	INDIAN SCHOOL AL WADI AL KABIR	
CLASS XI	**DEPARTMENT OF SCIENCE 2025 – 2026** **SUBJECT: BIOLOGY**	**DATE: 05/11/2025**
WORKSHEET NO: 12	**TOPIC: MORPHOLOGY OF FLOWERING PLANTS**	**NOTE: A4 FILE FORMAT**
CLASS & SEC :	**NAME OF THE STUDENT:**	**ROLL NO.**

I. OBJECTIVE TYPE QUESTIONS (1M EACH):

1. The mature seeds of plants such as gram and peas possess no endosperm, because:
   A. These plants are not angiosperms
   B. There is no double fertilisation in them
   C. Endosperm is not formed in them
   D. Endosperm gets used up by the developing embryo during seed development
2. Venation is a term used to describe the pattern of arrangement of:
   A. Floral organs
   B. Flower in inflorescence
   C. Veins and veinlets in a lamina
   D. All of them
3. When gynoecium is present in the topmost position of the thalamus, the ovary is known as:
   A. Inferior
   B. Half Inferior
   C. Half Superior
   D. Superior
4. Diadelphous condition is related to:
   A. Androecium
   B. Gynoecium
   C. Inflorescence
   D. All
5. The flower of the pea (*Pisum sativum*) is:
   A. Actinomorphic, bisexual
   B. Zygomorphic, bisexual
   C. Actinomorphic, unisexual
   D. Zygomorphic, unisexual
6. In racemose, flowers are arranged in:
   A. Acropetal order

B. Centrifugal order
C. Centripetal order
D. Basipetal order

7. Androecium is a whorl of:
   A. Anthers
   B. Stamens
   C. Filaments
   D. Style
8. A typical flower with half inferior ovary embedded or surrounded by the receptacle is called:
   A. Polygamous
   B. Hypogynous
   C. Perigynous
   D. Epigynous
9. Placentation in Solanaceae is:
   A. Parietal
   B. Marginal
   C. Axile
   D. Basal
10. Keel is the characteristic feature of:
   A. Tulip
   B. Peas and beans
   C. Potato
   D. Tomato

ASSERTION AND REASON (1M)

For the following questions, two statements are given, one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii), and (iv) as given below:

i) Both A and R are true, and R is the correct explanation of the assertion.
ii) Both A and R are true, but R is not the correct explanation of the assertion.
iii) A is true, but R is false.
iv) A is false, but R is true.

11. **Assertion (A):** A flower is called bisexual when both the androecium and gynoecium are present.
    Reason (R): Bisexual flowers contain both reproductive parts and can produce both pollen and ovules.
12. **Assertion (A):** Epigynous ovary is always inferior.
    Reason (R): All the floral parts lie above the level of the ovary in an epigynous condition and, therefore, the ovary becomes inferior.
13. **Assertion (A):** Axile placentation occurs in multilocular ovaries.
    Reason (R): Ovules are attached to the central axis in axile placentation.
14. **Assertion (A):** A simple leaf has an undivided lamina.
    Reason (R): Leaves showing pinnate and palmate venation have various types of

incisions.

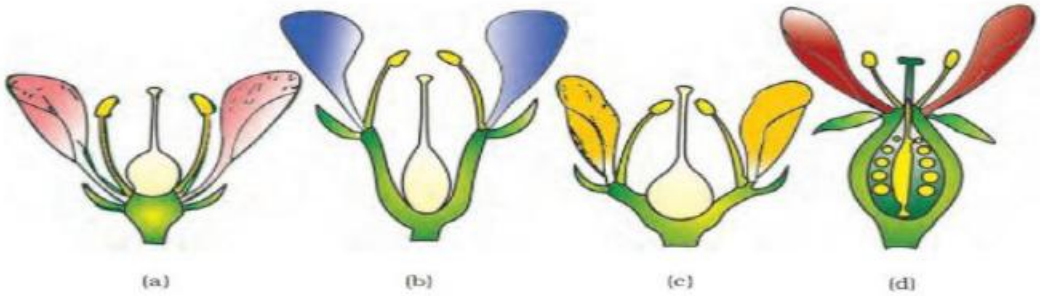
15. **Assertion (A):** In cymose branching, the growth of the terminal bud stops after some time.
    Reason (R): The growth of the main stem is definite.

