45 YEARS of Life Science book publishing
Saras for Science and Biology guide books

12th std

SARAS

BASED ON TAMILNADU STATE BOARD SYLLABUS

BOTANY

PURE SCIENCE - LONG VERSION

N.Arumugam
P.Senthil Kumar

Only Book having Objective Questions framed line by line from the Text Book

This package contains 4 Books

1. Botany (Additional topics)
2. Bio-Botany (Common Topics)
3. Question Bank Book
4. Short Answer Book

Solved Book back Questions
Solved Additional Questions
Government Exam Question Papers

This Package Contains 22 Practice Question Papers

Question Bank Book

Unit Test Question Papers - Chapterwise
Assessment Test Question Papers - 4
PTA Question Papers - 6

Short Answer Book

Definitions
Differences
Discoveries
Diagrams
Do You Know Questions
Days of Importance
Abbreviations
Flow charts
Laws and theories

SaraS 45 Years in Life Science Book Publishing. Since 1974

Botany

Pure Science - Long Version

Edited by
Dr., Capt. N. Arumugam

Designed by
P. Senthil Kumar

12

Only Book having Objective Questions framed line by line from the Text Book

Solved Book back Questions
Solved Additional Questions
Government Exam Question Papers

SAMPLE PAGES

This package contains 4 books
1 . Botany (Additional topics)
2. Bio Botany (Common Topics)
3. Question Bank Book
4. Short Answer Book

Question Bank book
Unit Test Question Papers - Chapterwise
Assessment Test Question Papers - 4
PTA Question Papers - 6

Short Answer book
Definitions
Differences
Discoveries
Do you know questions
Days of Importance
Abbreviations
Laws and Theories

SARAS PUBLICATION
114/35G, A.R.P. Camp Road, Periavilai, Kottar P.O.,
NAGERCOIL, Kanyakumari Dist. - 629 002. Tamil Nadu
Website : www.saraspublication.com
E-mail: info@saraspublication.com
Telephone: 04652 - 265026, 265099; Cell: 098421 23441.

12th Botany - Line by Line Solved Questions

Copyright Publisher
Published by Saras Publication, Nagercoil.
Printed by Saras Offset Printers, 1337/5, Sattur Road, Sivakasi - 626 189
Cell: 09842323441, **E-mail:**print@sarasprinter.in
45 years in Life Science Book publishing. Since 1974
First Edition : 2020

Price : Rs. 370/-

Botany - 102 Pages
Bio Botany - 392 Pages
Supplement Book 1 - 56 Pages
Supplement Book 2 - 80 Pages

Published by

SARAS PUBLICATION

114/35G, A.R.P. Camp Road, Periavilai,
Kottar P.O., Nagercoil,
Kanyakumari Dist -629 002.
Telephone : 04652 265026, 265099
Cell phone : 09842123441
Shop online : www.saraspublication.com
E-mail : info@saraspublication.com

Authors	Chapters
K. Kamala Sree M.Sc., M.Phil., B.Ed.	- 1, 4, 5, 9, 10
R. Jeya Saroj Bagya Rose M.Sc., M.Phil., B.Ed.,PGDMM	- 2
M.V. Deepa M.Sc., PGDIW & WWT., PGDCR., DMLT.	- 3, 8
S. Angel Suby M.Sc., BLS., PGDCA.	- 6, 7

Contents

Instruction to students

Botany and Bio-Botany have the same syllabus except some additional topics for botany. The additional topics for Botany are given in this book and the common topics are given in Bio-Botany book.

Our Titles for 10th 11th and 12th Standard

1. 10th Science - Line by line Solved Questions
2. 10th அறிவியல் - வரி வரி வினா விடைகள்
3. 10th Science - Spark Notes - Low Price Edition
4. 10th அறிவியல் - ஸ்பார்க் நோட்ஸ் - Low Price Edition
5. 10th Science - 1 Mark solved Questions - 2900
6. 10th அறிவியல் - 1 மதிப்பெண் வினா - விடைகள் - 2900
7. 10th Science - 12 Model Question Papers
8. 10th அறிவியல் - 12 மாதிரி வினாத்தாள்கள்
9. 11th Bio-Botany Vol 1 and 2 - Line by Line Solved Questions
10. 11th Bio-Zoology Vol 1 and 2 - Line by Line Solved Questions
11. 11th உயிரி-தாவரவியல் Vol 1 and 2 - வரி வரி வினா விடைகள்
12. 11th உயிரி-விலங்கியல் Vol 1 and 2 - வரி வரி வினா விடைகள்
13. 11th Bio-Botany Vol 1 and 2 - Spark Notes - Low Price Edition
14. 11th Bio-Zoology Vol 1 and 2 - Spark Notes - Low Price Edition
15. 11th உயிரி-தாவரவியல் Vol 1 and 2 - Spark Notes - Low Price Edition
16. 11th உயிரி-விலங்கியல் Vol 1 and 2 - Spark Notes - Low Price Edition
17. 12th Bio-Botany Line by Line Solved Questions
18. 12th Bio-Zoology Line by Line Solved Questions
19. 12th உயிரி-தாவரவியல் வரி வரி வினா விடைகள்
20. 12th உயிரி-விலங்கியல் வரி வரி வினா விடைகள்
21. 12th Bio-Botany - Spark Notes - Low Price Edition
22. 12th Bio-Zoology - Spark Notes - Low Price Edition
23. 12th உயிரி-தாவரவியல் - ஸ்பார்க் நோட்ஸ் - Low Price Edition
24. 12th உயிரி-விலங்கியல் - ஸ்பார்க் நோட்ஸ் - Low Price Edition
25. 12th Bio-Botany - 1 Mark solved Questions
26. 12th உயிரி-தாவரவியல் - 1 மதிப்பெண் வினா - விடைகள்
27. 12th Bio-Zoology - 1 Mark solved Questions
28. 12th உயிரி-விலங்கியல் - 1 மதிப்பெண் வினா - விடைகள்
29. 12th Biology - 12 Model Question Papers
30. 12th உயிரியல் - 12 மாதிரி வினாத்தாள்கள்
31. 12th Botany - Pure Science - Long Version
32. 12th Zoology - Pure Science - Long Version
33. 12th CBSE / NCERT Biology
34. 10th CBSE / NCERT Science
35. NEET - General Book - Physics, Chemistry, Biology
36. NEET - Biology
37. NEET - Physics
38. NEET - Chemistry

1 Asexual and Sexual Reproduction in Plants

Book Back Solved Questions - 1 Mark

I. Choose the Correct Answers

1. The correct order of haploid, diploid and triploid structure in fertilized embryo sac is
a) synergid, zygote and PEN
b) synergid, antipodal and polar nuclei
c) antipodal, synergid and PEN
d) synergid, polar nuclei and zygote

2. Ruminate endosperm is found in
a) *Cocos* b) *Areca*
c) *Vallisneria* d) *Arachis*

3. Caruncle develops from
a) funicle b) nucellus
c) integument d) embryo sac

Book Back Solved Questions - 2 Marks

1. How do *Dioscorea* reproduce vegetatively?

Dioscorea reproduce by forming **axillary bulbils.**

2. Name the cell which divides to form male nuclei.

Generative cell formed from **pollen grain** divides to form male nuclei.

