



Plant Taxonomy (A)

Q1/ Fill the blanks with missing words; (choose 20 phrases from the box and write the appropriate one in the blank): (20 Marks)

Historia Plantarum, Species Plantarum, Monopodial, Asteracea, Steroids, couplet, ales, reactions, Alkaloids, phyta, lead, Genera Plantarum, Sympodial, Phenolic compounds, functions, Non-protein amino acids, Fabaceae, Artificial, Brassicaceae, An Integrated System of Classification of Flowering Plants, opsida, De Plantis, inae, Poaceae, Malvaceae, Flavinoids, Terpenoids.

1. Plant physiology deals with - - - - - and - - - - -.
2. A dichotomous key consists of a series of two contrasting statements. Each statement is a - - - - -; the pair of leads constitutes a - - - - -.
3. The ending of the name indicates its rank, as Subdivision ends with phytina; Division ends with - - - - -; Class ends with - - - - -; and Order ends with - - - - -.
4. The published works of John Ray was - - - - - , and of Cronquist was - - - - -.
5. The families' alternative new names are also permitted ending in-aceae as: Cruciferae to - - - - -, Gramineae to - - - - -, Compositae to - - - - -.
6. Distribution of secondary compounds of low molecular weight such as - - - - -, - - - - -, - - - - -, - - - - -, and - - - - - provide valuable clues to the systematist.
7. Branching in plants have two patterns are: - - - - - and - - - - - system.

Q2/ Define only four of the following: (20 Marks)

1. Cone 2. Plant habit 3. Plant sex 4. Seed 5. Buds 6. Taxonomy

Q3/ List and mention only three bellow: (30 Marks)

- 1) Aestivation arrangement of petals - sepals in the flower buds with figures help.
- 2) Five types of seed shapes with scientific names examples.
- 3) List and mention scientific names example of Fleshy (succulent) fruits.
- 4) Ovary position in the flowers with figures help.

Q4/ Draw a Diagram of the following, with pointing their parts: (30 Marks)

1. Paripinnate Compound Leaf
2. Typical Dicot seed
3. Typical Compound umbel inflorescence.

Answer Keys: (A)

Q1/ Fill the blanks with missing words;

(20 Marks)

1. functions and reactions
2. lead, couplet
3. phyta, opsida, ales
4. Historia Plantarum, An Integrated System of Classification of Flowering Plants
5. Brassicaceae, Poaceae, Asteracea
6. Non-protein amino acids, Phenolic compounds, Steroids, Alkaloids, Flavinoids, Terpenoids
7. Monopodial, Sympodial

Q2/ Define only four of the following:

(20 Marks)

1. **Cone.** A **cone**, also called a **strobilus**, is a modified, determinate, reproductive shoot system of many non-flowering vascular plants, consisting of a stem axis bearing sporophylls.
2. **Plant habit** refers to the general form of a plant, encompassing a variety of components such as stem duration and branching pattern, development, or texture.
3. **Plant sex** refers to the presence and distribution of perfect or imperfect flowers on individuals of a species.
4. **Seed** is the mature ovule of the seed plants, consisting of an internal embryo surrounded by nutritive tissue (endosperm) and enveloped by a protective seed coat.
5. **Buds:** Buds are immature shoot systems, typically located in the axils of leaves. Buds may grow to form lateral vegetative branches or reproductive structures.
6. **Taxonomy** is a major part of systematics that includes four components: Description, Identification, Nomenclature, and Classification (**DINC**).

Q3/ List and mention only three bellow:

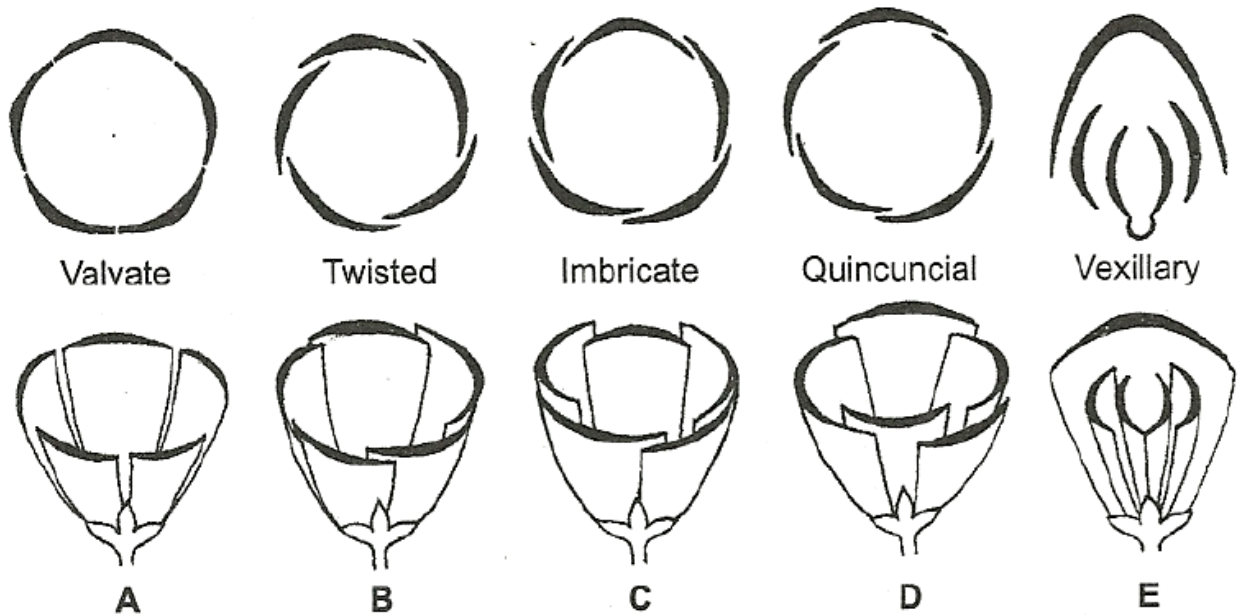
(30 Marks)

