

# II YEAR PUC PRACTICAL EXAMINATION

## SUBJECT: BIOLOGY [36]

Time: 2 Hours

Max. Marks : 30

- 1) Prepare a temporary slide to show pollen germination from the given material 'A1' and calculate the percentage of pollen germination. 5 Marks

(Preparation of the slide → 3 Marks, Calculating % germination → 2 Marks)

**Ans:** Calculation of Percentage of Pollen Grains Germinated:

1. Name of the plant used as pollen source: ***Vinca rosea***
2. Number of pollen grains in a field of microscope [N] = 19
3. Number of germinated pollen grains in the same field of microscope [n] = 11
4. Percentage of pollen germination =  $n \times \frac{100}{N} = 58\%$

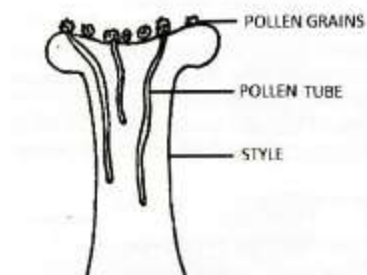
Number of observations	Total number of pollen [N]	Total number of pollen germinated [n]	% of pollen germination $n \times 100/N$
1	19	11	$11 \times \frac{100}{19} = 58\%$

OR

- 1) Prepare a temporary slide to show pollen tube growth on the stigma from the given material 'A2' and draw a labeled diagram of your observation. 5 Marks

(Preparation of the slide → 3 Marks, Labelled diagram → 2 Marks)

**Ans: Observation:**



Pollen tube growth on stigma.

OR

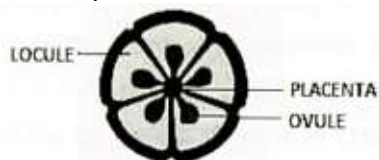
- 1) Prepare a temporary slide of given material 'A3' by taking a transverse section of ovary and report the number of locules and type of placentation. 5 Marks

(Preparation of the slide → 3 Marks, Reporting the number of locules → 1 Marks, Reporting the type of placentation → 1 Marks)

**Ans:** Material 'A' Hibiscus

→ In given material 'A3'

- The T. S. of ovary shows pentalocular ovary [Five locular ovary]
- The type of placentation is axil placentation.



OR

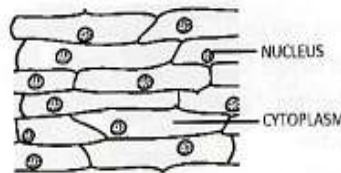
- 1) Prepare a temporary slide to show nuclear staining from the given material 'A4' and report the shape of cell and number of nuclei. 5 Marks

(Preparation of slide → 3 Marks, Reporting the shape of the cell → 1 Marks, Reporting the number of Nuclei → 1 Mark)

Ans:

- The shape of the cells in a given material 'A4' is rectangular or polygonal.
- Each cell has a single nucleus [Uninucleate cell]

Onion Peel:

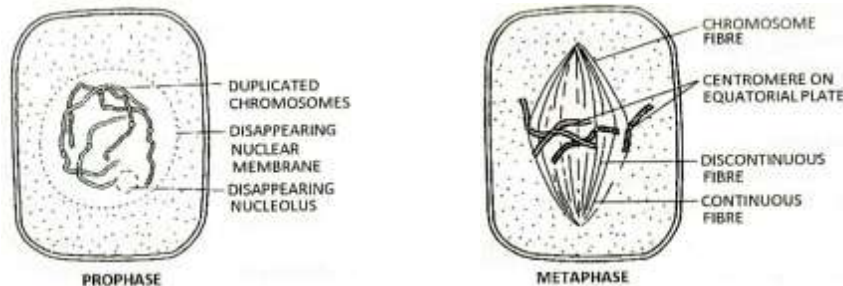


- 2) Prepare a temporary slide of the given material 'B' and identity any one stage of mitosis and comment on the stage observed. 5 Marks

(Preparation of the slide → 3 Marks, Identifying any one stage → 1 Mark, comments → 1 Mark)

Ans:

- In a prepared slide the following stages of mitosis are identified.

