

Answer the following questions :

Q.3 Identify the type of asexual reproduction given in the figures.



Ans : **Figure (A) :** Budding in yeast

Figure (B) : Zoospores in *Chlamydomonas*

Q.4 Differentiate between Apoplast pathway and Symplast pathway.

Ans :

No.	Apoplast pathway	Symplast pathway
i.	In apoplast pathway, water moves from interconnecting cell walls and intercellular spaces.	In symplast pathway, water moves from one cell to another through cytoplasmic bridges called plasmodesmata.
ii.	The movement of water is non-osmotic	The movement of water occurs due to osmosis.
iii.	Movement of water is fast	Movement of water is slow.
iv.	Obstructed in endodermis due to presence of casparian strip	Can be followed through endodermis and pericycle as casparian strip does not obstruct the pathway.

Q.5 Write a short note on toxicity of micronutrients.

Ans : (i) Micronutrients are always required in traces. However, their moderate decrease causes deficiency symptoms and a moderate increase causes toxicity.

- (ii) Mineral ion concentration which reduces the dry weight of tissues by 10%, is considered as toxic.
- (iii) The phenomenon where toxic effect of one mineral is counter balanced by the other ion is called antagonism.
- (iv) Toxicity of one element may inhibit the uptake of the other e.g. Mn competes with Fe, Mg for uptake, but inhibits Ca translocation to shoot apex.
- (v) Thus, Mn toxicity develops deficiency symptoms of Ca, Mg and Fe.

Q.6 Explain in brief mutation breeding.

- Ans :
- (i) Mutations are sudden and inheritable variations developed in an organism due to a permanent change in their genotype.
 - (ii) Mutations are caused due to alteration of base sequences of DNA resulting in changes in genotype and phenotype of the organism.
 - (iii) Mutations can be induced artificially through mutagens which may be chemical or physical.
 - (iv) Mutations can be induced to develop desirable traits in the organisms. This is referred to as mutation breeding.
 - (v) Example-Varieties of moong beans resistant to yellow mosaic virus & powdery mildew have been developed through mutation breeding.

Q.7 Define (i) Stratification

Ans: Stratification is the vertical distribution of different species of plants and animals occupying different levels. For example, trees occupy top vertical strata of a forest, shrubs the second and herbs and grasses occupy the lower strata. In open seas there are epipelagic, meso-pelagic, bathy-pelagic and benthic zones.

Q.8 Enlist the types of Pyramids.

- Ans :
- (1) Number pyramids
 - (2) Biomass pyramids
 - (3) Energy pyramids

Section -C : Attempt any 4 (Q.9 to 14) [12]

Q.9 Define the following terms :

- (i) Chasmogamy
- (ii) Cleistogamy
- (iii) Homogamy

Ans : (i) **Chasmogamy** : When flower opens to expose its sex organ, the condition is called as chasmogamy.

(ii) **Cleistogamy** : Some flowers are self-pollinated even before the opening of flower such condition is called as cleistogamy. [*Note : Cleistogamous flowers are always closed because of which self-pollination is the only method of pollination in these flowers.*]

(iii) **Homogamy** : When anther and stigma of a flower become mature at the same time, it is called homogamy.

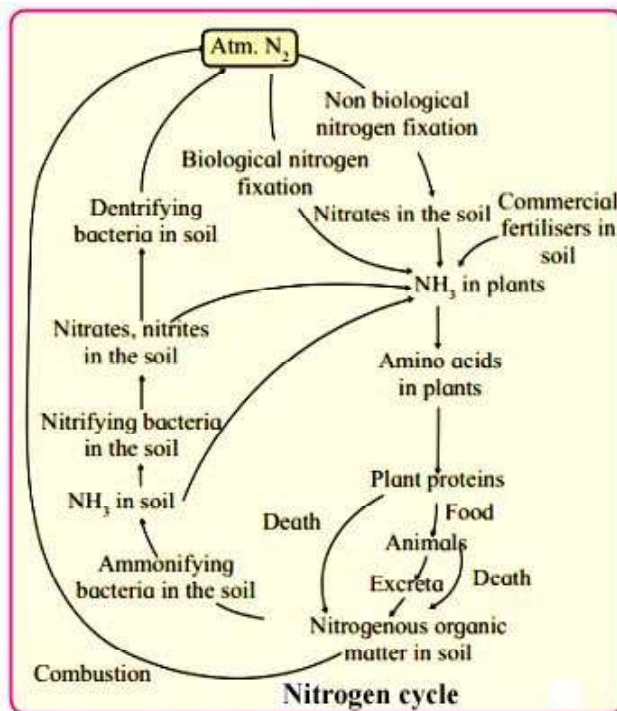
Q.10 Explain the term root pressure, Name the instrument used to measure root pressure.

Ans : **Root pressure** :

- (i) During absorption of water the continuous flow of water develops hydrostatic pressure in living cells of root. This is called root pressure.
- (ii) Root pressure causes water to flow from pericycle into the xylem. It also causes upward conduction of water against the gravity.
- (iii) **Manometer** is used to measure the root pressure.