)

1. Aestivation:

Arrangement of sepals and petals in the bud which may be of following types:

- A. Valvate;**
- B. Twisted;**
- C. Imbricate;**
- D. Quincuncial;**
- E. Vexillary;**



2. Five types of seed shapes with scientific names examples.

a. **Globoid:** as in wild species of *Vicia* and *Hibiscus esculentus* seeds.

b. **Ovoids:** as in *Salvia* and *Pyrus* seeds.

c. **Oblate:** as in many *Lathyrus* seeds.

d. **Ellipsoid:** as in *Phoenix* seeds.

e. **Angular:** as in *Phaseolus aureus* seeds.

f. **Reniform:** as in *Phaseolus vulgaris* seeds.

g. **Lenticular:** as in *Lens esculenta* seeds.

h. **Discoid:** as in many *Medicago* species and *Malva* seeds.

i. **Clavate:**

j. **Capitate:**

3. List and mention scientific names example of Fleshy (succulent) fruits.

Fleshy (succulent) simple fruits:

A. **Berry;** as in *Vitis*, *Phoenix* and *Lycopersicon*.

B. **Drupe;** as in *Prunus amygdalus*, *P. persica*, *P. armenica*, *Juglans* spp. *Olea europaea*, etc.

C. **Hesperidium;** as in *Citrus* spp. (orange, lemon, grapefruit, etc.).

D. **Pepo;** as in Cucurbitaceae (*Benincasa hispida* and *Cucurbita maxima*).

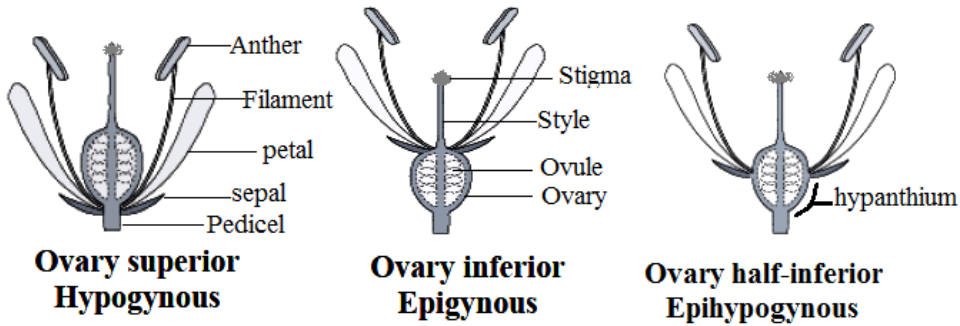
E. **Pome;** as in *Malus* and *Pyrus*

4. Ovary position in the flowers with figures help.

Ovary position; (Perianth/Androecial position);

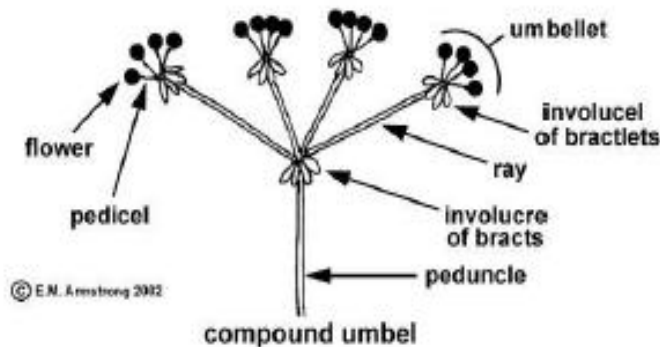
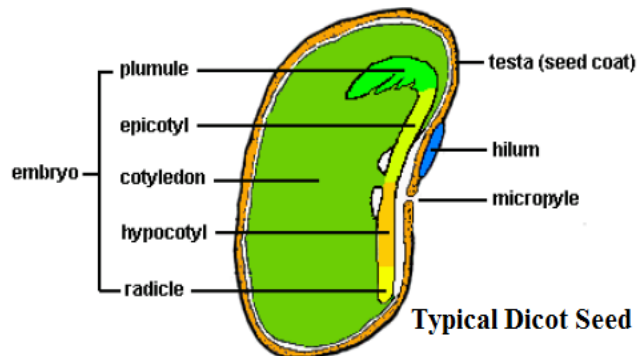
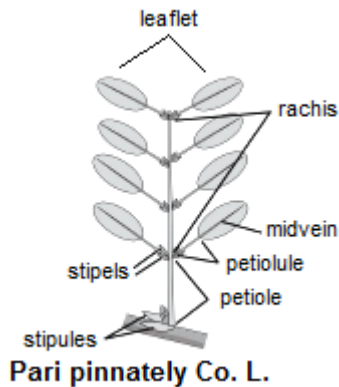
1. **Superior ovary, Hypogynous**

