CUET (UG)

BIOLOGY

As Per Latest NTA Pattern

CHAPTERWISE & TOPICWISE

QUESTION BANK

WITH REVISION SHEET (MIND MAPS)

- 13 Mind Maps
- 1420+ CUET Like MCQs
- 400+ PYQs
- ✓ Sample papers
- ✓ All Qns Typology

2026 EXAMINATION

4th EDITION

CUET 2025 Solved Papers

Contents

- CUET-2025 & 2024 Paper Analysis (Chapterwise)
- Online Through QR Code
  - Syllabus & Exam Structure
  - Past Year Solved Papers

Biology

Paper Analysis

Chapter-wise Analysis of Question Papers 2025 & 2024

S. No.	Name of the Chapter	NTA CUET Question Paper (3rd June 2025)		NTA CUET Question Paper (15th May 2025)		NTA CUET Question Paper (15th May 2024)	
		No. of Ques	Percentage (%)	No. of Ques	Percentage (%)	No. of Ques	Percentage (%)
1.	Sexual Reproduction in Flowering Plants	3	6	3	6	3	6
2.	Human Reproduction	4	8	4	8	3	6
3.	Reproductive Health	3	6	3	6	5	10
4.	Principles of Inheritance and Variation	3	6	3	6	3	6
5.	Molecular Basis of Inheritance	2	4	4	8	5	10
6.	Evolution	5	10	3	6	4	8
7.	Human Health and Disease	6	12	5	10	4	8
8.	Microbes in Human Welfare	4	8	5	10	3	6
9.	Biotechnology: Principles and Processes	5	10	5	10	4	8
10.	Biotechnology and its Applications	5	10	5	10	4	8
11.	Organisms and Populations	0	0	3	6	3	6
12.	Ecosystems	8	16	3	6	4	8
13.	Biodiversity and Conservation	2	4	4	8	5	10

Syllabus & Exam Structure

SCAN ME!

CUET Exam Structure & Syllabus

- NTA CUET 2024 Solved Papers
- NTA CUET 2023 Solved Papers
- NTA CUET 2022 Solved Papers

SCAN ME!

Past Year Solved Papers

CHAPTER-1

Revision Sheet

Sexual Reproduction in Flowering Plants

Pre-fertilisation: Structures and Events

Gametogenesis / Gamete Formation

Occurs in specialised structures: anthers (male) and ovules (female).

Gamete transfer through pollination

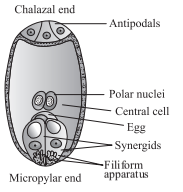
Transfer of pollen grains to stigma of a pistil for fertilisation.

Megasporogenesis and Monosporic Embryo sac Development

Megaspore mother cell (2n)
↓ Meiosis
Megaspore tetrad i.e., 4 Megaspores (n)
↓
A single chalazal megaspore is functional; rest degenerate
↓
Functional Megaspore (n)
↓ 1st nuclear division
Two nucleated stage
↓ 2nd nuclear division
Four nucleated stage
↓ 3rd nuclear division
Eight nucleated stage
↓
Cell walls are now laid down, forming 8 nucleated, 7-celled embryo sac

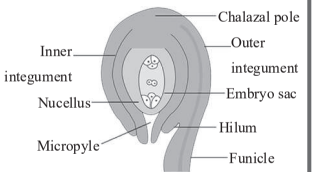
Development of embryo sac from a single megaspore (monosporic development)

These divisions are strictly free nuclear and no cell walls are laid yet



Ovule

- Ovule usually has a single embryo sac formed from a megaspore.



Megasporangium (ovule) showing embryo sac

Biotic Agent

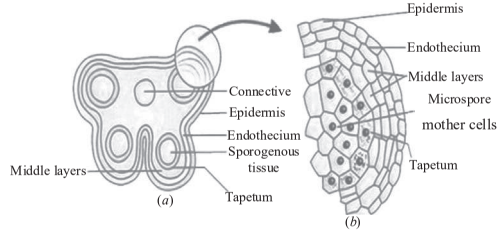
Insects (Bees, butterflies, flies, ants, wasps, etc.), birds (sunbirds humming birds), bats, some primates (lemurs), arboreal rodents, and reptiles (gecko lizard and garden lizard), etc.

Floral Adaptation

- **Nectar Production:** Flowers produce nectar to attract pollinators.
- **Color and Scent:** Bright colors and fragrances lure pollinators.
- **Mimicry:** Some flowers mimic female insects to facilitate pollination e.g., *Ophrys*
- **Offers Oviposition (egg-laying) site:** In some species floral rewards are in providing safe places to lay eggs; Some flowers, like the 6-feet *Amorphophallus* and *Yucca*.

Structure of Microsporangium

- Each microsporangium has four wall layers (**epidermis**, **endothecium** and **middle layers** protect the microsporangium and aid in anther dehiscence and the **tapetum** nourishes developing pollen grains) and a central sporogenous tissue that gives rise to pollen grains.

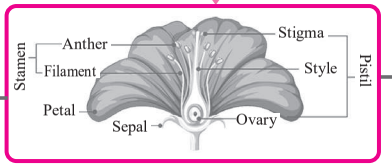


(a) T.S. of Young Anther (b) Enlarged view of Microsporangium

Microsporogenesis and Microgametogenesis:

Pollen mother cell (2n) —Meiosis→ Microspore tetrad i.e., 4 microspores (n)
↓ Anther matures and dehydrates
4 Pollen grains (n) or Male gametophyte
↓ Pollen mitosis I (Unequal division)
Vegetative cell (n) + Generative cell (n)
↓ Pollen mitosis II
Male gamete (n) + Male gamete (n)

Flower-A Fascinating Organ of Angiosperms



Male Reproductive Part (Stamen)

- Comprises a filament and a bilobed anther.
- Anther is dithecous, containing four microsporangia that become pollen sacs.

Female Reproductive Part (Pistil)

- Gynoecium in a flower represents the female reproductive part.
- It can be a single pistil (monocarpellary) or multiple pistils (multicarpellary).
- Pistils may be fused (syncarpous) or separate (apocarpous).

Pollinating agents

Abiotic Agents: Wind, Water

Wind pollinated flower

- Flowers are not colorful and do not produce nectar.
- Pollen grains are light and non-sticky.
- Have exposed stamens and large feathery stigmas to facilitate pollen dispersal and capture, e.g., grasses.

Water pollinated flower

- Flowers are not very colorful and do not produce nectar.
- Pollen grains are long, ribbon like released inside water and are carried passively; some of them reach the stigma and achieve pollination.
- E.g., *Vallisneria*, *Hydrilla* and *Zostera*.

Cross pollination

Xenogamy

- Cross-pollination between different flowers on different plants.

Self pollination

Geitonogamy

- Pollination between different flowers on the same plant.
- Geitonogamy is functionally cross-pollination but genetically self-pollination.

Autogamy

- Self-pollination within the same flower
- Ensures fertilisation but reduces genetic diversity.
- Requires perfect synchrony in pollen release and stigma receptivity.
- Some plants like *Viola* (Common Pansy), *Oxalis*, and *Commelina* produce chasmogamous (with exposed anthers and stigma, allowing cross-pollination) and cleistogamous (flowers do not open and ensure autogamy) flowers.

Pollen Grain (25-50 μm in diameter)

Component	Main Function	Location
Exine (made of sporopollenin)	Provides protection due to its resistance to extreme conditions and aids in the preservation of pollen grains as fossils.	Outer layer of the pollen grain wall.
Intine (made of cellulose and pectins)	Essential for the maturation of the pollen grain and pollen tube germination.	Inner layer of the pollen grain wall, beneath the exine.
Germ pores	Serve as sites for pollen tube emergence, facilitating the process of germination.	Specific regions on the exine where sporopollenin is absent.
Vegetative cell	Provides nutrients and energy for the growth of the pollen tube.	Larger cell within the pollen grain, contains a large nucleus and abundant food reserves.
Generative cell	Divides mitotically to produce two male gametes for fertilisation.	Smaller cell that floats in the cytoplasm of the vegetative cell, typically spindle-shaped.

- Some plants release **2-celled pollen** (one generative and one vegetative cell), while others disperse **3-celled pollen** (one vegetative and two male gametes).