3. Give examples for helobial endosperm.

- *Hydrilla*
- *Vallisneria*

Book Back Solved Questions - 3 Marks

1. Write short notes on approach grafting.

1. In this method of grafting, both **scion** and **stock** remain **rooted.**
2. The **stock** is grown in a pot.
3. It is brought close to the **scion**, grown in the soil.
4. The **thickness** of stock and scion should be the **same.**
5. A small **slice** is cut from both.
6. The cut surfaces are **brought near** and **tied together.**
7. They are **held together** by a tape.
8. After **1-4 weeks**, the **tip** of the stock and **base** of scion are cut off.
9. They are **detached** and **grown** in a separate pot.

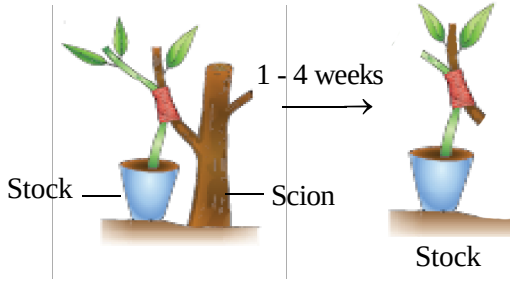


Fig. Approach grafting.

1. a. synergid, zygote and PEN 2. b. *Areca* 3. c. integument

2. The embryo develops at **micropylar** end of embryo sac.

3. The zygote divides by **transverse division** to produce **two cells:**

- **Upper** or **terminal** cell
- **Lower** or **basal** cell.

4. The **basal cell** divides **transversely.**

5. The **terminal cell** divides **vertically.** This division is at **right angle** to the first one.

6. They produce a four celled **proembryo.**

7. A second vertical division, right angle to the first one, takes place in terminal cells, to form a four celled ***quadrant.***

8. **Transverse division** takes place in the **quadrant.**

9. It results in ***eight celled*** stage called ***octant.***

10. In the ***octant***, the cells are arranged in ***two tiers*** of ***four cell*** each.

11. ***Upper tier*** of four cells of the octant is called ***epibasal*** or ***anterior octant.***

12. The **lower tier** of four cells constitute **hypobasal** or **posterior octant.**

13. A **periclinal division** in the octant results in the formation of **16 celled stage. 8 cells** are in the **outer** and **eight** in the **inner.**

14. The **outer eight cells** represent **dermatogen.** They undergo **anticlinal** division to produce **epidermis.**

15. The **inner eight** cells divide by **vertical** and **transverse** division. They form outer layer of **periblem.** Periblem gives rise to **cortex** and **pleurome**, the central region.

16. **Pleurome** forms **stele.**

17. During development, **two cells** of the **basal cell** undergo several **transverse divisions.**

18. This results in **six** to **ten** celled **suspensor.**

19. The **embryo** at this stage is called **globular** embryo.

20. The **suspensor** helps to push the **embryo** deep into the **endosperm.**

21. **Uppermost** cell of the **suspensor** enlarges to form a **haustorium.**

22. **Lowermost** cell of the suspensor is called the **hypophysis.**

23. A **transverse division** and two **vertical divisions** occur at right angle to each other on the **hypophysis.**

24. This results in the formation of **eight cells.**

25. These eight cells are arranged in **two tiers** of **four cells** each.

26. The **upper tier** gives rise to **root cap** and **epidermis.**

27. At this stage, **embryo proper** becomes **heart shaped.**

28. Cell divisions in the **hypocotyl** and **cotyledon** regions of the embryo proper result in **elongation.**

29. Further development results in **curved, horse-shoe shaped embryo** in the embryo sac.

30. The mature embryo has:

- *A radicle*
- *Two cotyledons*
- *A plumule*

9. **Filamentous** or **thread** like structure arises from each pollinium. It is called **retinaculum.**

10. The **whole pollinium** with **corpusculum** and **retinaculum** looks like an **inverted 'Y'.** It is called **translator.**

11. When an insect sits on the flower for **nectar**, the **translator** gets attached to its **proboscis** or leg.

12. When the insect visits the next flower, the **pollinia** come in contact with the **receptive stigma.** Thus pollination occurs.

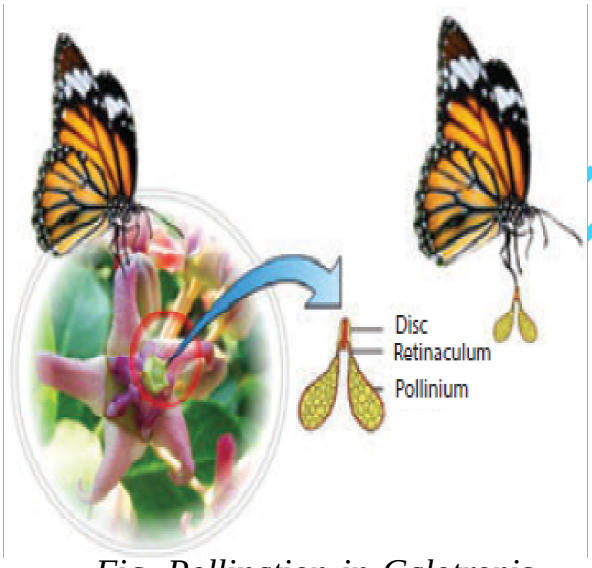


Fig. Pollination in Calotropis- Translator mechanism.