2. **Inferior ovary, Epigynous**
3. **Semi or half-inferior ovary, Perigynous or Epihypogynous**



Q4/ Draw a Diagram of the following, with pointing their parts: (30 Marks)

1. Paripinnate Compound Leaf
2. Typical Dicot seed
3. Typical Compound umbel inflorescence.



Typical inflorescence of the carrot family (Apiaceae = Umbelliferae)

Plant Taxonomy (B)

Q1/ Fill the blanks with missing words; (choose 20 phrases from the box and write the appropriate one in the blank): (20 Marks)

Poaceae, Epidermis, Apiaceae, Nomenclature, Cellular contents, Genera Plantarum, Plant Form, Biennial, Description, lead, Anatomy, Petiole and nodal anatomy, Asteraceae, Sympodial, Annual, Artificial, Species Plantarum, Lamiaceae, Perennial, Classification, Leaf anatomy and venation, De Plantis, Sclereids, Identification, Wood anatomy.

1. Plant morphology deals with - - - - - and - - - - -.
2. Taxonomy is a major part of systematics that includes four components: - - - - -
- -, - - - - - , - - - - - and - - - - -.
3. The published works of Linnaeus was - - - - - , while of De Jussieu was - - - - - .
4. The families' alternative new names are also permitted ending in-aceae as: Umbelliferae to - - - - - , Compositae to - - - - - , Labiatae to - - - - - .
5. Some important anatomical characters of well-established taxonomic value are as:- - - - - , - - - - - , - - - - - , - - - - - , - - - - - , and - - - - - .
6. The plants are classified according to plant duration to: - - - - - , - - - - - and - - - - - .

Q2/ Define only four of the following:

(20 Marks)

1. Shrubs 2. Inflorescence 3. Nectaries 4. Stamen 5. Pistil 6. Blade

Q3/ List and mention only three bellow:

(30 Marks)

- 1) Five types of **Placentation** types in flowering plants with figures help.
- 2) Five types of **Specialized inflorescences** with scientific names examples.
- 3) Five types of **Indehiscent** fruits with scientific names examples.
- 4) Types of **palmate compound** leaf with scientific names examples.

Q4/ Draw a Diagram of the following, with pointing their parts: (30 Marks)

1. Four cycles of flower (four major series of flower parts).
2. Reticulate and parallel venation of leaf blade.
3. Typical root and shoot system.

Answer keys: (B)

Q1/ Fill the blanks with missing words; (choose 20 phrases from the box and write the appropriate one in the blank): (20 Marks)

1. Plant Form, Anatomy
2. Description, Identification, Nomenclature, Classification
3. Species Plantarum, Genera Plantarum
4. Apiaceae, Asteraceae, Lamiaceae
5. Epidermis, Cellular contents, Petiole and nodal anatomy, Wood anatomy, Leaf anatomy and venation, Sclereids
6. Annual, Biennial, Perennial

Q2/ Define only four of the following: (20 Marks)

1. **Shrubs:** A **Shrub** is a perennial, woody plant with several main stems arising at ground level.
2. **Inflorescence:** An inflorescence is a collection or aggregation of flowers on an individual plant. Inflorescences often function to enhance reproduction.
3. **Nectaries:** Nectaries are specialized nectar-producing structures of the flower. Nectar is a solution of one or more sugars and various other compounds and functions as an attractant (a reward) to promote animal pollination.
4. **Stamen:** A **stamen** is a microsporophyll, which characteristically bears two thecae (each theca comprising a pair of microsporangia; Stamens can be leaf-like (laminar), but typically develop as a stalk-like **filament**, bearing the pollen-bearing **anther**.
5. **Pistil:** A **pistil** is that part of the gynoecium composed of an **ovary**, one or more **styles** (which may be absent), and one or more **stigmas**.
6. **Blade:** The most important part of the leaf and a seat of gaseous exchange for photosynthesis, respiration, transpiration.

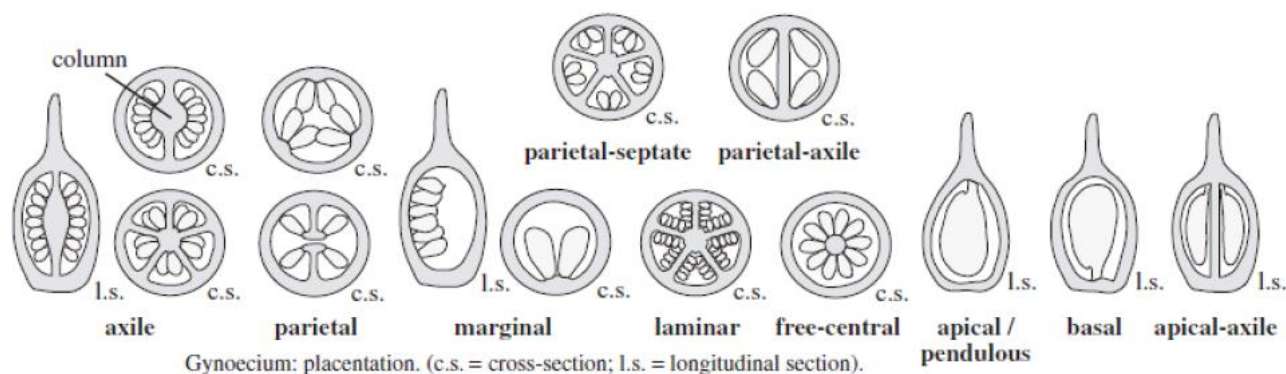
Q3/ List and mention only three bellow: (30 Marks)