Microsporogenesis pollen yield:

$$P = N \times 4$$

(∵ each microspore mother cell produces 4 microspores/pollens)

where,

P = Number of pollen grains

N = Number of microspore mother cell

Pollen Viability and Storage:

- Pollen viability varies, influenced by temperature and humidity.
- Rice, wheat pollen: lose viability within 30 minutes of their release.
- Pollen in some members of Rosaceae, Leguminoseae, Solanaceae: viable for months.
- Pollen can be stored for years in liquid nitrogen (-196°C), can be used as pollen banks in crop breeding programmes.

Sexual Reproduction in Flowering Plants

Endosperm Development

- Occurs before embryo development due to its crucial role in nutrition of embryo.
- Primary endosperm cell (PEC) divides and forms a triploid endosperm tissue.
- Contains reserve food materials for the developing embryo.
- In the most common type of endosperm development:
  - Primary endosperm nucleus (PEN) undergoes multiple nuclear divisions.
  - Results in formation of many free nuclei.
  - This phase is known as free-nuclear endosperm.
  - Following free-nuclear stage, cell walls begin to form.
  - Endosperm shifts from a free-nuclear to a cellular structure.
  - The number of nuclei before this transition varies widely.
- Endosperm can be persistent (e.g., castor, coconut) or consumed by the embryo (e.g., pea, groundnut, beans).

Artificial Hybridisation: Steps For Controlled Pollination in Bisexual Flowers

Emasculation:

Remove anthers with forceps before pollen release.

Bagging:

- Cover emasculated flowers with butter paper bags to avoid unwanted pollen contamination.
- Once stigma is receptive, dust selected pollen.
- Rebag flowers for fruit development.

Note: If the female parent produces unisexual flowers, there is no need for emasculation.

Outbreeding Devices (To Avoid Inbreeding Depression)

- Encourage cross-pollination to overcome inbreeding depression.
- Flowering plants have developed many devices to discourage self pollination.

Hereditary Device:

- Self-incompatibility: Genetic mechanism blocking self-pollen fertilisation by hindering germination or pollen tube growth.

Physiological Device:

- Asynchronous pollen release and stigma receptivity.
- Spatial separation of anther and stigma i.e., the anther and stigma are placed at different positions so, that the pollen cannot come in contact with the stigma of the same flower.
- Production of unisexual flowers in monoecious (castor, maize) and dioecious (papaya) plants.

Post-fertilisation Events

Fruit

Ovary develops into a fruit, with the ovary wall becoming the **pericarp**.

- **True Fruit** — Fruit develops solely from the ovary of the flower, e.g., mango.
- **False Fruit** — Fruit develops from both the ovary and surrounding floral parts, like the thalamus, e.g., apple, strawberry, cashew, etc.
- **Parthenocarpic Fruits** — Fruit develops without fertilisation, occurs in species like banana, leading to seedless fruits.

Seed

- Final product of sexual reproduction, formed inside fruits.
- Ovules inside the ovary develop into seeds.
- Consist of seed coat(s), cotyledon(s), and embryonal axis.

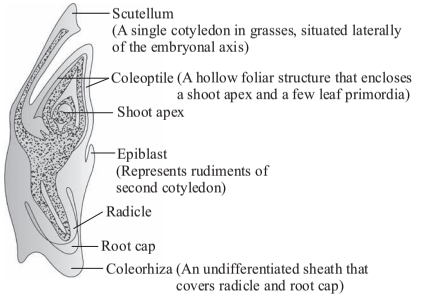
- **Seed dormancy:** As seeds mature, they reduce water content (10-15% moisture by mass), and embryo metabolic activity slows down and may enter a state of dormancy.
- **Non-albuminous Seed:** No residual endosperm as it is completely consumed during embryo development, e.g ., pea, groundnut, beans.
- **Albuminous Seed:** Retain a part of the endosperm as it is not completely used up during embryo development, e.g., wheat, maize, barley, castor coconut.
- **Cotyledons:** Thick and swollen, store food reserves.
- **Perisperm:** Some seeds like black pepper and beet, remnants of the nucellus persist as the perisperm.
- **Seed coat:** Integuments of ovules harden to form tough seed coats, and the micropyle allows oxygen and water entry during germination.

Embryo development

- Develops at the micropylar end of the embryo sac.
- Typically, zygotes divide only after some endosperm is formed.
- Early embryonic stages are similar in monocots and dicots.
- **Components of Embryonal Axis:** Epicotyl + Plumule + Hypocotyl + Radicle

Monocot Embryo

- Monocotyledonous embryo have one cotyledon.



Double Fertilisation and Fate of Male Gametes

Involves two fertilisation events in the embryo sac, syngamy and triple fusion.

Syngamy

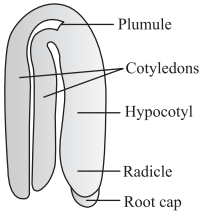
- Fusion of one male gamete with the egg cell forming a diploid zygote ($2n$).
- **Zygote** develops into the **embryo**.

Triple fusion

- Fusion of the other male gamete with two polar nuclei in central cell forming a triploid **primary endosperm nucleus (PEN) ($3n$)**.
- After triple fusion, the central cell becomes the **primary endosperm cell (PEC)**.
- **PEC** develops into the **endosperm**, a nutritive tissue.

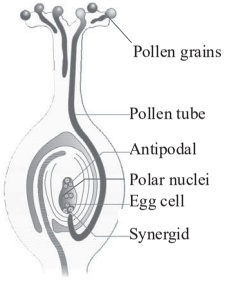
Dicot Embryo

- Dicotyledonous embryo has an embryonal axis with two cotyledons.



Pollen-Pistil Interaction

- Chemical components of pollen and pistil determine compatibility.
- Compatible pollen triggers pollen tube formation on the stigma.
- Certain plants release **two-celled pollen** (vegetative and generative cell).
- The generative cell divides into two male gametes during pollen tube growth.
- **Three-celled pollen** already contains two male gametes.
- The pollen tube enters the ovule through the micropyle, then enters one of the synergids through the filiform apparatus.



L.S. of a flower showing growth of pollen tube

Polyembryony

In plants like *Citrus* & Mango, nucellar cell division yields multiple embryos in a single ovule, notably observable in squeezed orange seeds.

Apomixis

- Form of asexual reproduction in some flowering plants, mimicking sexual reproduction but occurring without fertilisation.
- Diploid egg cell in some species develops directly into embryo without reduction division and fertilisation.
- Mostly observed in Asteraceae and grasses.
- Valuable in agriculture, maintains hybrid traits efficiently.

1 Chapter

SEXUAL REPRODUCTION IN FLOWERING PLANTS

TOPIC–WISE QUESTIONS

Flower - A Fascinating Organ of Angiosperms

1. What do we call the part of plant that enclose a developing bud?

(*a*) Petals (*b*) Carpals (*c*) Sepals (*d*) Leaves

2. In angiosperms, the site of sexual reproduction is

(*a*) Seed (*b*) Fruit (*c*) Flower (*d*) Embryo

Pre-Fertilization: Structure and Events

3. The only type of pollination that brings genetically different types of pollen grains to the stigma is

(*a*) Chasmogamy
(*b*) Cleistogamy
(*c*) Geitonogamy
(*d*) Xenogamy

4. Select the correct statement regarding tapetum?

(*a*) It is the innermost layer of anther wall.
(*b*) Cells of tapetum are quite large in size and consist of more than one nuclei.
(*c*) It contributes in the formation of sporopollenin.
(*d*) All of these.