3. Explain the type of pollination in *Aristolochia.*

1. Pollination in *Aristolochia* occurs by **trap mechanism.**

2. The **flowers** are **axillary**; **perianth** is **tubular** with a hood at the top.

3. Basal region is **swollen**. It possesses **gynostegium.**

4. Gynostegium has **six anthers.**

5. **Inner wall** of the tubular middle part of the **perianth** is **slippery.**

6. The inner wall is lined with **stiff** hairs, which are **pointed downwards.**

7. Young flowers are **erect.**

8. When the flowers are **young,** small flies enter.

9. They **cannot escape** as they are trapped by the **hairs.**

10. When the **anthers** of the flower **ripe, hairs wither** and **flowers** bent down.

11. The flies escape with **pollen.**

12. When they enter **another flower,** they dust the **pollens** on the **stigma.**

13. This brings out **pollination.**

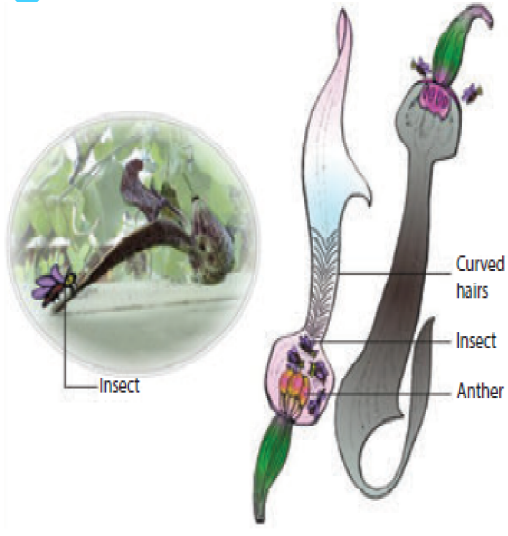


Fig. Pollination in Aristolochia- Trap mechanism.

4. How many cells are present in the pro-embryo? What are they?

Number of Cells in the Pro-embryo	
4 cells	

3 Chromosomal Basis of Inheritance

Book Back Solved Questions - 1 Mark

I. Choose the Correct Answers

1. Which one of the following pairs of codons is correctly matched with their function or the signal for the particular amino acid?

a) UUA, UCA - Leucine
b) GUU, GCU -Alanine
c) UAG, UGA - Stop
d) AUG, ACG - Start / Methionine

2. Removal of introns and joining of exons in a defined order during transcription is called

a) Splicing b) Looping
c) Inducing d) Slicing

3. If one strand of DNA has the nitrogenous base sequence as ATCTG, what would be the complementary RNA strand sequence?

a) ATCGU b) TTAGU
c) UAGAC d) AACTG

4. Removal of RNA polymerase III nucleoplasm will affect the synthesis of

a) rRNA b) tRNA
c) hnRNA d) mRNA

5. DNA dependent RNA polymerase catalyzes transcription on one strand of the DNA which is called the

a) Alpha strand b) Anti strand
c) Template strand d) Coding strand

6. Which of the following correctly represents the flow of genetic information?

a) DNA → RNA → Protein
b) RNA → DNA → Protein
c) RNA → Protein → DNA
d) Protein → RNA → DNA

7. Initiation codon is

a) UUU b) UGA
c) AUG d) UAG

8. A eukaryotic gene contains two kinds of base sequences, which of these play an important role in protein synthesis?

a) Introns b)Exons
c) Both a and b d) None of the above

9. Codon - anticodon interactions occur by

a) Covalent bond
b) Electrostatic interactions
c) Hydrogen bonds
d) Hydrophobic interaction

1.c) UAG, UGA - Stop 2. a) Splicing 3. c) UAGAC 4. b) tRNA
5. c) Template strand 6. a) DNA → RNA → Protein 7. c) AUG 8. c) Both a and b
9. c) Hydrogen bonds

2. They are also known as
   - ***Jumping*** *genes (or)*
   - ***Hopping*** *genes (or)*
   - ***Mobile controlling elements*** *by Barbara McClintock (or)*
   - ***Transposable elements*** *by Alexander Brink*

3. They were first reported in **1948** by American Geneticist, **Barbara McClintock** in **Maize.**

4. She gave the **first** direct experimental evidence that genomes are **not static.**

5. She found that genomes are **highly plastic entities.**

6. She noted **unstable inheritance** of the **mosaic pattern** of **blue, brown** and **red spots** in **maize kernels.**

7. **Two types** of transposons were found in maize plant genome. They were:
   - *Ac - Activator*
   - *Ds - Dissociation*

8. The activity of **Ac element** was **very distinct** in maize plant.

9. **Transposition** in **somatic cells** resulted in the changes in **gene expression.**

10. This resulted in **differential production** of **vacuolar anthocyanin.**

11. This led to **variegated pigmentation** in **maize Kernels.**

5. Explain ribosomal translocation in protein synthesis.

- *The movement of* ***tRNA*** *from* ***A-site*** *of* ***ribosome*** *to P-site is called translocation.*
- It requires the **hydrolysis** of **GTP.**
- The **tRNA** carrying **methionine** attaches itself to the **P-site** of the ribosome.
- The **anticodon** of tRNA base pairs with the **first codon** of mRNA.
- The **second tRNA** carrying **alanine** attaches with the **A-site** of the ribosome.
- It base pairs with the second codon of mRNA.
- Amino acids, **methionine** and **alanine** are close enough. A **peptide bond** is formed between them.
- When the bond between first t-RNA and methionine breaks, the **first tRNA** leaves the ***P-site.***
- The **P-site** is **vacant.**
- The **ribosome** moves along the mRNA strand for one codon.
- As the second tRNA is base-paired with mRNA, it is transferred to **P-site** from A-site.
- Now the **A-site** is vacant.

The **third** t-RNA fills the **A-site.**

A peptide bond is formed between **alanine** and **serine** (third mRNA).

mRNA moves through the ribosome by **one codon** (three bases).