1. Five types of **Placentation** types in flowering plants with figures help.

Placentation refers to the positioning of the ovules and takes into account the number

and position of placentae, septa, and locules. Placentation types are:

1. **Axile,**
2. **Apical** or **pendulous,**
3. **Basal,**
4. **Free-central,**
5. **Laminar** or **Lamellate,**
6. **Marginal,**
7. **Parietal,**



2. Five types of **Specialized inflorescences** with scientific names examples.

1) **Specialized inflorescences**; Some inflorescences are quite specialized and often restricted to certain taxonomic groups as:

2) **Catkin** (also called an ament) in *Quercus* and *Salix*.

3) **Cyathium** as in *Euphorbia helioscopia* *Euphorbia pilulifera*.

4) **Head** or **capitulum** are typical of the Asteraceae and Dipsacaceae (and some other groups).

5) **Syconium** or **Hypanthodium** in *Ficus*.

6) **Spadix** is a spike with a thickened or fleshy central axis, typically in the Araceae, e.g. *Arum* sp.

3. Five types of **Indehiscent** fruits with scientific names examples.

1) **Achene** as the unit fruits of sunflowers.

2) **Grain** or **caryopsis** are the fruit type of all Poaceae (grasses).

3) **Nut** as in *Quercus* sp., *Corylus* sp.

4) **Nutlet** as the mericarps of the Boraginaceae and Lamiaceae are termed nutlets.

5) **Samara** is a winged, dry, usually indehiscent fruit, as in *Isatis*.

6) **Double samara**, as in *Acer*.

7) **Cypsella**, as in fruits of Compositae members (e.g. *Erigeron* sp., *Taraxacum officinale*, *Tragopogon* sp. and *Onopordum*).

8) **Lomentum** or **indehiscent legumes**, as in *Mimosa Prosopis* sp., and *Tamarindus*.

4. Five types of **palmate compound leaf** with scientific names examples.

In such leaves, rachis does not differentiate and the lamina appears articulated or attached to a point on the top of the petiole. Such compound leaves may be of following types;

i. **Uni-foliate** — as in *Citrus*.

ii. **Bi-foliate** — as in *Bignonia grandiflora*.

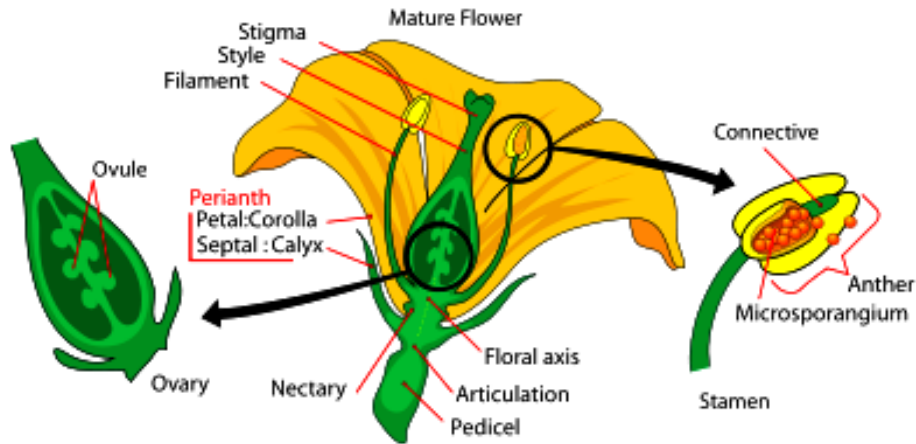
iii. **Tri-foliate** — as in *Oxalis*.

iv. **Quadri-foliate** — as in *Paris quadrifolia* and *Marsilea quadrifoliata*.