5. Which of the following is characteristic of angiosperm anther?

(*a*) Trilobed and monothecous
(*b*) Bilobed and monothecous
(*c*) Bilobed and dithecous
(*d*) Monolobed and dithecous

6. Pollen grain consist of double layered wall. The inner wall

(*a*) Is made up of cellulose and pectin
(*b*) Is thin and continuous
(*c*) Is made up of fat-like sporopollenin
(*d*) Both (*a*) and (*b*) are correct

7. A microspore mother cell undergoes _____ during formation of pollen grains.

(*a*) One meiotic division
(*b*) Two mitotic division only
(*c*) One meiotic and one mitotic divisions
(*d*) One meiotic and two mitotic divisions

8. In pollen grain, the generative cell is

(*a*) Small and floats in the cytoplasm of vegetative cell
(*b*) Spindle-shaped
(*c*) Having a dense cytoplasm and a nucleus.
(*d*) All of these

9. In angiosperm embryo sac is

(*a*) 8 - nucleate, 7 - celled
(*b*) 7 - nucleate, 7 - celled
(*c*) 7 - nucleate, 8 - celled
(*d*) 9 - nucleate, 6 - celled

10. Which layer of microsporangium provides nutrition to the pollen grains?

(*a*) Epidermis (*b*) Endothecium
(*c*) Tapetum (*d*) Both (*a*) and (*c*)

11. In angiosperm, megasporangium is equivalent to

(*a*) Ovule (*b*) Embryo sac
(*c*) Ovary (*d*) Egg apparatus

12. Which of the following is a characteristic of insect pollinated flowers?

(*a*) Light coloured scented pollen covered with nectar
(*b*) Dry pollens with smooth surface
(*c*) Sticky pollen and rich in nectar
(*d*) Brightly coloured pollens in large quantity

13. A typical embryo sac consist of

(*a*) Egg, synergids and secondary cell
(*b*) Synergids, egg, central cell and secondary wall
(*c*) Egg, synergids, polar nuclei and antipodals
(*d*) Egg, synergids and secondary wall

14. Which one produces embryo sac?

(*a*) Megaspore mother cell
(*b*) Megaspore
(*c*) Microspore
(*d*) Embryo cell

15. What do we call the yellowish powdery substance on the anthers of a *Hibiscus* flower?

(*a*) Microsporangium (*b*) Exine
(*c*) Male gametophyte (*d*) Female gametophyte

16. Which of the following condition is required for the autogamy?

(*a*) Bisexuality
(*b*) Synchrony in pollen release and stigma receptivity
(*c*) Stigma and anther should be close to each other
(*d*) All of these

17. Species that provides floral rewards in the form of providing safe area to lay eggs?

(*a*) *Amorphophallus* (*b*) Fig
(*c*) *Yucca* (*d*) All of these

18. In what percentage angiosperms, the male gametophyte is shed at 3-celled stage?

(*a*) 60% (*b*) 70% (*c*) 40% (*d*) 30%

19. One of the major approaches of crop improvement programme is artificial hybridization. For the bisexual flower it includes the following steps in correct order.

(*a*) Bagging, pollination, rebagging
(*b*) Emasculation, pollination, bagging, rebagging
(*c*) Emasculation, bagging, pollination, rebagging
(*d*) Bagging, emasculation, pollination, rebagging

20. Tapetum present in the microsporangial wall occurs between

(*a*) Epidermis and endothecium
(*b*) Endothecium and middle layers
(*c*) Epidermis and middle layers
(*d*) Middle layers and sporogenous tissue

21. Xenogamy is

(*a*) Pollination between two flowers of two different plants
(*b*) Pollination between two different flowers of same plant and same branch
(*c*) Pollination between anther and stigma of same flower
(*d*) A mechanism of parthenocarpy

22. Following are the stages in the formation of pollen grains during the process of microsporogenesis:

A. Cells of sporogenous tissue undergo meiotic divisions
B. Formation of microspore tetrads
C. Development into pollen grains
D. Dissociation of microspores from the tetrads
E. Dehiscence of anther to release pollen grains

Choose the correct sequence of these stages from the options given below:

(*a*) (A)-(B)-(D)-(C)-(E) (*b*) (B)-(A)-(C)-(D)-(E)
(*c*) (C)-(A)-(B)-(D)-(E) (*d*) (D)-(B)-(A)-(C)-(E)

23. Which of the following events is important for fertilization after pollination?

(*a*) Sperm swim to the egg and the polar nuclei.
(*b*) Petals close around the reproductive parts.
(*c*) The process of cell division (meiosis) take place within the pollen grain.
(*d*) A pollen tube grows from the stigma to the ovule.

24. A pair that has haploid structures is:

(*a*) Nucellus and stamen
(*b*) Antipodal cells and egg cell
(*c*) Antipodal cells and megaspore mother cell
(*d*) Nucellus and primary endosperm nucleus

25. Egg apparatus comprises of

(*a*) Egg cell and antipodal cells
(*b*) Antipodal cell and central cell
(*c*) Egg cell and two synergids
(*d*) Egg cell and one synergid

26. In plants having bisexual flowers, the flowers are first emasculated. Which organ of the plant is removed in this process?

(*a*) Ovary (*b*) Ovules
(*c*) Stigmas (*d*) Stamens or anthers

27. Dioecious condition can prevent

(*a*) Autogamy (*b*) Xenogamy
(*c*) Geitonogamy (*d*) Both (*a*) and (*c*)

28. The point of attachment of the stalk with the seed is

(*a*) Hilum (*b*) Micropyle
(*c*) Tegmen (*d*) Plumule

29. Which of the following is correct about Pollination?

(*a*) Shedding of pollen from anthers.
(*b*) Similar to fertilization of animals.
(*c*) Transfer of pollen from anthers to stigmas.
(*d*) Transfer of pollen from anthers to ovules.

30. Embryo sac is to ovule as _____ is to an anther.

(*a*) Stamen (*b*) Filament
(*c*) Pollen grain (*d*) Androecium

31. Select the correct statements with respect to a typical female gametophyte:

A. It is eight-nucleate and seven-celled at maturity.
B. It is free-nuclear during the development.
C. It is present inside the integument, but outside the nucellus.
D. It comprises of an egg apparatus present near the chalazal end.

(*a*) A and D (*b*) B and C
(*c*) A and B (*d*) A and C

Rank Booster

Match The Column MCQs

1. Match the List-I with List-II.

List-I		List-II	
A.	Plumule	(i)	Attachment of seed
B.	Radicle	(ii)	Embryonic stem
C.	Hilum	(iii)	Embryonal axis
D.	Scutellum	(iv)	Embryonic root
		(v)	Modified cotyledon

(*a*) A-(ii), B-(iv), C-(i), D-(v)

(*b*) A-(ii), B-(iv), C-(i), D-(iii)

(*c*) A-(ii), B-(iv), C-(iii), D-(v)

(*d*) A-(iii), B-(iv), C-(i), D-(ii)

2. Match the List-I with List-II.

List-I		List-II	
A.	Funicle	(i)	Small opening of ovule
B.	Integuments	(ii)	Stalk of ovule
C.	Chalaza	(iii)	Protective envelopes of ovule
D.	Hilum	(iv)	Junction part of ovule and stalk
E.	Micropyle	(v)	Basal part of ovule

(*a*) A-(ii), B-(iii), C-(v), D-(iv), E-(i)

(*b*) A-(i), B-(iii), C-(ii), D-(iv), E-(v)

(*c*) A-(ii), B-(iii), C-(i), D-(iv), E-(v)

(*d*) A-(ii), B-(iv), C-(v), D-(i), E-(iii)

3. Match the List-I with List-II.

List-I		List-II	
A.	Sporogenous tissue	(i)	Meiosis
B.	Pollen	(ii)	Mitosis
C.	*Parthenium*	(iii)	Male gametophyte
D.	Generative cell	(iv)	Pollen allergy

(*a*) A-(ii), B-(iii), C-(i), D-(iv)

(*b*) A-(ii), B-(i), C-(iii), D-(iv)

(*c*) A-(i), B-(iii), C-(iv), D-(ii)

(*d*) A-(iii), B-(ii), C-(i), D-(iv)

4. Match the List-I with List-II.

List-I		List-II	
A.	Endosperm	(i)	Castor
B.	Perisperm	(ii)	Pea
C.	Non- albuminous	(iii)	Black pepper

(*a*) A-(ii), B-(iii), C-(i)

(*b*) A-(i), B-(ii), C-(iii)

(*c*) A-(i), B-(iii), C-(ii)

(*d*) A-(iii), B-(i), C-(ii)

5. Match the List-I with List-II.

List-I		List-II	
A.	Synergid	(i)	Haploid
B.	Endosperm	(ii)	Polyploid
C.	Megaspore mother cell	(iii)	Triploid
D.	Tapetum	(iv)	Diploid

(*a*) A-(ii), B-(iii), C-(i), D-(iv)

(*b*) A-(i), B-(iii), C-(iv), D-(ii)

(*c*) A-(ii), B-(i), C-(iii), D-(iv)

(*d*) A-(iii), B-(ii), C-(i), D-(iv)

Assertion & Reason MCQs

Directions: These questions consist of two statements each, printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

(*a*) Both Assertion (A) and Reason (R) are True and the Reason (R) is a correct explanation of the Assertion (A).