II. SHORT ANSWER TYPE QUESTIONS (2M EACH):

16. What are the main functions of the stem?
17. Distinguish between fibrous and adventitious roots.
18. Draw diagrams of a typical monocot and dicot leaves to show their venation pattern.
19. A typical angiosperm flower consists of four floral parts. Give the names of the floral parts and their arrangements sequentially.

III. SHORT ANSWER TYPE QUESTIONS (3M EACH):

20. The arrangements of ovules within the ovary are known as placentation. What does the term placenta refer to? Name and draw various types of placentation in the flower as seen in T.S. or V.S.
21. Identify the position of the floral parts on the thalamus as shown in the diagram below, and briefly describe the same.



22. Describe the important parts of a leaf.
23. Describe the three types of phyllotaxy found in the majority of plants.
24. Differentiate between
    a) Reticulate and parallel venation
    b) Simple and compound leaves
    c) Pinnately compound and palmately compound leaves

IV. CASE STUDY BASED QUESTIONS (4M):

A flower is a modified shoot wherein the shoot apical meristem changes to a floral meristem. The apex produces different kinds of floral appendages laterally at successive nodes instead of leaves. When a shoot tip transforms into a flower, it is always solitary. The arrangement of flowers on the floral axis is termed as inflorescence. Depending on whether the apex gets developed into a flower or continues to grow, two major types of inflorescences are defined: racemose and cymose. In racemose type of inflorescences, the main axis continues to grow, and the flowers are borne laterally in an acropetal succession. In cymose type of inflorescence, the main axis terminates in a flower, hence it is limited in growth. The flowers are borne in a basipetal order. The flower is the reproductive unit in the angiosperms. It is meant for sexual reproduction. A typical flower has four different kinds of whorls arranged successively on the swollen end of the stalk or pedicel, called the thalamus or receptacle.

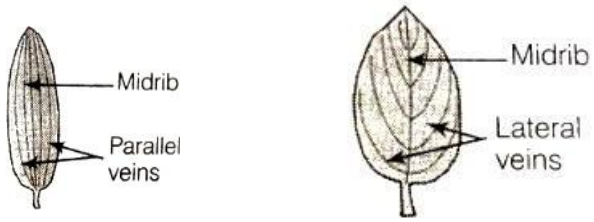
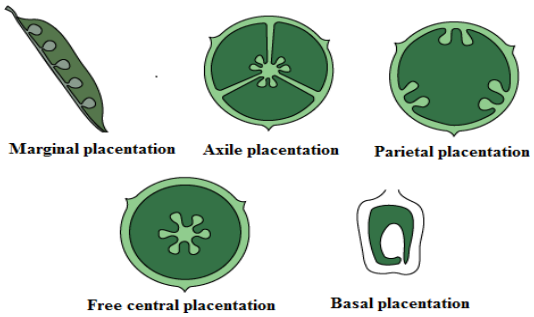
i) In a racemose inflorescence, flowers bloom from base to apex. How does this benefit the plant?
ii) A flower is called a modified shoot. Which evidence supports this?
iii) Explain why the transformation of a shoot tip into a flower leads to solitary flowers, while continuous growth produces an inflorescence.
iv) Write the floral formula of the potato family.

V. LONG ANSWER TYPE QUESTIONS (5M EACH):

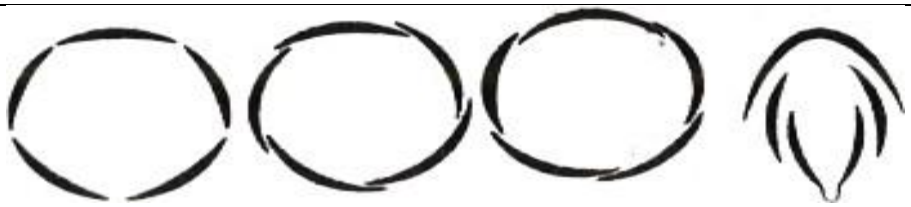
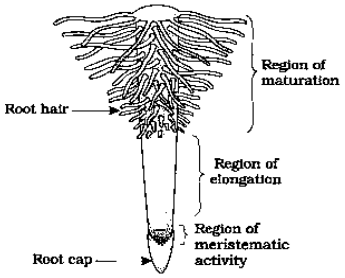
25. Describe the main types of aestivations with the help of simple diagrams.
26. Describe the different regions of the root with the help of a labelled diagram.
27. Write a detailed note on the structure of a dicotyledonous seed with the help of a labelled diagram.
28. Briefly explain the identifying floral features of the family Solanaceae.