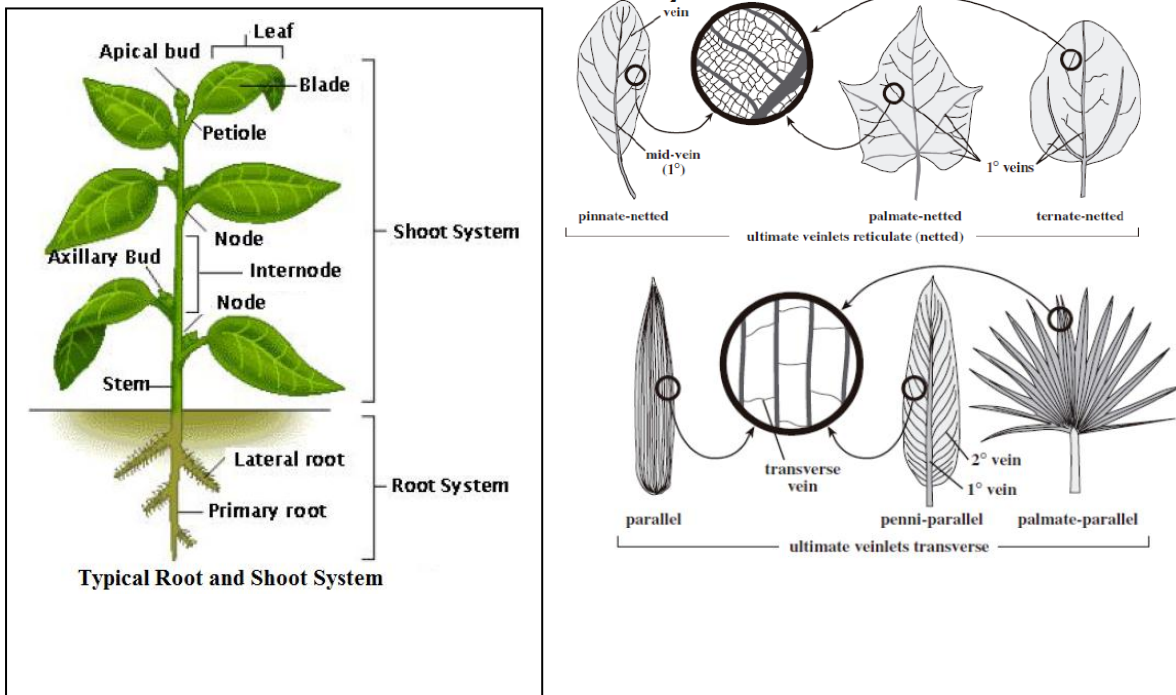
v. **Multi-foliate** — as in *Acanthopanax*.

Q4/ Draw a Diagram of the following, with pointing their parts: (30 Marks)

1. Four cycles of flower (four major series of flower parts).



2. Reticulate and parallel venation of leaf blade.



3. Typical root and shoot system.

Plant Taxonomy (C)

- Q1/** List only two of the following: **(20 Marks)**
A- The types of specialized inflorescences with scientific names examples.
B- Five types of indeterminate inflorescences with figure examples.
C- Historical periods of Plant taxonomy.

- Q2/ Answer the following:** **(20 Marks)**
A. Five types of fleshy tap root with scientific names examples.
B. Mention the stamen arrangement with figures help.

- Q3/** Choose the most appropriate answer for the followings: **(20 Marks)**
1. A leaf with two basal lobes directed outwards called :
a- ovate b- cordate c- hastate d- sagittate
 2. Who is the editor of **Flowering Plants Origin and Dispersal**:
a- De-Candolle b- Cronquist c- Bessey d- Armen Takhtajan
 3. The new name of **Gramineae** is:
a- Fabaceae b- Arecaceae c- Poaceae d- Apiceae
 4. The new name of **Leguminosae** is:
a- Fabaceae b- Arecaceae c- Poaceae d- Apiaceae
 5. The cluster of tuber roots called:
a- Root tubers b- Fasciculated roots c- Proproots d- Conical roots
 6. The subtending flower bract of **Hibiscus sp.** called:
a- Glum b- Foliaceous c- Epicalyx d- spathy bract
 7. The subtending flower bract of **Antirrhinum sp.** is:
a- Glum b- Foliaceous c- Epicalyx d- spathy bract
 8. The ending of **Divition** name in the rank is:
a- Phyta b- opsida c- opsidae d- aceae
 9. The leaves which fall off as soon as they are formed, called:
a- Caducous b- Deciduous. c- Annual. d- Persistent
 10. An **ovule** also called:
a- placenta. b- strobilus. c- ovary. d- megasporangium

- Q4/** Diagram the following with pointing their parts: **(30 Marks)**
A. Impari- pinnately compound leaf.
B. Types of the ovary position.
C. Types of leaf arrangements (Phyllotaxy).

- Q5/ Define two of the following:** **(10 Marks)**
1. Monoecious 2. Plant anatomy 3. Chemotaxonomy

Answer Keys: (C)

Plant Taxonomy

Q1/ List only:

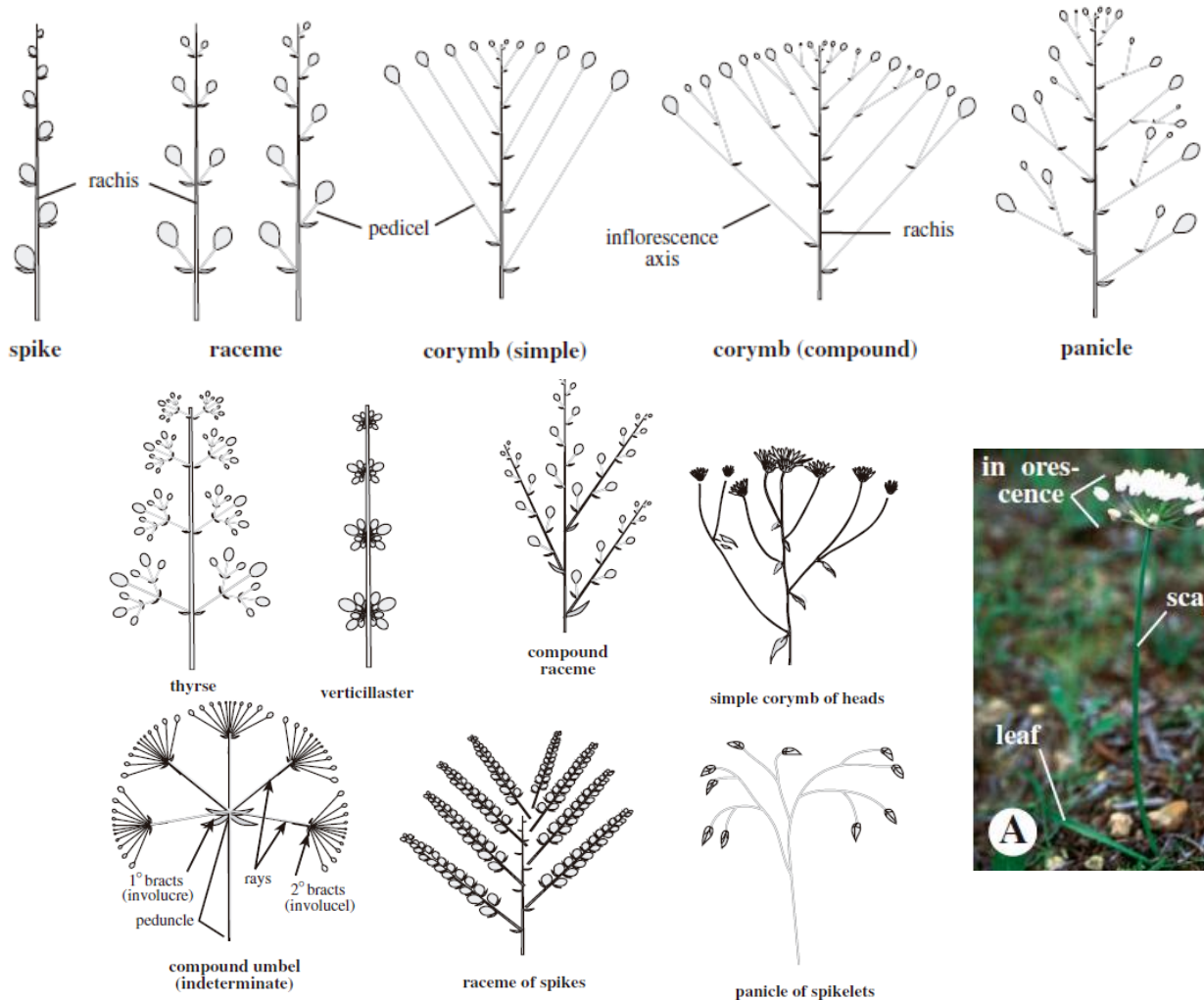
(20 Marks)

A- SPECIALIZED INFLORESCENCES;

1. **Catkin**, as in *Quercus* and *Salix*.
2. **Cyathium**, as in *Euphorbia helioscopia* *Euphorbia pilulifera*.
3. **Head or capitulum**, Heads are typical of the Asteraceae and Dipsacaceae.
4. **Syconium or Hypanthodium**, as in *Ficus*.
5. **Spadix**, as in the Araceae, e.g. *Arum* sp.

B- 1. Indeterminate "Racemose";

- | | |
|--------------------|-------------------------|
| 1. Simple spike; | 6. Simple umbel |
| 2. Compound spike; | 7. Compound umbel |
| 3. Raceme: | 8. Simple corymb: |
| 4. Panicle: | 9. Compound corymb: |
| 5. Thyrese: | 10. solitary, or scape; |
| 6. Verticillaster: | |



- C. Historical periods of plant taxonomy:**
 Period I: Early History of Plant Taxonomy
 Period II: Later Progress in Plant Taxonomy
 a- Artificial or Sexual Systems
 b- Natural Systems
 Period III: Modern Approaches in Plant Taxonomy;
 Phylogenetic Systems
 Period IV: Recent Systems of Classification

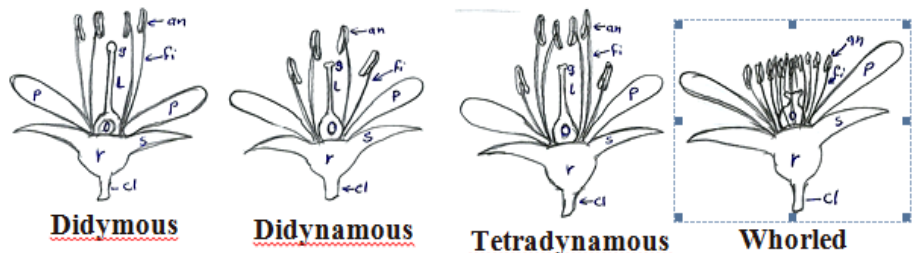
Q2/ (20 Marks)

A- Fleshy or Succulent taproots:

1. Fusiform roots: as in *Raphanus sativus*.
2. Conical roots: as in carrot *Daucus carota*.
3. Napiform roots: as in *Brassica rapa* L.
4. Root tubers: e.g. *Ipomoea batatas*.
5. Globform: e.g. *Beta vulgaris*.
6. Fasciculated roots: as found in *Asparagus* and *Dahlia*.