(*b*) Both Assertion (A) and Reason (R) are True but Reason (R) is not a correct explanation of the Assertion (A).

(*c*) Assertion (A) is True but the Reason (R) is False.

(*d*) Assertion (A) is False but Reason (R) is True.

6. Assertion (A): Microsporangium of angiosperms is surrounded by 4 wall layers.

Reason (R): Outer 3 layers provide protection and help in dehiscence of anther to release pollen grains.

7. Assertion (A): Ex-albuminous seeds do not have residual endosperm.

Reason (R): Barley is an ex-albuminous.

8. **Assertion (A):** Tapetum is the innermost layer of anther which is single layered.
Reason (R): Tapetum is polyploid and multinucleated.

9. **Assertion (A):** Protandry and protogyny ensures cross fertilization.
Reason (R): Cross fertilization introduces variation in progeny.

10. **Assertion (A):** Strawberry is also known as false fruit.
Reason (R): In strawberry, fruit develop without fertilization.

Statement Type-I Based MCQs

Directions: These questions consist of two statements each, printed as Statement-I and Statement-II. While answering these questions, you are required to choose any one of the following four responses.

(*a*) Both Statement-I and Statement-II are correct.

(*b*) Both Statement-I and Statement-II are incorrect.

(*c*) Statement-I is correct & Statement-II is incorrect.

(*d*) Statement-I is incorrect & Statement-II is correct.

11. **Statement-I:** Cells of tapetum possess little cytoplasm and have single nucleus.
Statement-II: Microspore mother cells undergo mitosis to form microspore tetrad.

12. **Statement-I:** Exine is resistant to high temperatures, strong acids, alkali and enzymes.
Statement-II: Sporopollenin is absent at germ pore.

13. **Statement-I:** Xenogamy is cross pollination functionally but self pollination genetically.
Statement-II: In geitonogamy, pollens from one flower are transferred to another flower borne on same plant.

14. **Statement-I:** *Commelina* shows cleistogamy.
Statement-II: Cleistogamous condition reduces chances of inbreeding.

15. **Statement-I:** During embryo sac formation, a functional megaspore divides by complete mitotic division.
Statement-II: In these mitotic divisions, karyokinesis is immediately followed by cytokinesis.

Statement Type-II Based MCQs

16. Choose the incorrect statement regarding endosperm?
A. Provides nutrition to the developing embryo
B. Has the potentiality to form a complete plant
C. Contains reserve food material such as fats, carbohydrates, oil, proteins, etc in mature seeds
D. Develops from the primary endosperm cell in the embryo sac.
(*a*) A and B (*b*) B only
(*c*) B and C (*d*) D only

17. Mark the incorrect statement w.r.t. seed.
A. The seed coat has two layers, the outer testa and the inner tegmen.
B. The hilum is the small pore on seed coat.
C. Both plumule and radicle are enclosed in sheath known as coleoptile.
D. The food storing tissue of *Castor* is endosperm.
E. Generally monocots have non-endospermic seeds except some like orchids.
F. A dicot embryo consists of an embryonal axis and two cotyledons.
(*a*) A, B and F (*b*) B, C and E
(*c*) A, C and D (*d*) A, C and E

18. Identify the correct statement.
(*a*) Integument surrounded by nucellus is called megasporangium.
(*b*) Only one cell of nucellus differentiates into MMC and undergoes meiosis.
(*c*) One meiosis and three mitotic divisions are required in megagametogenesis.
(*d*) Megaspore is the progenitor of male gametophyte.

19. Which one of the following statements is incorrect?
(*a*) Sometimes the generative cell divides during the growth of pollen tube in the stigma.
(*b*) In some species, floral rewards are providing safe places to lay eggs.
(*c*) The portion of embryonal axis above the level of cotyledons is the hypocotyl.
(*d*) Scutellum is lateral to the embryonal axis in monocots.

20. Which of the following statements are correct?
A. Tapetum nourishes the developing pollen grains.
B. Flowers are objects of aesthetic, ornamental, social, religious and cultural value.
C. Endosperm is a nutritive tissue and it is triploid.
D. Endosperm is formed by the fusion of primary nucleus to second male gamete.
(*a*) A, B and C (*b*) A and D
(*c*) A, C and D (*d*) B, C and D

21. Which of the following statements is incorrect?
(*a*) Pollen grains are rich in nutrients.
(*b*) Pollen grain intine has prominent apertures called germ pores where sporopollenin is present.
(*c*) Continued self-pollination result in inbreeding depression.
(*d*) Cleistogamous flowers are invariably autogamous.

22. Select the correct statement:
(*a*) Cleistogamous flowers do not open at all.
(*b*) Xenogamy produces genetic variations.
(*c*) Plants pollinated by wind has large often-feathery stigma.
(*d*) All of these

23. Which of the following statements are incorrect?

A. In many Citrus and mango varieties, each ovule contains many embryos (polyembryony).

B. Coconut has both free-nuclear endosperm and cellular endosperm.

C. Microsporogenesis is defined as the process of formation of microspores from a pollen mother cell (PMC) through mitosis.

D. The pollen grains represent the female gametophytes.

(*a*) A, B and C (*b*) B, C and D

(*c*) A and B (*d*) C and D

24. How many statements are correct?

A. Pollen grains are generally spherical measuring about 35-50 nanometers in diameter.

B. The hard inner layer of pollen grain is made up of sporopollenin.

C. Exine is a thin and continuous layer made up of cellulose and pectin.

D. In over 60 per cent of angiosperms, pollen grains are shed at 2-celled stage.

(*a*) A (*b*) C (*c*) B (*d*) D

25. Choose correct statement among the following:

(*a*) A typical angiosperm embryo sac, at maturity, is 8-nucleate and 7-celled.

(*b*) Autogamy is defined as the transfer of pollen grains from the anther to the stigma of the same flower.

(*c*) Pollination by wind is more common amongst abiotic pollinations.

(*d*) All of these

Case Based Questions

Case Based-I

Read the following passage and answer the questions that follow:

The transfer of pollen from an anther of a plant to the stigma of a plant, later enabling fertilization and the production of seeds, most often by an animal or by wind is called pollination. All pollinations do not lead to successful fertilization because for successful fertilization, the pistil of a flower has to recognize the pollen of the same species. During this interaction the pistil screens the pollen grains. Pollen of other species are inhibited at the level of pollen germination or pollen tube growth in the style. Plants have evolved many intricate methods for attracting pollinators. These methods include visual cues, scent, food, mimicry, and entrapment. There are two types of pollination namely self pollination and cross-pollination.

26. What type of pollination leads to genetic variation?

(*a*) Autogamy (*b*) Cleistogamy

(*c*) Xenogamy (*d*) Geitonogamy

27. Which of the following is pollinated through water?

(*a*) *Oxalis* (*b*) *Vallisneria*

(*c*) *Common pansy* (*d*) *Viola*

28. Which of the following is functionally cross-pollination but genetically self-pollination?

(*a*) Chasmogamy (*b*) Cleistogamy

(*c*) Geitonogamy (*d*) Monogamy

29. Select the odd one out w.r.t. plant having both cleistogamous and chasmogamous flowers.

(*a*) *Oxalis* (*b*) *Hydrilla*

(*c*) *Commelina* (*d*) *Viola*

30. How many ovule are present in the ovary of plants that are pollinated by wind?

(*a*) Four (*b*) Three (*c*) Two (*d*) One

Case Based-II

Read the following passage and answer the questions that follow:

Double fertilization in angiosperms triggers the transformation of ovule into a seed. In this transformation the zygote develops into embryo. Triploid primary endosperm nucleus give rise to nutritive tissue called endosperm. The endosperm may persist or completely digested during embryogenesis. Seed with copious amount of endosperm is called albuminous seed while the one in which endosperm is used up is called ex-albuminous seed.The ex-albuminous seed usually store reserve food materials in cotyledons.