This expels the second tRNA from **P-site.**

23. Identify the correct statement related to transcription.

a) Transcription occurs in 3'→ 5' direction

b) RNA polymerase catalyses the addition of nucleotides at the 5' end of growing RNA chain

c) To start transcription, regulatory elements help the DNA polymerase to recognise core promoter

d) Silencer sequence inhibits or decreases transcription

24. Which enzyme is required for the synthesis of large ribosome RNAs except 5S rRNA?

a) RNA Pol II b) RNA Pol I
c) RNA Pol III d) RNA Pol IV

25. Capping is modification with methylguanosine triphosphate at the 5' end of the .....

a) Primary RNA
b) Heterogenous nuclear RNA
c) mRNA d) tRNA

26. Who discovered split genes, independently?

a) Philips and Jacob
b) Jacob and Roberts
c) Roberts and Phillip
d) Roberts and Richard

27. ..... are non-coding sequences of a gene

a) Introns b) Exons
c) Split genes d) Spliceosomes

28. The process of removing out introns from and knitting of exons in the pre-mRNA is called .....

a) RNA editing b) Capping
c) Alternate splicing
d) RNA splicing

29. Which enzyme is used in the removal of introns by the spliceosomes?

a) Restrictase
b) Terminal transferase
c) Ribozyme
d) Aminoacylase

30. Out of 64 codons, how many codons code for amino acids

a) 60 b) 61
c) 62 d) 63

31. Identify the start codon

a) UAG b) UAA
c) AUG d) AGU

32. Which codon does not code for termination codon?

a) UAA b) UAG
c) UGA d) UUA

33. Identify the wrong statement

a) Codons in the mRNA are read in 5'→ 3' direction

b) Anticodons of the tRNA are oriented in the 3'→ 5' direction

c) Transcription occurs in the 5'→ 3'

23. d) Silencer sequence inhibits or decreases transcription 24. b) RNA Pol I 25. a) Primary RNA 26. c) Roberts and Phillip 27. a) Introns 28. d) RNA splicing 29. c) Ribozyme 30. b) 61 31. c) AUG 32. d) UUA 33. d) The ribosome moves from codon to codon along the mRNA in the 3'→ 5' direction

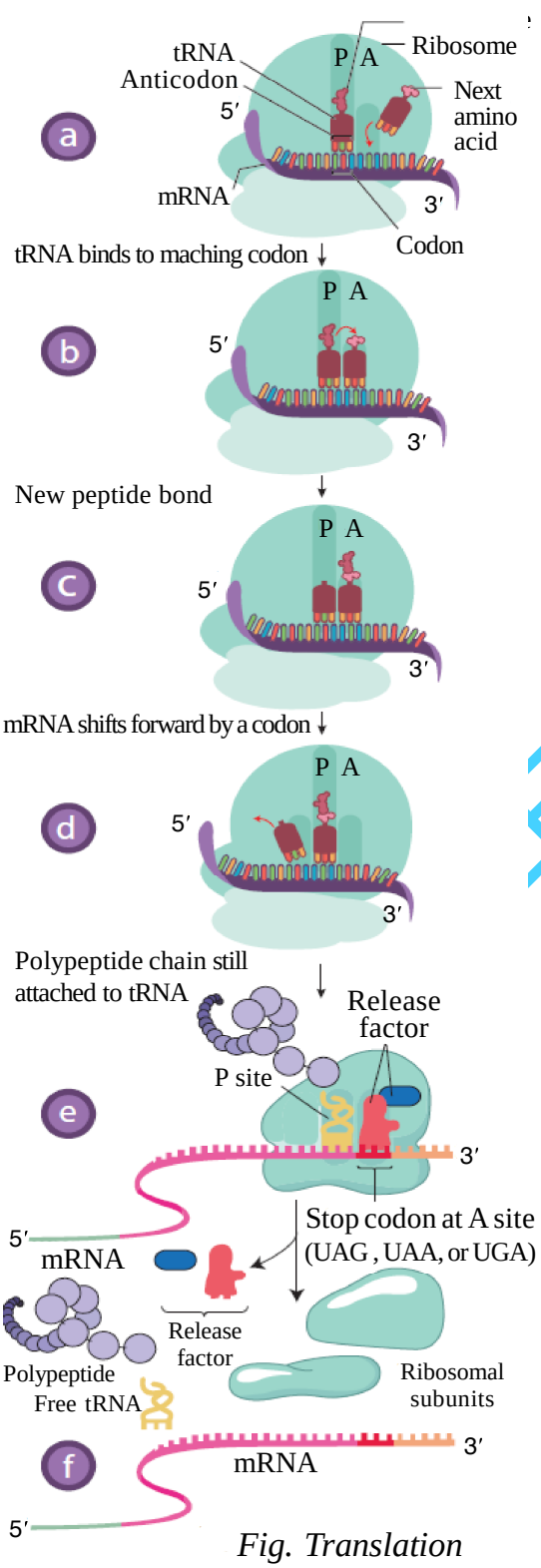


Fig. Translation

fills the **A-site.**

17. A **peptide bond** is formed between **alanine** and **serine.**

18. **Ribozyme-peptidyl transferase** in the ribosome catalyses the formation of **peptide bond. Amino acids** are added to the growing **polypeptide chain.**

19. Ribosome moves from codon to codon along, the mRNA in the 5' → 3' direction.

20. This expels **deacylated uncharged tRNA** from **P-site.**

21. This moves **second peptidyl tRNA** into the **P-site. A-site** becomes vacant.

22. Movement of tRNA from **A-site** to **P-site** is called **translocation.** It requires the **hydrolysis** of **GTP.**

23. tRNA translates the codons.

24. Amino acids are added one by one as dictated by mRNA.

5. Explain termination step of polypeptide synthesis in eukaryotes.

1. *Termination is the **completion** or **end** of polypeptide synthesis.*

2. When the ribosome reaches the **stop codon, protein synthesis** comes to an end.

3. Stop codon does not code an amino acid.

4. Eukaryotes have **cytosolic proteins,** called **release factors.**

5. Release factors recognise the **ter-**

4 Principles and Processes of Biotechnology

Additional Solved Questions - 1 Mark

1. The term biotechnology was coined by

a) Louis Pasteur b) Karl Ereky
c) Operon d) Alwin

2. Which of the following is wrongly matched.

a) Immunology - Study of body's defence mechanism
b) Microbiology - Study of microbes
c) Biochemistry - Study of chemicals
d) Biophysics - Application of physical principles and methods to biological problems

3. Which of the following is correctly matched

a) 1770 - Basis of alcoholic fermentation
b) 1919- First viral vaccine
c) 1928-Human genome project
d) 2001- First plant genome

4. Match the following and select the correct option.

i) Edward Jenner - A. Invertase
ii) Gerardus and Jons - B.Role of microorganims in fermentation
iii) Ernst Hoppe, Seyler - C. First viral vaccine
iv) Louis Pasteur - D. Protein