B- Stamen arrangement,

1. whorled or spiral,
2. Didymous,
3. Didynamous,
4. Tetradynamous,

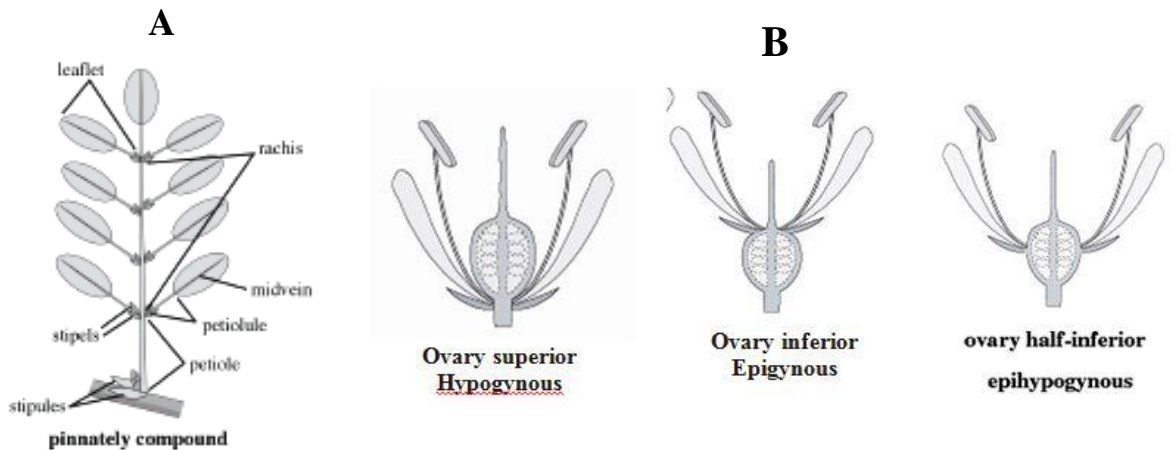


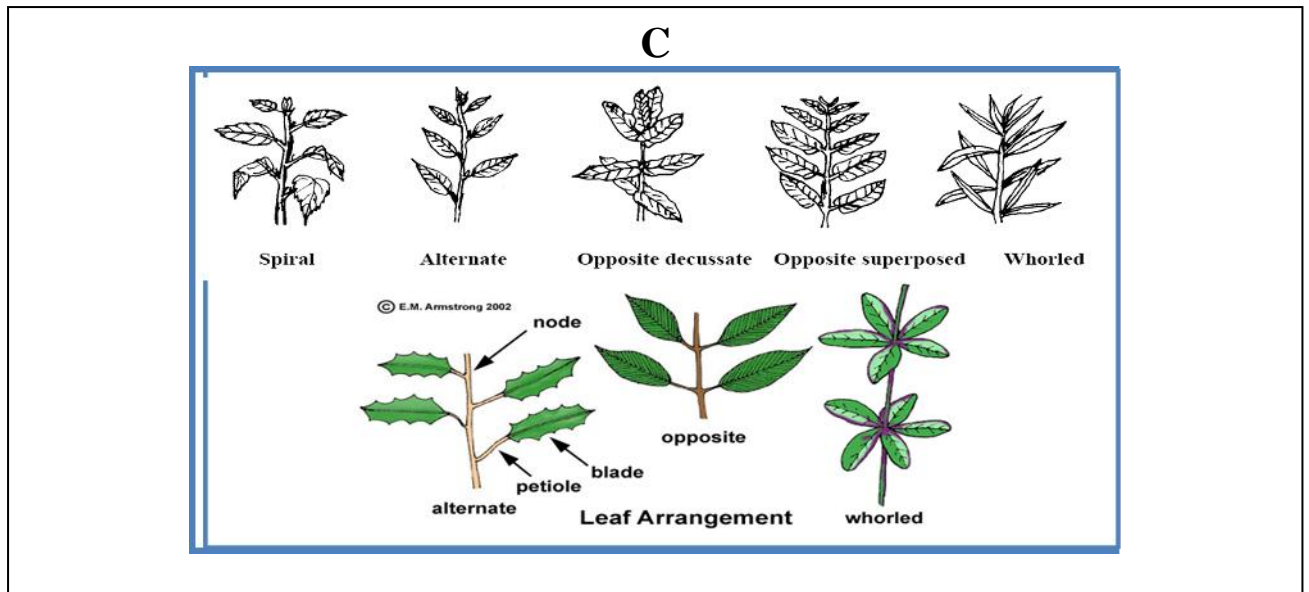
Stamen arrangement, (cl) pedicel; (r) receptacle; (s) sepal; (p) petal; (an) anther; (fi) filament; (g) stigma; (L) style (o) ovary.

Q3/ Choose by underlining or circling the most appropriate answer: (20 Marks)

1. C 2. d 3. c 4. a 5. b 6. c 7. b 8. a 9. a 10. d

Q4/ Diagram the following with pointing their parts: (30 Marks)





Q5/ Define the following

(10 Marks)

1. **Monoecious;** (*mono*, one + *oikos*, house) plant is one with only unisexual flowers, both staminate and pistillate on the same individual plant; e.g. *Quercus* spp. and *Zea mays*.

2. **Plant Anatomy:**

Anatomical characters of the vegetative organs of flowering plants have been employed with great success to the solution of taxonomic problems and to the elucidation of phylogenetic relationships. Some important anatomical characters of well-established taxonomic value are as: Epidermis, Leaf anatomy and venation, Petiole and nodal anatomy, Sclereids, Cellular contents, Wood anatomy.