31. Cotyledons in the embryo of monocotyledons refers to

(*a*) Coleoptile (*b*) Scutellum

(*c*) Hypocotyl (*d*) Plumule

32. Which of the following structure is present between radicle and coleorhiza?

(*a*) Root cap (*b*) Shoot apex

(*c*) Coleoptile (*d*) Both (*b*) and (*c*)

33. Select the non-albuminous seed from the following

(*a*) Pea (*b*) Castor

(*c*) Wheat (*d*) Both (*a*) and (*c*)

34. Persistent nucellus is called

(*a*) Pericarp (*b*) Endocarp

(*c*) Perisperm (*d*) Endosperm

35. Epicotyl is enclosed inside _____.

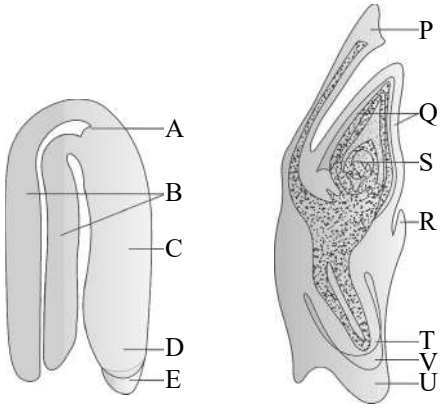
(*a*) Coleorhiza (*b*) Epiblast

(*c*) Coleoptile (*d*) Scutellum

Case Based-III

Read the following passage and answer the questions that follow:

Embryo develops at the micropylar end of the embryo sac where the zygote is situated. Most zygotes divided only after certain amount of endosperm is formed. The early stages of embryo development are similar in both monocotyledons and dicotyledons. The zygote gives rise to the proembryo and subsequently to the globular heart-shaped and mature embryo.



36. In monocot P grow rapidly, P will be
(*a*) Plumule (*b*) Radicle
(*c*) Coleorhiza (*d*) Scutellum

37. Lower end of the embryonal axis in monocots is enclosed within _____.
(*a*) Scutellum (*b*) Coleorhiza
(*c*) Plumule (*d*) Radicle

38. In the embryos of a typical dicot and a monocot, true homologous structure are
(*a*) P and Q (*b*) B and P
(*c*) R and S (*d*) S and T

39. In grass family, the R is called
(*a*) Epiblast (*b*) Plumule
(*c*) Scutellum (*d*) Perisperm

40. In grass embryo, the U
(*a*) Is produced by mitotic divisions within the proembryo
(*b*) Develops into the endosperm
(*c*) Is protective layer
(*d*) Is homologous to second cotyledon

PAST YEAR QUESTIONS

1. Production of seeds without fertilization is known as: **(CUET 2024)**
(*a*) Parthenogenesis (*b*) Apomixis
(*c*) Polyembryony (*d*) Syngamy

2. Arrange the given stages of Megasporogenesis in chronological order. **(CUET 2024)**
A. Megaspore tetrad
B. Megaspore dyad
C. Megaspore mother cell
D. Female gametophyte
Choose the **correct** answer from the options given below:
(*a*) (D), (A), (B), (C) (*b*) (A), (D), (C), (B)
(*c*) (B), (A), (D), (C) (*d*) (C), (B), (A), (D)

3. Match **List-I** with **List-II**: **(CUET 2024)**

	List-I Kind of Pollinations		List-II Features
A.	Autogamy	(*i*)	Pollination involving flower of two different plants
B.	Geitonogamy	(*ii*)	Pollination involving water
C.	Xenogamy	(*iii*)	Pollination involving two flowers of same plant
D.	Hydrophily	(*iv*)	Pollination involving same flower

Choose the **correct** answer from the options given below:
(*a*) A-(*ii*), B-(*i*), C-(*iii*), D-(*iv*)
(*b*) A-(*iii*), B-(*ii*), C-(*i*), D-(*iv*)
(*c*) A-(*iv*), B-(*iii*), C-(*i*), D-(*ii*)
(*d*) A-(*i*), B-(*iii*), C-(*ii*), (D)-(*iv*)

4. Cells present in the mature pollen grains are _____. **(CUET 2024)**
(*a*) Central cell and generative cell
(*b*) Antipodal cell and vegetative cell
(*c*) Vegetative cell and generative cell
(*d*) Filiform cell and micropylar cell

5. Match **List-I** with **List-II:** **(CUET 2024)**

	List-I Structures		List-II Functions
A.	Filiform apparatus	(*i*)	Made up of sporopollenin
B.	Tapetum	(*ii*)	Attachment of ovule to the placenta
C.	Exine	(*iii*)	Guides pollen tube into the synergid
D.	Funicle	(*iv*)	Nourishes the pollen grain

Choose the ***correct*** answer from the options given below:
(*a*) (A) - (*iv*), (B) - (*i*), (C) - (*ii*), (D) - (*iii*)
(*b*) (A) - (*iii*), (B) - (*iv*), (C) - (*i*), (D) - (*ii*)
(*c*) (A) - (*ii*), (B) - (*i*), (C) - (*iii*), (D) - (*iv*)
(*d*) (A) - (*i*), (B) - (*iii*), (C) - (*iv*), (D) - (*ii*)

6. Primary Endosperm Nucleus is the product of: **(CUET 2024)**
(*a*) Double fusion (*b*) Triple fusion
(*c*) Parthenogenesis (*d*) Apomixis

NTA CUET PAPER
(3RD JUNE 2025, SHIFT-II)

Instructions

All questions are compulsory. Each questions carries 5 marks. One mark will be deducted for a wrong answer.

Full Marks: 250 ***(Time: 60 Minutes)***

1. Which one of the followings is an indirect measure of the organic matter present in water?

(*a*) pH level (*b*) Nitrogen content

(*c*) Turbidity (*d*) BOD

2. Which one of the following plants is the source of cannabinoids commonly used in drug abuse?

(*a*) *Papaver somniferum* (*b*) *Cannabis sativa*

(*c*) *Erythroxylum coca* (*d*) *Atropa belladona*

3. Arrange the following steps of genetically engineered insulin production.

A. Isolation and purification of the insulin gene from beta cells of the pancreatic islets

B. Expression of gene in host cell

C. Joining the two polypeptides by disulfide bonds

D. Cloning of insulin gene in *Escherichia coli* cloning host cell

Choose the **correct** answer from the options given below:

(*a*) A, B, C, D (*b*) A, D, B, C

(*c*) A, B, D, C (*d*) A, C, D, B

4. Which of the following statements about ecological pyramids is incorrect?

(*a*) Pyramids of energy are always upright.

(*b*) Saprophytes are given the top position in ecological pyramids.

(*c*) In terrestrial ecosystems, the pyramid of number can be inverted.

(*d*) In this, the single species related to two or more trophic levels is not considered.