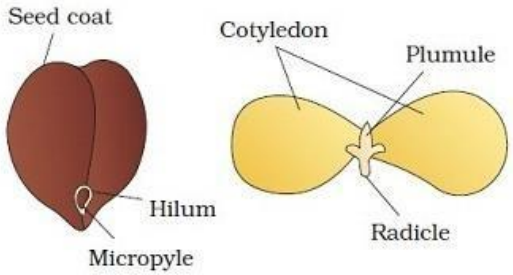
ANSWERS

I. OBJECTIVE TYPE QUESTIONS (1M EACH)	
1.	D. Endosperm gets used up by the developing embryo during seed development
2.	C. Veins and veinlets in a lamina
3.	D. Superior
4.	A. Androecium
5.	B. Zygomorphic, bisexual
6.	A. Acropetal order
7.	B. Stamens
8.	C. Perigynous
9.	C. Axile
10.	B. Peas and beans
ASSERTION AND REASON (1M)	
11.	i) Both A and R are true, and R is the correct explanation of the assertion.
12.	ii) Both A and R are true, but R is the correct explanation of the assertion.
13.	i) Both A and R are true, and R is the correct explanation of the assertion.
14.	ii) Both A and R are true, but R is not the correct explanation of the assertion.
15.	i) Both A and R are true, and R is the correct explanation of the assertion.
II.SHORT ANSWER TYPE QUESTIONS (2M EACH):	
16.	The main functions of the stem are as follows – a) Spreading out the branches that bear leaves, flowers, and fruits. b) They help to conduct water and mineral transportation. They also help with photosynthesis. c) Most of the stems perform the function of food storage and support. They also provide protection and help in vegetative propagation.
17.	Fibrous roots grow from the base of the stem, whereas adventitious roots grow from various parts of the plant other than the radicle. Wheat has fibrous roots, whereas plants like the Banyan tree have adventitious roots.

18.	Monocot leaves Dicot leaves 
19.	A typical flower has four different kinds of whorls arranged successively on the swollen end of the stalk or pedicel, called the thalamus or receptacle. These are calyx, corolla, androecium and gynoecium. The calyx is the outermost whorl of the flower, and the members are called sepals. The corolla is the second outermost whorl composed of petals. Androecium is the second innermost whorl composed of stamens. Gynoecium is the innermost whorl, which is female reproductive part of the flower and is made up of one or more carpels.
III.SHORT ANSWER TYPE QUESTIONS (3M EACH):	
20.	The ovules are female reproductive structures and are borne in the ovary of the flower. The number, structure, and position in the ovaries vary in different plants. They also differ in mode of attachment with the ovary wall. At the point of attachment, there is a cellular ridge or cushion of cells called placenta. The mode of attachment of the ovule to the placenta is known as placentation, which is of the following types: (a) Marginal (b) Axile (c) Parietal (d) Free central (e) Basal. 
21.	**(a) Hypogynous flower:** • Ovary is **superior**. • Other floral parts (sepals, petals, stamens) are attached **below the ovary**. • Example: Mustard, China rose, Brinjal. **(b) Perigynous flower:** • Ovary is **half-inferior**. • Floral parts are attached to the **rim of the thalamus**, forming a cup-like structure (hypanthium) around the ovary. • Example: Peach, Plum, Rose. **(c) Epigynous flower:** • Ovary is **inferior**.