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

5. Penicillin was discovered by

a) Sir Robert
b) Watson and Crick
c) Herbert Boyer
d) Alexander Fleming

1. b) Karl Ereky 2. c) Biochemistry - Study of chemicals 3. a) 1770 - Basis of alcoholic fermentation 4. a) i-C, ii-D, iii-A, iv-B 5. d) Alexander Fleming

34. The first monoclonal antibody is produced by
a) Watson and Crick
b) Kohler and Milstein
c) Robert and Herbert
d) George and Edward

35. When were biolistic transformation first developed?
a) 1987 b) 1988
c) 1989 d) 1990

36. The first genetically modified food is
a) Golden rice
b) Bt potato
c) Flavr Savr tomato
d) Golden wheat

37. The first transgenic sheep is
a) Billy b) Lambert
c) Dolly d) Glory

38. PCR was developed by
a) Sir Robert G. Edward
b) Kary B.Mullis
c) Arber
d) Sanger

39. Sir Robert G. Edwards developed
a) Invitro fertilization in animal
b) Invivo fertilization in animal
c) Invitro fertilization in plant
d) Invivo fertilization in animal

40. James Allison and TasukuHonjo discovered a
a) Enzyme found in immune cells
b) Lipid found in immune cells
c) Protein found in immune cells
d) Minerals found in immune cells

41. Match the following and select the correct sequence

i) 1973	-	A. U.S. approved humulin
ii) 1976	-	B. First yeast chromosome was sequenced
iii) 1982	-	C. r-DNA technology
iv) 1992	-	D. DNA sequence techniques

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

42. What protein is associated with CRISPR genome editing?
a) Cas 3 b) Cas 9
c) Cpr 3 d) Cpr 9

43. DMH-11 is a
a) Transgenic brinjal
b) Transgenic rice
c) Transgenic tomato
d) Transgenic mustard

34. b) Kohler and Milstein. 35. a) 1987 36. c) Flavr Savr tomato. 37. c) Dolly. 38. b) Kary B.Mullis. 39. a) Invitro fertilization in animal 40. c) Protein found in immune cells. 41. a) i - C, ii - D, iii - A, iv - B. 42. b) Cas 9. 43. d) Transgenic mustard

7 Ecosystem

Book Back Solved Questions - 2 Marks

18. Write some plants found in sub-Alpine forest.

- *Abies*
- *Pinus*
- *Betula*
- *Epiphytic orchids*
- *Lichens*
- *Quercus*
- *Salix*
- *Rhododendron*
- *Moss*

Additional Solved Questions - 1 Mark

1. Ecological succession is a ------- process
a) Primary b) Secondary
c) Complex d) Organic

2. Grasslands created and maintained by human are called
a) Low altitude grassland
b) Anthropogenic grassland
c) Higher altitude grassland
d) Alpine grassland

3. This type of vegetation is found in lakes, ponds, puddles and marshy places.
a) Aquatic vegetation
b) Riparian vegetation
c) Grassland vegetation
d) None of the above

4. How many types of causes are responsible for any ecological succession?
a) 2 b) 3 c) 5 d) 4

5. Which factor controls the stabilization of the plant community in an area
a) Competition between organisms
b) Migration
c) Climatic factors
d) Invasion

6. Champion and Seth in 1968 categorized ---------- types of forest in India.
a) 16 b) 8 c) 9 d) 15

7. Champion and Seth in 1968 categorized ------ types of forests in Tamil Nadu.
a) 16 b) 9 c) 19 d) 18

8. How many geographic zones are there in India?
a) 15 b) 10 c) 8 d) 9

9. The final establishment of plant community is called ----------
a) Aggregation b) Competition
c) Invasion d) Stabilization

10. Development of a barren area with-

1. c) Complex 2. b) Anthropogenic grassland 3. a) Aquatic vegetation
4. b) 3 5. c) Climatic factors 6. a) 16 7. b) 9 8. b) 10 9. d) Stabilization

The plant community which maintains itself in **equilibrium** with **climax** of the area and **not replaced** by others is known as climax community.

10. What is stabilization?

The **final establishment** of **plant community** is called stabilization.

11. What is lithosere?

Lithosere is a type of **xerosere.**

It is a plant succession that begins **life** on a **barren rock surface.**

It is also known as **climax stage.**

12. What are the continuing causes of ecological succession?

- Continuing causes are processes responsible for **changes** in **plant community** and **nature of soil** in an area.
- Processes include:
  - *Migration*
  - *Aggregation*
  - *Competition*
  - *Reaction, etc.*

13. What are the initiating causes of ecological succession?

- Initiating causes are activities that lead to the **formation** of a **barren area** or the **destruction** of **existing community** of an area.
- The activities include **abiotic** and **biotic** factors:

1. Abiotic factors include
   - *Light*
   - *Temperature*
   - *Water*
   - *Fire*
   - *Soil erosion*
   - *Wind*

2. Biotic factors include
   - Competition among organisms-Such causes initiate **primary** or **secondary succession.**

14. What are the stabilizing causes of ecological succession?

Stabilizing causes are those which bring **stability** of the **plant community** in an area.

This stabilization is **primarily** brought about by **climatic factors.**

15. Define migration in the context of primary autotrophic succession?

It is the process by which a species **invade** or **reach** a **barren area** from any other area.

It is also known as **invasion.**

Seeds, spores or other **propagules** of **plant species** reach barren area, by **air, water** and various other **agents.**

16. Define aggregation.

It is the **successful establishment** of a species, following **reproduction** and **increase** in population than in the **earlier stage.**

17. What is seral community?

The community **replaced** by **another community** is called the seral community.