5. Recombinant DNA technology involves the following steps in a specific sequence.

A. Culture of the host cell

B. Extraction of desired product

C. Isolation of desired DNA fragments

D. Transformation of the recombinant DNA into the host cell

Arrange these sequences correctly and choose the **correct** answer from the options given below:

(*a*) A, B, C, D (*b*) C, D, A, B

(*c*) B, A, D, C (*d*) C, B, D, A

6. Match List-I with List-II.

List-I (Terms)		List-II (Features)	
A.	Selectable marker	I.	Site that commonly used for cutting the DNA by restriction enzyme
B.	Origin of replication	II.	Removes nucleotides from the ends of the DNA
C.	Exonuclease	III.	Helps in identification and elimination of non-transformants
D.	Recognition site	IV.	The sequence responsible for controlling the copy number of linked DNA

Choose the **correct** answer from the options given below:

(*a*) A-III, B-IV, C-II, D-I
(*b*) A-I, B-II, C-III, D-IV
(*c*) A-I, B-II, C-IV, D-III
(*d*) A-III, B-IV, C-I, D-II

7. Match List-I with List-II.

List-I (Birth control methods)		List-II (Features)	
A.	Diaphragms	I.	Removal of vas deferens
B.	Lactational amenorrhea	II.	Increase phagocytosis of sperms
C.	Vasectomy	III.	Absence of menstrual cycle and ovulation following parturition
D.	IUDs	IV.	Cover the cervix and blocks the entry of sperm

Choose the **correct** answer from the options given below:

(*a*) A-I, B-II, C-III, D-IV
(*b*) A-IV, B-III, C-I, D-II
(*c*) A-IV, B-II, C-I, D-III
(*d*) A-III, B-IV, C-I, D-II

8. Which one of the following plays an important role in guiding the entry of pollen tube into the synergid?

(*a*) Filiform apparatus (*b*) Antipodals
(*c*) Polar nuclei (*d*) Egg cell

9. Which one of the following pyramids of biomass is generally inverted in the ecosystems?

(*a*) Forest (*b*) Grassland
(*c*) Sea (*d*) Desert

10. How many base pairs are present in one complete turn of DNA?

(*a*) 10 (*b*) 5 (*c*) 7 (*d*) 12

11. The arrangement of the nuclei in a normal embryo sac from the chalazal to micropylar end in dicots is:

(*a*) 3 + 3 + 2 (*b*) 2 + 3 + 3
(*c*) 3 + 2 + 3 (*d*) 4 + 1 + 3

12. Match List-I with List-II.

List-I (Scientists)		List-II (Discoveries)	
A.	Frederick Griffith	I.	Genetic Code
B	Francois Jacob and Jacque Monad	II.	Semi-conservative mode of DNA replication
C.	Har Gobind Khorana	III.	Transformation
D.	Meselson and Stahl	IV.	*Lac* operon

Choose the **correct** answer from the options given below:

(*a*) A-II, B-I, C-III, D-IV
(*b*) A-I, B-II, C-III, D-IV
(*c*) A-III, B-IV, C-II, D-I
(*d*) A-III, B-IV, C-I, D-II

13. Sex determination in grasshopper is of:

(*a*) XX-XY type (*b*) XX-XO type
(*c*) ZZ-ZO type (*d*) ZZ-ZW type

14. Three cells grouped together at the micropylar end and constitute_____in the embryo sac.

(*a*) Central cell (*b*) Polar cells
(*c*) Egg apparatus (*d*) Antipodals

15. Which one of the following disorders is a sex linked recessive disease?

(*a*) Sickle-cell anaemia (*b*) Haemophilia
(*c*) Phenylketonuria (*d*) Thalassemia

16. Which one of the followings cells are attacked by HIV?

(*a*) Cytotoxic cells (*b*) B-cells
(*c*) T-helper cells (*d*) T-memory cells

17. Arrange the following steps of curd formation from milk.

A. Coagulation and partial digestion of milk protein
B. Growth of starter culture
C. Growth of lactic acid bacteria (LAB) in milk
D. A small amount of curd is added as an inoculum to fresh milk

Choose the **correct** answer from the options given below:

(*a*) B, D, C, A (*b*) D, B, C, A
(*c*) B, D, A, C (*d*) C, D, B, A

18. Which of the following techniques are commonly used for early detection of cancer?

A. Biopsy and histopathological studies
B. Radiography (x-rays)
C. MRI (Magnetic Resonance Imaging)
D. Electrocardiogram (ECG)

Choose the **correct** answer from the options given below:

(*a*) A, B, C and D only (*b*) A, B and D only
(*c*) A, B and C only (*d*) A, B, C and D only

19. Which one of the following diagnostic techniques is based on the principle of antigen-antibody interaction?

(*a*) Recombinant DNA technology
(*b*) Polymerase Chain Reaction
(*c*) Enzyme-linked immuno sorbent assay
(*d*) Gel electrophoresis

20. Match List-I with List-II.

List-I (Microorganisms)		List-II (Commercial Uses)	
A.	*Lactobacillus*	I.	Use for the production of butyric acid
B.	*Saccharomyces cerevisiae*	II.	Use for production of swiss cheese
C.	*Propionibocterium sharmanii*	III.	Use for making bread
D.	*Clostridium butylicum*	IV.	Improves nutritional quality of milk by increasing vitamin B_{12}

Explanations

1. (*d*) BOD (Biochemical Oxygen Demand) measures the amount of oxygen required by microorganisms to decompose organic matter in water.

A high BOD indicates high organic matter pollution.

2. (*b*) Cannabinoids (e.g., marijuana, hashish, ganja, charas) are obtained from *Cannabis sativa*.

Papaver somniferum → Source of opium (morphine, heroin).

Erythroxylum coca → Source of cocaine.

Atropa belladonna → Source of alkaloids

3. (*b*) The correct sequence of insulin production using rDNA technology is:

(A) Isolation and purification of the insulin gene from pancreatic beta cells.

(D) Cloning of insulin gene into *E. coli* host cells for multiplication.

(B) Expression of gene in host cells to produce polypeptides A and B of insulin.

(C) Joining of the two polypeptides (A and B chains) by disulfide bonds to form functional insulin.

4. (*b*) Saprophytes are not included in ecological pyramids even though they play an important role in the ecosystem.

5. (*b*) The correct sequence of steps in Recombinant DNA Technology:

1. Isolation of desired DNA fragments → *(Step C)*
2. Transformation of recombinant DNA into host cell → *(Step D)*
3. Culture of the host cell → *(Step A)*
4. Extraction of desired product → *(Step B)*

6. (*a*) A. Selectable marker → (III) Helps in identification and elimination of non-transformants

B. Origin of replication → (IV) The sequence responsible for controlling the copy number of linked DNA

C. Exonuclease → (II) Removes nucleotides from the ends of the DNA

D. Recognition site → (I) Site that commonly used for cutting the DNA by restriction enzyme

7. (*b*) (A) Diaphragms → (IV) Cover the cervix and block the entry of sperm (barrier method)

(B) Lactational amenorrhea → (III) Absence of menstrual cycle and ovulation following parturition

(C) Vasectomy → (I) Removal (or cutting) of vas deferens in males

(D) IUDs (Intrauterine Devices) → (II) Increase phagocytosis of sperms

8. (*a*) The filiform apparatus is present at the micropylar end of the synergids. It guides the pollen tube into the synergid for the release of male gametes.

9. (*c*) In a sea (aquatic ecosystem), the pyramid of biomass is inverted. This happens because the biomass of producers (phytoplankton) is less than the biomass of primary consumers (zooplankton).

Pyramids of biomass are generally upright in forest, grassland and desert ecosystems.

10. (*a*) DNA is a double helix structure as proposed by Watson and Crick. One complete turn of the DNA helix contains 10 base pairs (bp). The distance between a bp in a helix is approximately 0.34 nm.

11. (*c*) A normal embryo sac (also called mature female gametophyte) in dicots is 7-celled and 8-nucleated, arranged as:

- Chalazal end: 3 antipodal cells - (3 nuclei)
- Central cell: 2 polar nuclei in the center - (2 nuclei)
- Micropylar end: Egg apparatus = 1 egg cell + 2 synergids - (3 nuclei)

12. (*d*) (A-III) Frederick Griffith discovered the phenomenon of transformation in bacteria *(Streptococcus pneumoniae)*.

(B-IV) Francois Jacob and Jacque Monod proposed the *Lac* operon model for gene regulation in bacteria.

(C-I) Har Gobind Khorana helped decipher the genetic code (which codons code for which amino acids).

(D-II) Meselson and Stahl proved that DNA replication is semi-conservative using *E. coli* and N_{15} isotope.

13. (*b*) Grasshoppers show XX-XO type of sex determination. Females have XX sex chromosomes. Males have only one X chromosome (XO). The presence or absence of the second X chromosome determines sex.

14. (*c*) In a mature embryo sac (female gametophyte), the micropylar end contains three cells: 1 egg cell and 2 synergids. Together, they form the egg apparatus.

15. (*b*) Haemophilia is a sex-linked recessive disorder carried on the X chromosome, and is more common in males (XY) since they have only one X chromosome. Females (XX) are usually carriers and show symptoms only if both X chromosomes carry the defective gene.