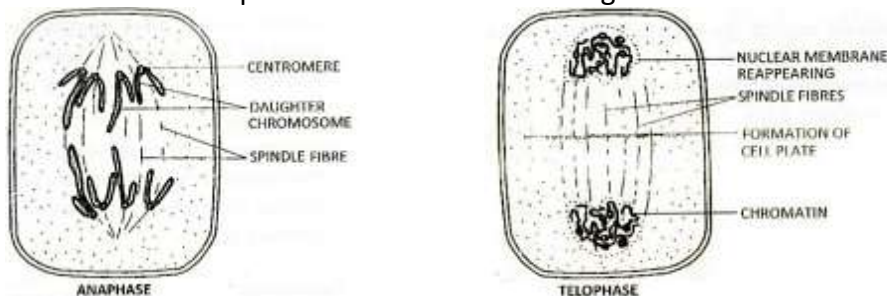


**Prophase:**

- Chromatin becomes condensed thread like structures called chromosomes.
- Nuclear membrane and nucleolus start disintegrating.

**Metaphase:**

- Nucleolus and nuclear membrane disappear.
- Chromosomes are thick and arranged on the equatorial plane of the cell.
- Each chromosome is made up of two chromatids held together at the centromere.



**Anaphase:**

- Two sister chromatids of each chromosome separate due to the splitting of centromere and move towards the opposite poles.
- Daughter chromosomes (separated chromatids) during their movement appear V, J, L, and I shaped depending upon the position of the centromere.

**Telophase:**

- Daughter chromosomes reach the opposite poles.
- They uncoil to form chromatin fibres.
- Nuclear membrane and nucleoli reappear. Thus, two daughter nuclei appear at opposite poles.

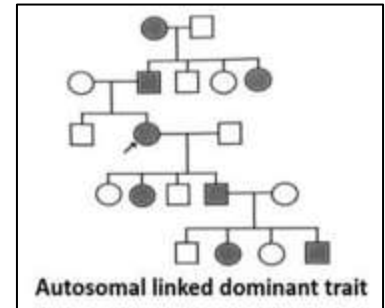
### 3) Identify and comment on the given Pedigree chart "C"

3 Marks

(Identification of the type of pedigree → 1 Mark; Comments → 2 Marks)

#### 1. Autosomal dominant trait:

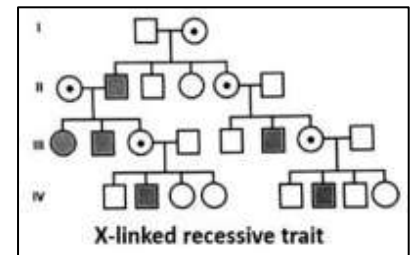
- Ex: Polydactyly
- The trait is transmitted from either father or mother.
- The trait is expressed in every generation/The trait does not skip generations/The pedigree is vertical.
- The trait is expressed in males and females in equal proportions.



OR

#### 2. X-linked recessive trait:

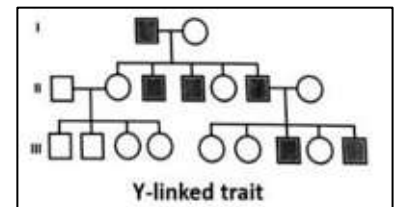
- Ex: Haemophilia or Colourblindness
- The trait is expressed more regularly in males than in females.
- Heterozygous females are normal, but carriers.
- The trait is never transferred from father to son.
- The trait tends to be inherited from mother to son and father to daughter.



OR

#### 3. Y-linked inheritance:

- Ex: Hypertrichosis of the ear
- The trait is expressed in males only.
- The trait is always transmitted from father to son.



### 4) Identify "D" and comment

3 Marks

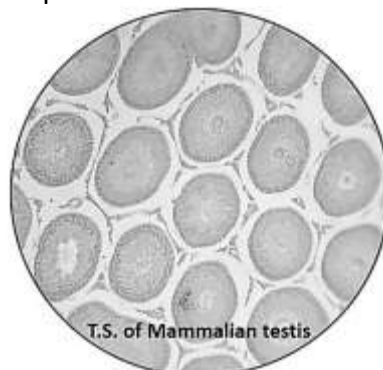
(Identification → 1 Mark, Any Two comments → 2 Marks)

Ans:

→ The given slide "D" is identified as **T. S. of Mammalian testis**

Comments:

1. Each testis is made up of about 250 compartments called testicular lobules.
2. Each lobule contains 2 – 3 small coiled seminiferous tubules which are lined with germinal epithelium.
3. The germinal epithelium consists of spermatogonia and Sertoli cells.
4. The spermatogonia undergo spermatogenesis to produce sperm.
5. Sertoli cells are large cells which provide nutrition to the developing spermatids and sperm.