18. List the stages of lithosere succession.

1. Crustose lichen stage
2. Foliose lichen stage
3. Moss stage
4. Herb stage
5. Shrub stage
7. Forest stage

19. List the types of forests in India?

increasing **altitudes.**

4. **Small sized plants** are common in these forests, that include:

- *Sedum*
- *Primula*
- *Juniperus*
- *Saxifraga*
- *Rhododendron*

5. These forests are further classified into **two** types, namely:

- *Moist alpine scrubs*
- *Dry alpine scrubs*

17. What is Grassland vegetation? Write about it in detail.

Grassland Vegetation

- Grassland refers to the **vegetation community**, predominated by **graminoids.**
- Graminoids include **grass** and **grass** like plants.
- Grasslands are found in the **altitude**, ranging from **150** to **2000m** and above **mean sea level.**
- They comprise **plants** and a variety of **micro** and **macro fauna.**
- Major **plant families** found are the following:
  - *Poaceae*
  - *Cyperaceae*
  - *Fabaceae*
  - *Gentianaceae*
  - *Asteraceae*
- Based on the range of **altitude**, grasslands are categorised into **two** types, namely:
  1. *Low altitude grasslands*
  2. *High altitude grasslands*

18. Explain briefly about low altitude grasslands.

1. These type of grasslands are found at an altitude **up to 1000m.**
2. They are spread over the following places:
   - *Coastal areas*
   - *Riverline and alluvial areas of Deccan Plateau*
   - *Chota Nagpur Plateau*
   - *Gangetics*
   - *Brahmaputra Valley*
   - *Eastern Ghats*
3. In **Tamil Nadu**, these grasslands are found in the **Eastern Ghats.**
4. These grasslands are **scattered** and **intermixed** with **local forests.**
5. They are exposed to considerable **biotic interference.**
6. **Fires** occur commonly during **dry months.**
7. Common plant species include:
   - *Halopyrum*
   - *Arundinella*
   - *Chrysopogon*
   - *Wild Saccharum*
   - *Heteropogon*

19. Describe higher altitude grasslands.

type of **littoral** and **swamp forests.**

2. They are found in ***low lying land areas.***

3. ***Rain*** or ***river water*** gets collected in these areas for some time.

4. ***Water table*** is close to the ***earth surface.***

5. These forests are found in the **wetlands** of the following places in **Tamil Nadu.**

- *Kanchipurum*
- *Kanyakumari*

6. Common plants found are:

- *Salix*
- *Acer*
- *Ficus*
- *Grasses*
- *Sedges*

3. Which forests are found in altitudes between 1000 and 2000m. Describe them. Give its classification.

Montane Subtropical Forests

1. These forests are found in areas with **fairy high rainfall.**

2. Climate is **cooler** than the **tropical** forests.

3. Climate is **warmer** than the **temperate** forests.

4. These forests are found in the **altitude** between **1000m** and **2000m.**

5. They are found in the following **places:**

- *Nilgiri*
- *Mahabaleswar*
- *Assam*
- *Manipur*

6. In **Eastern Ghats**, it is found in the **upper slopes** and **plateaus** of:

- *Shervaroys*
- *Kollimalai*
- *Pachamalai*

7. Common **plants** found are:

- *Eugenia*
- *Syzygium*
- *Toona*

They are mostly **evergreen.**

8. **Epiphytes** including **orchids** and **ferns** are also present.

Classification

Montane subtropical forests are classified into **three** types, namely:

1. Sub-tropical broad leaved hill forests

2. Sub-tropical pine forests

3. Sub-tropical dry evergreen forests

1. Sub-tropical Broad Leaved Hill Forests

They are found in places like:

- *Tamil Nadu*
- *Kerala*
- *Karnataka*
- *Assam*

2. Sub-tropical Pine Forests

They are found in places like:

- *Punjab*
- *Uttar Pradesh*
- *Sikkim*

2. Sub-tropical Dry Evergreen Forests

They are found in places like:

- *Shivaliks*
- *Foot hills of Western Himalayas*

4. What is the forest found in Himalayas? Describe it.

Montane Temperate Forests

- They are also called **mountain wet temperate forests.**
- They are found in the **mountains** of **Himalayas.**

8 Environmental Issues

Book Back Solved Questions - 1 Mark

1. The lake which was built in British era and is near the Indian Army base

a) Veeranam lake

b) Maduranthagam lake

c) Sholavaram lake

d) Chembrambakkam lake

2. The invasive species introduced in India from Philippines

a) Lantana b) Prosopis

c) Parthenium d) Kappaphycus

3. Cash crops like sesame and pearl millet are inhibited by the invasive plant.

a) Kappaphycus b) Parthenium

c) Lantana d) Prosopis

4. IUCN red list categories has developed criteria for threatened species. The criteria 'c' refers to

a) Geographic range

b) Quantitative analysis

c) Small population size and decline

d) Population reduction

Book Back Solved Questions - 2 Marks

18. What are agrochemicals?

- These are **chemicals** used for **crops.**
- They include the following:
  - *Fertilizers*
  - *Liming and acidifying agents*
  - *Soil conditioners*
  - *Pesticides*
  - *Chemicals used in animal husbandry.*

Book Back Solved Questions - 3 Marks

1. Distinguish between endangered, vulnerable and rare species.

Endangered species	Vulnerable species	Rare species
1. It meets any of the criteria **A to E** for **endangered.** 2. It faces **very high risk** of **extinction** in the wild.	1. It meets any of the criteria **A to E** for **vulnerable.** 2. It faces **high risk** of extinction in the wild.	1. It is **lesscr** in number and it is not **endangered** or **vulnerable** at present. 2. It is at **risk** of extinction.

1. (c) 2. (d) 3. (b) 4. (c)

6. When is a taxon considered as least concerned?

1. It is **not a critically** endangered species.
2. It is **not an endangered** species.
3. It is **not** a **vulnerable** species.
4. It is **not** a **near threatened** species.
5. It is **widespread.**
6. It is an **abundant taxa.**

7. Write about the lake built during the British era.

Sholavaram lake is built during the British era.

It is located in **Ponneri** Taluk of **Thiruvallur** district.

It is one of the **rain fed reservoirs.**

Water supply to **Chennai** city is drawn from this lake.

Full capacity of this lake is **65.5 feet.**

This lake is used for **water sports.**

This lake has varied species of **flora** and **fauna.**

Additional Solved Questions - 5 Marks

1. (i) What is sewage?

(ii) Where is it treated?

(iii) List the stages.