3. **Chemotaxonomy:**

The application of chemistry to systematics is called chemotaxonomy or chemical taxonomy. Distribution of secondary compounds of low molecular weight such as, Non-protein amino acids, Phenolic compounds, Flavinoids, Alkaloids, Terpenoids and Steroids provide valuable clues to the systematist.

قوتابی خوشه‌ویست ههول بده تا پیتبکریت خودی خوت وه لامه‌کان بده‌یته‌وه

Plant Taxonomy (D)

Q1/ Fill the blanks with missing words; (choose 20 phrases from the box and write the appropriate one in the blank):
(40 Marks)

1. Theophrastus classified plants into four major groups they are: - - - -
-----, -----, -----, -----.
2. The fleshy or succulent taproots have different shapes are : - - - - -
--, -----, -----, ----- and -----.
3. Some secondary chemical compounds of plant provides taxonomic value they are: - - - - - , ----- , -----
-----, -----, -----, -----.
4. The families' alternative names are also permitted ending in-aceae as:
Cruciferae to Brassicaceae , Leguminosae to - - - - - ,
Compositae to ----- , Umbelliferae to ----- .
5. Linnaeus system of classification is thought artificial system , the first class is ----- , and the last class is -----.

Q2/ List only : (20 Marks)

A- Phyllotax or Leaf arrangement with figure examples.

B- Plant classification according to plant duration with examples.

Q3/ Define only two of the following terms: (10 Marks)

1. Palaeobotany.
2. Nomenclature
3. Flower.

Q4/ Draw the figure of impari-pinnati compound leaf with pointing parts.
(20 Marks)

Q5/ Stipules may be of various types mention only four of them with scientific names example. 4 (10 Marks)

Plant Taxonomy (E) □

Q1/ Fill the blanks with missing words; (choose 20 phrases from the box and write the appropriate one in the blank): (40 Marks)

1. Bract and bracteoles may be variously modified, such as: (Foliaceous in *Antirrhinum*), **Epicalyx** in- - - - - , **Glumes** in- - - - - , **Cymba** in- - - - - , **Cupule** in- - - - - .
2. The fleshy or succulent taproots have different shapes are : - - - - - , - - - - - , - - - - - , - - - - - and - - - - - .
3. Stipules may be of various types; as (Tendrillar in *Smilax glabrae*), - - - - - in *Rosa*, - - - - - in *Capparis*, and - - - - - in *Pisum*.
4. The terms that are used to describe the sepals are: - - - - - , - - - - - , - - - - - and - - - - - .
5. The subterranean or underground stems have different shapes such as : - - - - - , - - - - - , - - - - - , and - - - - - .

Q2/ Write a brief illustration on the following: (20 Marks)

- 1) Modified calyx with examples (Scientific names).
- 2) Only five shapes of leaf blade or lamina with illustration figures.

Q4/ Define only two of the following terms: (20 Marks)

1. Leaf.
2. Flower.
3. Monoecious plant
4. Monopodial branching.

Q5/ Diagram the followings with pointing their parts: (20 Marks)

- D. Four flower cycles
- E. Pari-pinnately compound leaf.

Plant Taxonomy (F)

Q1/Fill the blanks with correct phrases from the following box: (40)

Ovary, Loculicidal, Asteraceae, Equatorial view, Dioecious, *Antirrhinum*, anther, Septicidal, staminate, Stigmas, Style, Circumscissile, Monoecious, Poricidal, *Quercus*, Spur, *Ficus*, asepalous, Polar view, Stamens, *Euphorbia* sp. *Arum* sp, filament, Stipulate,

1. - - - - - plant is one with only unisexual flowers, both staminate and pistillate on the same individual plant, while - - - - -
- - - plant is one with unisexual flowers, but with staminate and pistillate on separate individual plants
2. - - - - - can be typically develop as a stalk-like called - - - - -
- - - , and bearing the pollen-bearing called - - - - -.
3. A **pistil** is that part of the gynoecium composed of - - - - - , - - - - -
- - - - - , and one or more - - - - -.
4. Four types of capsules can be recognized based on the type or location of dehiscence they are - - - - - , - - - - - , - - - - -
- - - - - and - - - - - capsules.
5. Observing a **pollen grain** from the direction of either pole is known - - - - -
- - - - - , and observing from the equatorial direction is known - - - - -.
6. Some inflorescences are quite specialized and often restricted to certain taxonomic groups as: **Catkin** in - - - - - , **Cyathium** as in - - - - -
- - - - - , **Head** or **capitulum** are typical of the - - - - -
and - - - - - , **Syconium** or **Hypanthodium** in - - - - - ,
and **Spadix** in - - - - -.

Q2/ List the following: (20 Marks)

A- Fleshy or **succulent simple fruits** with scientific name examples.

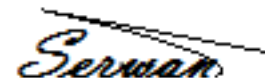
B- Five types of **Placentation** with scientific name examples.

Q3/ Define only two of the following: (10 Marks)

1. Flower
2. Placentation
3. Nectaries

Q4/ Diagram only two of the following with **pointing their parts**. (30 Marks)

- A) Typical four flower cycles.
- B) Typical compound umbel inflorescence.
- C) Flower sex.



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