Q.11 Give a diagrammatic representation of nitrogen cycle.

Ans :



Q.12 Explain the concept of single cell protein giving examples

Ans : **Single cell Protein :**

- (i) Single cell protein refers to the microbial biomass produced by unicellular and multicellular microorganisms.
- (ii) SCP's can be used as food or feed additives.
- (iii) Microbes like *Chlorella*, *Spirulina*, *Methylophilus*, *Methylotrophus* etc. are grown on a large scale as a source of protein.
- (iv) Being a good source of proteins and vitamins, minerals, carbohydrates, SCPs can be used as a food for human beings or as a feed for animals in poultry & dairy animals.
- (v) SCP's can be an ideal supplement for conventional food & may be used to meet with the growing requirements of human population.

Q.13 What is Productivity? Explain their types.

Ans : **Productivity :**

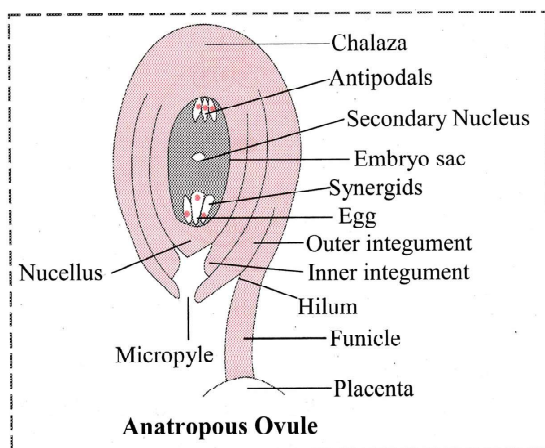
- The rate of generation of biomass in an ecosystem.
 - It is expressed in units of mass per unit area (or volume) per unit time.
For example - Grams per square metre per day ($\text{g}/\text{m}^2/\text{day}$)
 - The mass unit - dry matter or to the mass of carbon generated.
- (i) Gross Primary Productivity (GPP) : is the rate of production of organic matter during photosynthesis.
– GPP depends on several environmental factors like availability of nutrients and photosynthetic capacity of plants.
 - (ii) Net primary productivity (NPP) – Gross primary productivity (GPP) minus respiratory losses (R).
$$\text{GPP} - \text{R} = \text{NPP}$$

– Net primary productivity is the biomass available for consumption, to heterotrophs.
– The annual NPP of the whole biosphere is approximately 170 billion tons (dry weight) of organic matter.

- (iii) Secondary productivity - The rate of formation of new organic matter by consumers Or the rate of assimilation of food energy by consumers. It is the amount of energy available to consumer for transfer to the next trophic level.

Q.14 Draw neat and labelled diagram of anatropous ovule and explain its structure in detail.

Ans : Structure of anatropous ovule:



- (i) Anatropous ovule is the most common type of ovule in angiosperms. It consists of following parts.
- (ii) **Funiculus/Stalk/Funicle:** Each ovule develops inside the ovary. Ovule is attached to the placenta by a small stalk called funiculus.
- (iii) **Hilum :** The point of attachment of funiculus to the main body of ovule is known as hilum.
- (iv) **Nucellus :** The ovule consists of central parenchymatous tissue called nucellus.
- (v) **Integuments :** Nucellus is usually surrounded by two protective coverings called integuments viz. outer and inner integument.
- (vi) **Micropyle :** A narrow opening at the apex of the ovule is called micropyle. In anatropous ovule, micropyle is directed downwards and is present adjacent to the funiculus (funicle).
- (vii) **Chalaza :** Chalaza is the base of ovule directly opposite to micropyle.
- (viii) **Embryo sac :** Embryo sac (female gametophyte) is oval multicellular structure embedded in the nucellus.

Section -D : Attempt any 2 (Q.15 to 18) [06]

Q.15 Write a short note on entomophily.

Ans : Entomophily :

- (i) Pollination carried out by insects is called as entomophily.
- (ii) Entomophilous flowers show following adaptations :
- They are large, showy and often brightly coloured.
 - The flowers produce sweet odour (smell) and have nectar glands.
 - The stigma is rough due to presence of hair or is sticky due to mucilaginous secretion.
 - The pollen grains are spiny and surrounded by a yellow sticky substance called pollenkitt.
- (iii) Entomophily commonly occurs in Rose, Jasmine, *Cestrum*, *Salvia*, etc.

Q.16 What is transpiration? Describe mechanism of opening and closing of stomata.

Ans : i. Transpiration : (i) The loss of water in the form of vapour is called transpiration that occurs through leaves, stem, flowers and fruits.

- (ii) Transpiration occurs through three main sites- cuticle, stomata and lenticels.

Q.18 What is decomposition? Eulist the steps of decomposition.

Ans: It is the breakdown of complex organic matter into inorganic substances. Raw material for decomposition - Dead remains of plants and animals. Decomposition involves-

- (i) Fragmentation
- (ii) Leaching
- (iii) Catabolism
- (iv) Humification
- (v) Mineralization