Sewage

Sewage is **waste water** from homes and **factories.**

It contains large amounts of **organic matter** and **microbes.**

Treatment of Sewage

Sewage is treated in **sewage treatment plants.**

Stages of Treatment

It involves **three** stages

1. *Primary treatment*
2. *Secondary treatment*
3. *Tertiary treatment*

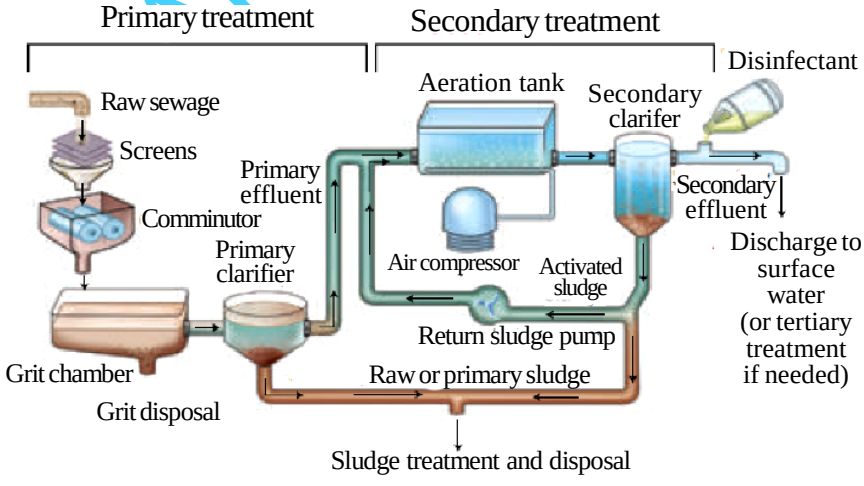


Fig. Flow diagram of Sewage treatment plant process

9 Plant Breeding

Book Back Solved Questions - 2 Marks

1. List the ways by which seeds can be stored for longer duration.

1. Conventional methods of seed storage.
2. Modern methods of seed storage.
   1. Seed storage by cryopreservation
   2. Seed storage in gene bank
   3. Svalbard seed bank

2. Discuss the importance of neem in seed storage.

1. **Neem leaf powder** was used in traditional methods of **seed protection.**
2. Seeds were coated with **neem leaf powder.**
3. The seeds are then stored for **short duration.**

Additional Solved Questions - 1 Mark

1. Sorghum seeds are treated with lime in the proportion of -------- for storage.
a) 2 kg of lime in 5 litres of water
b) 1 kg of lime in 10 litres of water
c) 1 kg of lime in 5 litres of water
d) 2 kg of lime in 10 litres of water

2. Traditional method permits storage of seeds for
a) 5 to 10 years b) Short duration
c) Long duration d) Unlimited period

3. What is used for the storage of paddy seeds?
a) Salt water b) Lime water
c) Citronella leaf oil
d) Castor seed oil

4. Paddy seeds should be dried in shade for ---------- years of storage.
a) 10 days b) 1-2 years
c) 10-20 months d) 5 years

5. Sorghum seeds are treated with ----------for storage.
a) Pongamia leaf extract
b) Cotton seed oil
c) Soya bean oil
d) Lime water

6. For how many days should sorghum seeds be treated with lime water?
a) 10 days b) 20 days
c) 30 days d) 6 months

7. Biological seed treatment is known as
a) Seed hardening
b) Bio-priming of seeds
c) Seed pelleting
d) Seed coating

8. Who classified seeds based on physiological behaviour occurring during storing?

1. b) 1 kg of lime in 10 litres of water 2.b) Short duration 3.a) Salt water
4. b) 1-2 years 5.d) Lime water 6.a) 10 days 7. b) Bio-priming of seeds

- Ewart classified seeds into **three types** in **1908.**
- It was based on the **life span** or **longevity** of seeds.
- The types of seeds are:
  1. *Microbiotic seeds*
  2. *Mesobiotic seeds*
  3. *Macrobiotic seeds*

1. Microbiotic Seeds

The **life span** of these seeds **does not** exceed **3 years.**

2. Mesobiotic Seeds

The life span of these seeds **does not** exceed **3 to 15 years.**

3. Macrobiotic Seeds

The life span of these seeds does not exceed from **15 years** to over **1000 years.**

4. Explain in brief the conventional methods of seed storage?

- Conventional storage includes **storage** of seeds in the following **materials:**
  - *Bamboo structures*
  - *Mud*
  - *Earthern structures*
  - *Wooden structures*
  - *Underground structures*
- In **villages,** storage is done in **large level** in
  - *Concrete/cement silos*
  - *Metal or plastic drums*
  - *Metal silos*
- Improved **rural level storage** includes:
  - *Coal tar drum*
  - *Udaipur bins*
  - *Bamboo bins*
  - *Pusa bins*
  - *Metal bins*

5. Write about the modern method of storage of plant parts that uses liquid nitrogen?

- Seed storage by **cryopreservation** is the modern method.
- This is the method used for the conservation of **germ plasm.**
- The seeds are stored at **ultra-low temperature** in **liquid nitrogen** at **-196°C.**
- It cannot be used for **commercial seed storage.**

6. Write about seed storage in gene bank.

- Seeds are stored under **controlled environmental conditions.**
- The **viability** of the seeds prolong for **long periods** in this method.
- The following **properties** of seeds do not change in this method:
  - *Temperature*
  - *Relative humidity*
  - *Seed moisture content*

7. Which method of seed storage uses ply sealed envelopes? Write in brief about it.

Method of Seed Storage

Svalbard seed bank method uses ply sealed envelopes.

Explanation

- Seeds are stored in **four ply** sealed envelopes.
- They are placed in **plastic tote containers.** They are kept on **metal**

duction of **beverages.**

3. Banana beverages include
   - *Banana juice*
   - *Beer*
   - *Vinegar*
   - *Wine*

3. Write the economic importance of *Lycopersicon esculentum?*

Lycopersicon esculentum is the botanical name of **tomato.**

Economic Importance

1. It is processed into the following for **human consumption:**
   - *Juice*
   - *Ketchup*
   - *Sauce*
   - *Diced fruits*
   - *Puree*
   - *Canned whole*