OR

The given slide “D” is identified as **T. S. of Mammalian ovary.**



**Comments:**

1. The ovary is externally covered by germinal epithelium.
2. The cortex [outer region] has many ovarian follicles of different stages [namely primary follicle, secondary follicle, tertiary follicle and mature or Graafian follicle] Corpus luteum and corpus albicans.
3. Graafian follicles have a secondary oocyte and fluid filled cavity called antrum.
4. Graafian follicles rupture to expel the oocyte with a few follicular cells. This is called ovulation.

OR

**V.S. of ovary showing female gametophyte or ovule:**

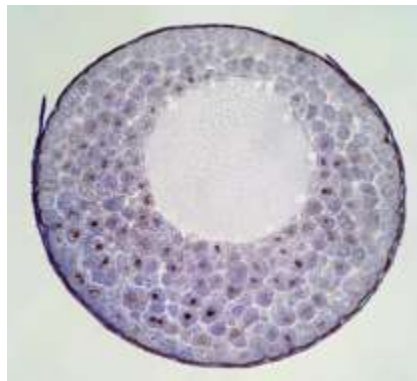
**Comments:**

- The ovule develops inside the ovary.
- It is attached to the placenta by a stalk called funicle.
- The ovule consists of two integuments and nucellus.
- The cells of nucellus contain reserve food material.
- The female gametophyte (embryo sac) is located inside the nucellus.
- The embryo sac forms from a megaspore mother cell.



OR

The given slide “D” is identified as **V. S. of Mammalian Blastula.**



**V. S. of Mammalian Blastula**

**Comments:**

- Blastula of a mammal is called the blastocyst
- Blastula is a spherical, hollow embryonic developmental stage.
- It consists of a covering trophoblast, an inner cell mass and a central fluid filled cavity called blastocel.
- The trophoblast cells which cover the inner cell mass are called cells of Rauber.
- Trophoblast provides physiological support, it gives rise to extra embryonic membranes and it helps in implantation.

## 5) Identify "E" and comment

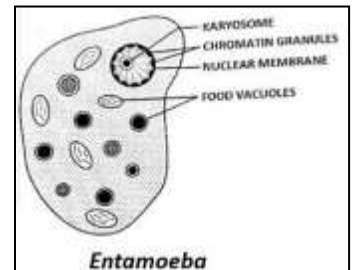
2 Marks

(Identification with scientific name → 1 Mark, Commenting on the organism → 1 Mark)

Ans:

### 1. *Entamoeba histolytica*:

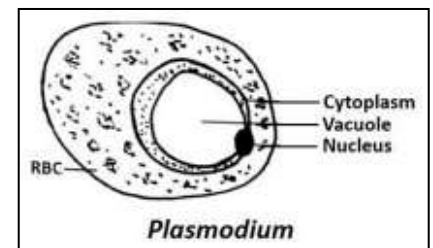
- *Entamoeba* is a microscopic and acellular parasite which causes a disease called amoebic dysentery.
- Body is irregular in shape due to pseudopodia.
- Nucleus is large, single and eccentrically placed.
- Cytoplasm contains variable number of food vacuoles.
- Contractile vacuoles are absent.



OR

### 2. *Plasmodium vivax*:

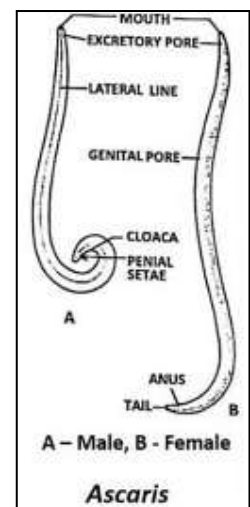
- *Plasmodium* is a microscopic and acellular parasite which causes malaria.
- Diagnostic stage of the parasite is signet ring stage in the RBCs of human host.
- In this stage, it appears like a ring or rounded body with large central vacuole. The cytoplasm is concentrated with nucleus towards the periphery.
- The parasite enters the human host in the infective stage called sporozoite.



OR

### 3. *Ascaris lumbricoides*:

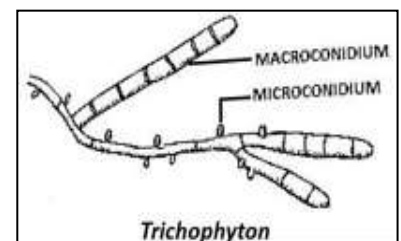
- *Ascaris* is an endoparasite which causes a disease called ascariasis.
- The body is long, unsegmented and cylindrical with tapering ends.
- External surface of the body is covered with cuticle.
- Anterior tip has mouth bounded by three lips.
- Dorsal, ventral and two lateral lines run all along the length of the body.
- Males are short with curved posterior end & females are long with straight posterior end.
- Males have a cloacal aperture with a pair of penial setae.
- Females have a gonopore on the ventral side at one third the length from the anterior end.
- Both males and females have a mid-ventral excretory pore behind the mouth.