	• Floral parts arise from the **top of the ovary**. Example: Guava, Cucumber, Sunflower.
22.	The leaf consists of three main parts: the leaf base, petiole, and lamina. a) Leaf base: The leaf base is the part where the leaf is attached to the stem. It may bear stipules or form a sheath, as in monocots. In some leguminous plants, the leaf base may become swollen and is called the **pulvinus**. b) Petiole: The petiole gives structural support to the blade. It helps hold the leaf blade up to the light. The long, flexible petioles in some plants allow the leaves to flutter in the wind, which helps cool the leaf surface. c) Lamina: Lamina is the green expanded part of the leaf with veins and veinlets. These veins provide rigidity to the leaf blade and act as channels for transporting water, minerals, and food materials
23.	The three main types: a) Alternate: Alternate phyllotaxy is when a single leaf arises at each node alternately, the most common example being China rose. b) Opposite: Opposite phyllotaxy is when a pair of leaves arise at each node and lie opposite each other. The most common example is Calotropis and guava plants. c) Whorled: Whorled phyllotaxy is when more than two leaves arise at a node and form a whorl. The most common example is Alstonia.
24.	a) Reticulate venation has a web-like network of veins, while parallel venation has veins that run parallel to each other from the base to the tip of the leaf. Reticulate venation is most common in dicots like mango and hibiscus, whereas parallel venation is found in monocots like grasses and maize. The primary difference is the pattern of vein arrangement: a complex network versus straight, parallel lines. b) Simple leaves have a single, undivided blade, while compound leaves have a blade divided into multiple leaflets attached to a central stalk (rachis). A key difference is that a simple leaf has an axillary bud at the base of its petiole, whereas a compound leaf's leaflets do not have axillary buds at their bases. c) Pinnately and palmately compound leaves are two types of compound leaves that differ in the arrangement of their leaflets. Pinnately compound leaves have leaflets arranged along a central axis called the rachis, resembling a feather, while palmately compound leaves have leaflets attached to a single point at the end of the petiole, like the fingers on a hand.
IV.CASE STUDY BASED QUESTIONS (4M):	
i)	Ensure continuous flowering and prolonged pollination.
ii)	Floral appendages are produced instead of leaves. Shoot tip → flower: apex stops growing → solitary flower
iii)	Apex continues to grow → lateral flowers → inflorescence
iv)	Racemose: Main axis grows continuously; flowers in acropetal succession. Cymose: Main axis ends in a flower; flowers in basipetal succession.
V.LONG ANSWER TYPE QUESTIONS (5M EACH):	

25.	 Valvate Twisted Imbricate Vexillary **Valvate**-When sepals or petals in a whorl just touch one another at the margin, without overlapping, as in Calotropis, it is said to be valvate. **Twisted-** If one margin of the appendage overlaps that of the next one and so on as in China rose, lady's finger and cotton, it is called twisted. **Imbricate**- If the margins of sepals or petals overlap one another but not in any particular direction, as in Cassia and gulmohur, the aestivation is called imbricate. **Vexillary-** In pea and bean flowers, there are five petals, the largest (standard) overlaps the two lateral petals (wings), which in turn overlap the two smallest anterior petals (keel); this type of aestivation is known as vexillary or papilionaceous.
26.	• **Root cap**-The root is covered at the apex by a thimble-like structure called the root cap. It protects the tender apex of the root as it makes its way through the soil. • **Region of meristematic activity-**The cells of this region are very small, thin, walled and with dense protoplasm. They divide repeatedly. • **Region of elongation**-The cells proximal to this region undergo rapid elongation and enlargement and are responsible for the growth of the root in length. • **Region of maturation**-The cells of this zone gradually differentiate and mature. From this region, some of the epidermal cells form very fine and delicate, thread-like structures called root hairs. These root hairs absorb water and minerals from the soil.  **Figure 5.3** The regions of the root-tip
27.	The structure of a bean seed is described below: 1. The bean seed is protected by a thin, greenish outermost covering called seed coat. It protects the seed from insects and bacteria as well as from mechanical injury. 2. The seed coat is divided into two parts, the outer part is called Testa and inner part is called Tegmen. Tegmen is a thin membrane that lies under the Testa. 3. On the inner concave side of the seed, there is a scar called Hilum

	which marks the place where the seed was attached to the fruit wall. 4. Above the hilum is a small pore called Micropyle. The Micropyle absorbs and allows the entry of as much water as is required for germination. 5. On removing the testa and tegmen from a soaked bean seed, the seed is made up of two fleshy seed leaves called the Cotyledons. They contain stored food material which is used by the seedling for growth. 6. In between the two cotyledons is located the delicate embryo which consists of a Radicle and Plumule. The radicle develops into a root, while the plumule develops into a shoot. 
28.	• **Inflorescence:** Usually **axillary or terminal cymose** type. • **Flower: Bisexual** and **actinomorphic** (radially symmetrical). • **Calyx: 5 sepals**, united (gamosepalous), **persistent** in fruit. • **Corolla: 5 petals**, united (gamopetalous), forming a **funnel-shaped or rotate** corolla. • **Androecium: 5 stamens**, epipetalous (attached to petals), alternate with petals. • **Gynoecium: Bicarpellary**, **syncarpous**, ovary **superior**, **bilocular** with **axile placentation**. • **Fruit: Berry** or **capsule**. • **Seed: Many**, with **endosperm** present.

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