2. It is used for the preparation of **salads.**

3. It is used as an **ingredient** for different kinds of foods.

4. It is used as **flavouring agent** in **soups** and some **dishes.**

5. It is used for the preparation of **sweet candies,** dried **fruits** and **wine.**

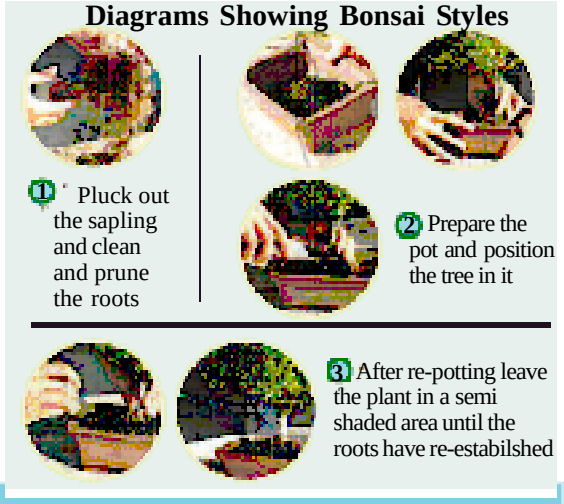
Book Back Solved Questions - 5 Marks

1. What are the advantages of cultivation of aromatic plants?

1. Cultivation of aromatic plants generates **employment** through development of **ancillary industries.**
2. It promotes **foreign exchange earnings** through exports.
3. Aromatic plants are **not damaged** by **animals** or by **birds.**
4. Technologies used are **farmer** and **eco-friendly.**
5. Aromatic plants like **lemongrass** grow well in **full sun,** with **plenty** of **water** and in a **rich, well-draining soil.**
6. They can **thrive well** all through the **year.**
7. **Stem base** and **leaves** can be harvested for **cooking** and as **consumer products.**
8. **Oil** extracted from these plants can be used in
   - *Perfumery*
   - *Cosmetics*
   - *Confectionery*
   - *Beverages*
   - *Mosquito repellents*
   - *Toilet cleaners*

2. How will you make a bonsai tree?

1. Bonsai is a **Japanese art form,** using **miniature trees.**
2. It is grown in **containers.** It mimics the **shape** and **scale** of **full size trees.**
3. To make a bonsai tree, **visualize** the finished product of **bonsai.** Select the **plant species** and **pot** appropriately.
4. Pluck out the **sapling.**
5. **Clean** and **prune** the roots.
6. Prepare the **pot.**



10. Which is the crop introduced into India from East Africa and is rich in calcium?
a) Foxtail millet b) Finger millet
c) Little millet d) Kodo millet

11. Which is the major millet rich in calcium and iron and is native to Africa?
a) *Setaria italica*
b) *Panicum sumatrense*
c) *Sorghum vulgare*
d) *Paspalum scrobiculatum*

12. Which is the oldest millet native to India and is rich in iron and fibre?
a) *Panicum sumatrense*
b) *Eleusine coracana*
c) *Setaria italica*
d) *Sorghum vulgare*

13. Identify the pulse that originated in West Asia and is a prime constituent of many forms of Indian confectionery.
a) Pigeon pea b) Bengal gram
c) Green gram d) Black gram

14. Which state is the World's No.1 banana producer?
a) Tamil Nadu b) Punjab
c) Gujarat d) Maharashtra

15. Which is the nut that helps in promoting HDL?
a) Cashew nut b) Chest nut
c) Brazil nut d) Almond

16. Which is the most popular natural sweetener and a substitute for white sugar?
a) Sugarcane b) Agave nectar
c) Stevia d) Molasses

17. Which is the top producer of tea in India?
a) Assam b) Kerala
c) Karnataka d) Tamil Nadu

18. Regular consumption of green tea lowers
a) Blood pressure
b) Bad cholesterol
c) Good cholesterol
d) Blood sugar

19. Which is the largest coffee producing state in India?
a) Tamil Nadu b) Kerala
c) Andhra Pradesh
d) Karnataka

20. Which is the beverage rich in antioxidants?
a) Coffee b) Tea
c) Cocoa
d) Carbonated drinks

21. Which fibre is obtained from *Calotropis*?
a) Textile fibre
b) Filling fibre
c) Plaiting fibre
d) Brush fibre

22. Commercial coir is obtained from which part of coconut?
a) Exocarp b) Endocarp
c) Mesocarp d) Endosperm

23. Which is the oldest and most ex-

10. b) Finger millet 11. c) *Sorghum vulgare* 12. a) *Panicum sumatrense*
13. b) Bengal gram 14. a) Tamil Nadu 15. d) Almond
16. c) Stevia 17. a) Assam 18. b) Bad cholesterol 19. d) Karnataka
20. c) Cocoa 21. b) Filling fibre 22. c) Mesocarp

12th Zoology
Pure Science - Long Version

[Both English & Tamil medium]

Line by Line Solved Questions
Book Back Solved Questions
This book contains Two Supplement Books

Question Bank Book

Unit Test Question Papers - Chapterwise - அலகுத் தேர்வு வினாக்கள் - பாடம் வாரியாக
Assessment Test Question Papers - மதிப்பீட்டு தேர்வு வினாத்தாள்கள்
Govt. Model Question Papers (PTA) - அரசு மாதிரி வினாத்தாள்கள்

Short Answer Book

Definitions - வரையறைகள்
Differences - வேறுபாடுகள்
Discoveries - கண்டுபிடிப்புகள்
Do you know questions - உங்களுக்கு தெரியுமா வினா விடைகள்
Days of Importance - முக்கிய தினங்கள்
Diagrams - வரைபடங்கள்
Flow charts - ஓட்ட விளக்க படங்கள்
Laws and Theories - விதிகள் மற்றும் கோட்பாடுகள்
Abbreviations - சுருக்கங்கள்
For Memory - நினைவில் நிறுத்த


45 YEARS of Life Science book publishing
Saras for Science and Biology guide books
12th std
BASED ON TAMILNADU STATE BOARD SYLLABUS
SARAS
Bio-Botany
N. Arumugam P. Senthil Kumar
SUPPLEMENT - 1
UNIT TEST QUESTION PAPERS
ASSESSMENT TEST QUESTION PAPERS - 4
GOVERNMENTMODEL QUESTION PAPERS (PTA) - 6
SARAS
BOTANY
PURE SCIENCE - LONG VERSION
N.Arumugam
P.Senthil Kumar
Only Book having Objective Questions framed line by line from the Text Book
This package contains 4 books
1. Botany (Additional topics)
2. Bio-Botany (Common Topics)
3. Question Bank Book
4. Short Answer Book
Question Bank Book
Unit Test Question Papers - Chapterwise
Assessment Test Question Papers - 4
PTA Question Papers - 6
Short Answer Book
Definitions
differences
Discoveries
Diagrams
Do You Know Questions
days of Importance
Abbreviations
Flow charts
Laws and theories
Solved Book back Questions
Solved Additional Questions
Government Exam Question Papers
This Package Contains 22 Practice Question Papers
SUPPLEMENT - 2
DEFINITIONS AND DIFFERENCES
DO YOU KNOW QUESTIONS
DISCOVERIES
DAYS OF IMPORTANCE
ABBREVIATIONS
THEORIES AND CONCEPTS