OR

### 4. *Trichophyton rubrum*:

- *Trichophyton* is an ectoparasite on man that feeds on skin and nails via keratin degradation and causes ringworm disease.
- Texture is waxy, smooth and even to cottony.
- Hyphae have white to cream colour pigmentation on their surface and yellow-brown to wine-red on the opposite side.



**6) Identify "F" and comment.**

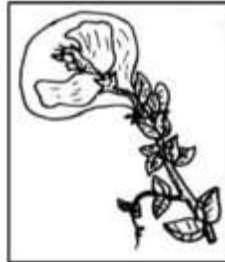
**2 Marks**

**Ans:**

**Comments:**

**1. Bagging:**

- It is a procedure used in controlled pollination.
- The emasculated flower is covered with a suitably sized polythene bag that has minute pores (for aeration) to prevent undesirable pollination.
- Emasculation is the careful removal of the stamens from a selected flower bud using forceps.

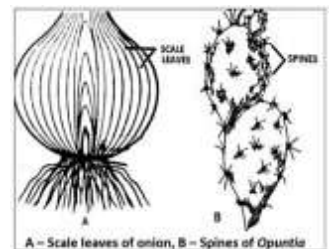


**OR**

**Homologous organs in plants/animals:**

**Scale leaves of onion and spines of Opuntia:**

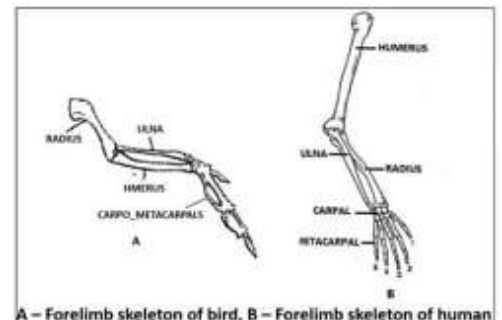
- The scale leaves in onion and spines in Opuntia are homologous organs as both are modifications of leaves.
- The scale leaves of onion are thick, fleshy and store water and food while the spines in Opuntia are sharp and defensive in function.



**OR**

**Forelimb skeleton of mammals and birds:**

- The forelimb skeletons of a bird and human are homologous organs as they have similar anatomical structure and origin but perform different functions.
- The bones, namely, humerus, radius, ulna, carpals, metacarpals and phalanges are found in both bird and human.
- The forelimbs of bird help in flight while the forelimbs of human are used for various non-locomotory activities.

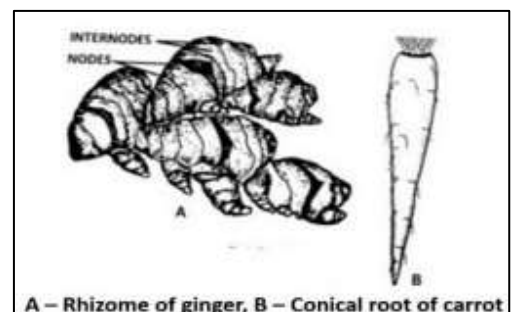


**OR**

**Analogous organs in plants/animals:**

**Modified underground stem and modified root:**

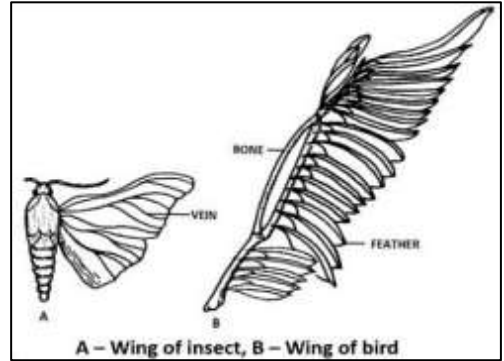
- Modified underground stem (rhizome, corm and tuber) and modified roots (carrot and radish) are analogous organs as they are similar in their structure and function but dissimilar in their origin.
- Both are storage in function. They store water and food.



**OR**

### Wings of birds and wings of an insect:

- The wings of insects and birds are analogous organs as they perform similar function but anatomically and origin-wise are different structures.
- The wing of an insect is lifeless structure. It is supported by hollow veins (nervures) and covered with chitinous exoskeleton. The wing of bird is supported by forelimb skeleton and is covered with feathers.
- They help in flight.



7) Viva – Voce

4 Marks

8) Practical Records

6 Marks