Sickle-cell anaemia, phenylketonuria, and thalassemia are all autosomal recessive disorders.

16. (*c*) HIV primarily attacks the T-helper cells, which are crucial for activating other immune cells. By destroying these cells, HIV weakens the immune system, making the body vulnerable to infections and diseases.

17. (*b*) The correct order of steps of curd formation from milk are as follows:

(D) A small amount of curd is added as an inoculum to fresh milk.

(B) This inoculum contains starter culture, which starts growing.

(C) Lactic acid bacteria (LAB) multiply and grow in milk.

(A) LAB causes coagulation and partial digestion of milk proteins, forming curd.

18. (*c*) Cancer detection is commonly done through biopsy and histopathological studies, where the suspected tissue is examined microscopically.

Radiography (X-rays) and MRI (Magnetic Resonance Imaging) are useful for detecting cancers of internal organs

ECG is used for heart examination, not for cancer detection.

19. (*c*) ELISA works on the antigen–antibody interaction principle to detect the presence of pathogens or specific proteins.

Recombinant DNA Technology involves joining DNA fragments from different sources to form recombinant DNA.

1

MOCK TEST PAPER

Instructions

All questions are compulsory. Each question carries 5 marks. One mark will be deducted for a wrong answer.

Full Marks: 250 ***(Time: 60 Minutes)***

1. Arrange the following vertebrate groups according to their increasing proportion of species number :

(A) Mammals (B) Birds

(C) Fishes (D) Reptiles

(E) Amphibians

Choose the ***correct*** sequence from the options given below:

(*a*) (E)-(D)-(A)-(B)-(C) (*b*) (D)-(E)-(A)-(B)-(C)

(*c*) (A)-(E)-(D)-(B)-(C) (*d*) (A)-(D)-(B)-(E)-(C)

2. Growth of pollen tube towards embryo sac is

(*a*) Chemotropic (*b*) Thigmotaxis

(*c*) Geotropic (*d*) Phototropic

3. Match the List-I with List-II.

	List-I		List-II
A.	Bt toxin	(i)	Silencing of m-RNA
B.	RNA interference	(ii)	ADA cDNA
C.	Autoradiography	(iii)	*cry* gene
D.	Gene Therapy	(iv)	DNA or RNA probe

(*a*) A-(i), B-(iii), C-(ii), D-(iv)

(*b*) A-(iii), B-(i), C-(ii), D-(iv)

(*c*) A-(iii), B-(i), C-(iv), D-(ii)

(*d*) A-(ii), B-(i), C-(iii), D-(iv)

4. Part of exine where sporopollenin is ***not*** present is called

(*a*) Germ pores (*b*) Intine

(*c*) Generative cell (*d*) Aperture

5. Given below are two statements:

Statement-I: Primitive atmosphere was reducing in nature.

Statement-II: Primitive atmosphere does not contain free oxygen at all.

(*a*) Both Statement-I and Statement-II are correct

(*b*) Both Statement-I and Statement-II are incorrect

(*c*) Statement-I is correct & Statement-II is incorrect

(*d*) Statement-I is incorrect & Statement-II is correct

6. Funicle is

(*a*) Point where ovules are attached to placenta

(*b*) Where body of the ovules fuse with hilum

(*c*) Protective covering of body

(*d*) Present at chalazal end

7. Which of the following statements are ***incorrect***?

A. In many Citrus and mango varieties, each ovule contains many embryos (polyembryony).

B. Coconut has both free-nuclear endosperm and cellular endosperm.

C. Microsporogenesis is defined as the process of formation of microspores from a pollen mother cell (PMC) through mitosis.

D. The pollen grains represent the female gametophytes.

(*a*) A, B and C (*b*) B, C and D

(*c*) A and B (*d*) C and D

8. Chasmogamous and cleistogamous type of flower are found in

(*a*) *Primrose* (*b*) *Ficus religiosa*

(*c*) *Commelina* (*d*) *Calotropis*

9. Bulbourethral gland help in the

(*a*) Lubrication of penis

(*b*) Stimulation of sperm activity

(*c*) Help in the secretion of sperms

(*d*) Maturation of sperms

10. Prostate gland is present
(*a*) In seminiferous tubules
(*b*) Side of bulbourethral gland
(*c*) Below seminal vesicles
(*d*) Below seminiferous tubules

11. In a situation where an immediate immune response is necessary, which of the following can be administered?
(*a*) A weakened form of the pathogen.
(*b*) Preformed antigens.
(*c*) Preformed antibodies.
(*d*) Immunosuppressants.

12. Following are the statements about oogenesis.
A. The tertiary follicle undergoes meiosis-I to form large haploid secondary oocyte.
B. The tertiary follicle is characterised by a fluid filled cavity, antrum.
C. Each ovary contains less than 10,000–20,000 primary follicles at puberty.
D. During the period from infancy to puberty, many of the primordial follicles degenerates.
Select the ***correct*** statements:
(*a*) A, B and D (*b*) B and D
(*c*) A and D (*d*) A, C and D

13. Sex education should involve all of the following except:
(*a*) Safe and hygienic sexual practices
(*b*) STDs
(*c*) Adolescence and related changes
(*d*) To make students believe in myths

14. Which is the most widely accepted method of contraceptive in India?
(*a*) Periodic abstinence (*b*) Vaults
(*c*) Progesterone pills (*d*) IUDs

15. Which of the following is ***not*** a barrier method of contraception?
(*a*) Condoms (*b*) Cervical caps
(*c*) Diaphragm (*d*) Progestasert

16. MTPs are considered safe up to how many weeks of pregnancy?
(*a*) 10 (*b*) 12 (*c*) 30 (*d*) 24

17. Which of the following statements are ***correct***?
A. Generation of productivity at the next trophic level is 20%.
B. Energy is lost in the respiration process.
C. 10 percent law was given by Florey.
D. If plants create 100 units of energy, 10 units of that energy will be transferred to primary consumers.
Select the ***correct*** statements:
(*a*) A, B and C (*b*) A, C and D
(*c*) B, C and D (*d*) B and D

18. Example of incomplete dominance is
(*a*) Snapdragon (*b*) Dog flower
(*c*) *Antirrhinum* sp. (*d*) All the above

19. In a monohybrid cross between two heterozygous individuals, percentage of pure homozygous individuals obtained in F_1 generation is
(*a*) 25% (*b*) 50% (*c*) 75% (*d*) 100%

20. Given below are two statements:
Statement-I: Morphine is a pain killer.
Statement-II: Morphine is used by patients dealing with depression.
(*a*) Both Statement-I and Statement-II are correct
(*b*) Both Statement-I and Statement-II are incorrect
(*c*) Statement-I is correct & Statement-II is incorrect
(*d*) Statement-I is incorrect & Statement-II is correct

21. Test cross is a cross between
(*a*) Hybrid × Recessive parent (Tt × tt)
(*b*) Hybrid × Dominant parent (Tt × TT)
(*c*) Hybrid × Hybrid (Tt × Tt)
(*d*) All the above

22. Multiple alleles are characterised by
(*a*) Occurrence of one gene in two chromosomes
(*b*) More than two alternate forms of a gene found at different loci
(*c*) More than two alternate forms of a gene found at same locus
(*d*) None of the above

23. Who amongst the following scientist had no contribution in the development of the double helix model for the structure of DNA?
(*a*) Rosalind Franklin (*b*) Maurice Wilkins
(*c*) Erwin Chargaff (*d*) Meselson and Stahl

24. At what stage does chromatin become further coiled and condensed?
(*a*) Prophase (*b*) Telophase
(*c*) Anaphase (*d*) Metaphase

25. Match the List-I with List-II

	List-I		List-II
A.	Erwin Chargaff	(i)	Double helix model
B.	Wilkins & Franklin	(ii)	A + G = T + C
C.	Watson & Crick	(iii)	X-ray diffraction
D.	Crick	(iv)	Central dogma

(*a*) A-(ii), B-(iii), C-(i), D-(iv)
(*b*) A-(i), B-(iii), C-(iv), D-(ii)
(*c*) A-(ii), B-(i), C-(iii), D-(iv)
(*d*) A-(iii), B-(ii), C-(i), D-(iv)

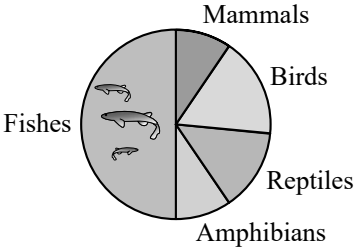
26. Total amount of A and T in DNA is 45%. Amount of guanine will be
(*a*) 22.5% (*b*) 55% (*c*) 45% (*d*) 27.5%

27. In RNA, the additional –OH group is present at _____ of the ribose.
(*a*) 5′ position (*b*) 2′ position
(*c*) 3′ position (*d*) 1′ position

28. Arrange the sequence of crosses needed to achieve a genotype and phenotype ratio of 1:2:1 in F_2 of Snapdragon flowers exhibiting incomplete dominance:

Explanations

1. (*c*) Mammals are depicted as having the smallest proportion of species among the vertebrates, followed by amphibians, reptiles, birds, and fishes. This order represents their increasing biodiversity, with fishes having the largest proportion among the vertebrate groups as shown in the following pie chart:



2. (*a*) The movement of an organism or plant in response to a chemical stimulation is known as chemotropic. The development of the pollen tube towards the embryo sac exemplifies this

3. (*c*) A-(iii), B-(i), C-(iv), D-(ii).

4. (*a*) Pollen exine has prominent apertures called germ pores where sporopollenin is absent.

5. (*a*) Primitive atmosphere was reducing in nature and does not contain free oxygen at all. Since hydrogen atoms to form water leaving no free oxygen.

6. (*a*) Funicle is the point where ovules are attached to the placenta.

7. (*d*) Microsporogenesis is the formation of microspores from a pollen mother cell (PMC) through meiosis. The pollen grains represent the male gametophytes.

8. (*c*) In *Commelina*, both types of flowers i.e., chasmogamous (open flower) and cleistogamous (closed flowers) are found.

9. (*a*) Bulbourethral gland helps in the lubrication of penis.

10. (*c*) Prostate gland is present below the seminal vesicle and above the bulbourethral glands.

11. (*c*) Preformed antibodies can be injected to provide immediate immunity. This is known as passive immunity, where the antibodies are ready to act against the pathogen without waiting for the body's immune system to produce them.

12. (*a*) The primary follicle is formed when each primary oocyte is encircled by a layer of granulosa cells. During the period from infancy to puberty, many of these follicles degenerates. As a result, each ovary only contains 60,000–80,000 primary follicles at puberty.

13. (*d*) Introduction of sex education in schools should be encouraged to provide right information to the young so as to discourage children from believing in myths and having misconceptions about sex-related aspects.

14. (*d*) Intrauterine device (IUD) is one of the most widely accepted methods of contraception in India.

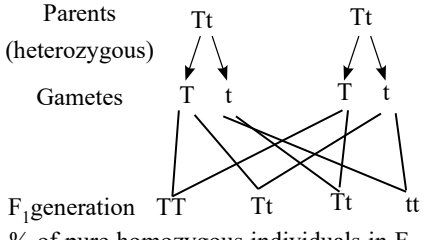
15. (*d*) Progestasert is a hormone-releasing IUD.

16. (*b*) MTPs are considered relatively safe during the first trimester, i.e., upto 12 weeks of pregnancy.

17. (*d*) Only 10% of energy is moved from one trophic level to another, according to a law put forward by Lindeman, and 90% of that energy is lost during the processes of transfer, respiration, and digestion. As a result, if plants (located at the producers level) create 100 units of energy, 10 units of that energy will be transferred to primary consumers.

18. (*d*) The flower color inheritance in dog flower (snapdragon or *Antirrhinum* sp.) is a good example of incomplete dominance.

19. (*b*)



% of pure homozygous individuals in F_1 is 50%.

20. (*c*) Morphine can be used as a pain killer. It is not used for the treatment of patients dealing with depression.

21. (*a*) Breeding an organism of unknown genotype with a recessive homozygote is called a test cross.

22. (*c*) More than two alternate forms of gene present on the same locus are called multiple alleles.

23. (*d*) Meselson and Stahl conducted their famous experiment on DNA replication in 1958, which was after the initial proposal of the double helix structure of DNA by Watson and Crick in 1953, based on the contributions from Chargaff, Franklin, and Wilkins.

24. (*d*) In order to form chromosomes, the chromatin fibers are coiled and condensed at metaphase stage.

25. (*a*) A-(ii), B-(iii), C-(i), D-(iv)

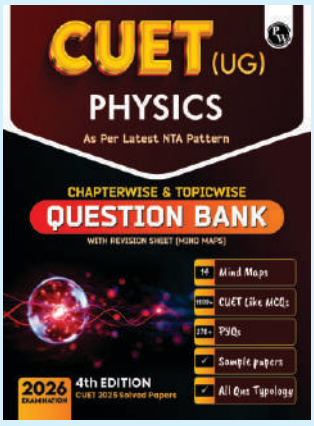
26. (*d*) A + T = 45%
G + C = 100 – 45 = 55%
G = 55/2 = 27.5%

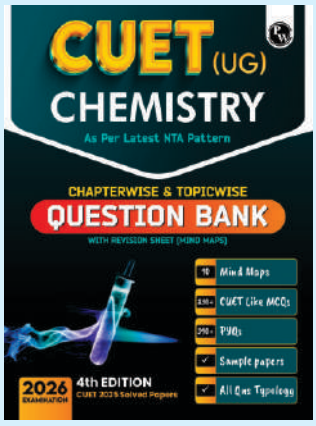
27. (*b*) In RNA, every nucleotide residue has an additional –OH group present at 2′–position in the ribose.

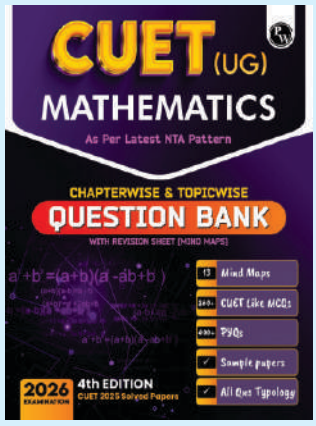
28. (*b*) To achieve a 1:2:1 ratio of phenotypes for red, pink, and white flowers in Snapdragon plants, start by crossing RR (red-flowered plants) with rr (white-flowered plants). This initial cross (RR x rr) will produce all Rr offspring, which are pink due to incomplete dominance. In the next step, cross these Rr (pink) offspring with each other (Rr x Rr). The resulting generation from this cross will display the genotype and phenotype ratios of 1 RR (red): 2 Rr (pink): 1 rr (white).

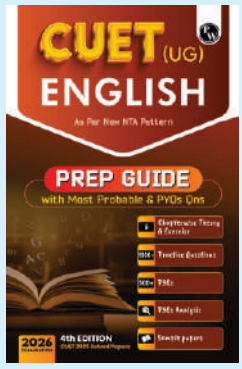
29. (*a*) Mutualism: Both species benefit.
Amensalism: One species is harmed while the other is unaffected (neutral effect).
Commensalism: One species benefits while the other is unaffected (neutral effect).
Parasitism: One species benefits while the other is harmed.

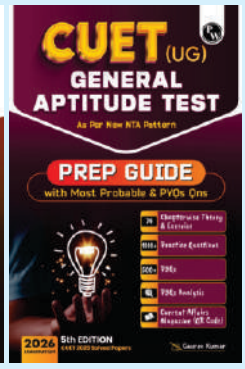
Complete Your Preparation

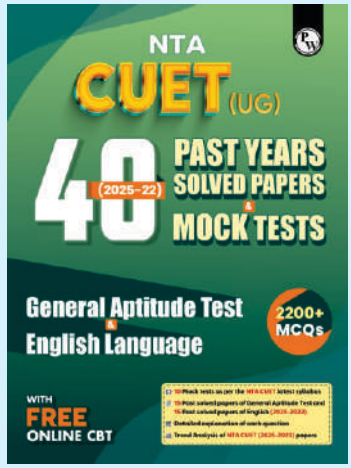












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