

## XII BOTANY - PREVIOUS QUESTIONS 2012-2021

### Chapter 1-Reproduction in organisms

#### 1Mark Questions

1. Zoospores are common asexual reproductive structures in plants and animals with relatively simple organization. Name two other asexual reproductive structures seen in the group 2012 Say
2. In papaya, male and female flowers are seen in separate plants. They are said to be..... 2012 Say
3. Morphologically and genetically similar individuals are called\_\_\_\_\_ 2013 March
4. In honeybees and some lizards female gamete undergoes development to form new organisms without fertilization. This phenomenon is called.... 2013 March
5. a) Amoeba asexually multiplies by binary fission, whereas sponge by \_\_\_\_\_  
b) Water hyacinth vegetatively multiplies by offset, whereas agave by\_\_\_\_\_ 2014 Say
6. (a) Yeast asexually multiplies by budding whereas *Penicillium* by \_\_\_\_\_  
(b) Bryophyllum vegetatively multiplies by adventitious buds whereas water hyacinth by ..... 2015 Say
7. When a gamete without any fusion develop into a new organism the phenomenon is\_\_\_\_  
(a) Syngamy  
(b) External fertilization  
(c) Parthenogenesis  
(d) Parthenocarpy 2016 March
8. A unisexual flower having no androecium is called \_\_\_\_\_  
(a) Dithecous  
(b) Dioecious  
(c) Monoecious  
(d) Pistillate 2016 March
9. Select one which is not helping vegetative propagation.  
(a) Bulb (b) Clone (c) Adventitious buds  
(d) Eyes of the potato 2016 Say
10. The plant in which adventitious buds along the margin of leaves give rise to new plants is  
a) Water Hyacinth  
b) Agave  
c) Bryophyllum  
d) Dahlia 2017 March
11. The thick protective covering of the fruit is known as \_\_\_\_\_ 2017 March
12. In flowering plants male flower is called \_\_\_\_\_ flower and female flower is known as \_\_\_\_\_ flower. 2017 Say
13. Rhizome, bulbil, offset and bulb are different methods of vegetative reproduction in plants. Of these, the vegetative reproductive structures of Agave and Ginger are \_\_\_\_\_ and \_\_\_\_\_ respectively. 2017 Say
14. Choose the correct answer  
Bulbil is the vegetative propagule in...  
a) Onion  
b) Ginger  
c) Bryophyllum  
d) Agave 2017 Ist term
15. Observe the relationship between the first two terms and fill in the blank.  
Fungus and alga : Lichen ;  
Fungus and roots of higher plants : \_\_\_\_\_ 2018 2nd term
16. Choose the correct answer ;  
Vegetative propagule in Water hyacinth is :  
A) Bulbil  
B) Rhizome  
C) Offset  
D) Bulb 2018 2nd term
17. Observe the figure and identify the asexual reproductive structure 2019 Model
18. Observe the relationship between the first pair and fill up the blank using appropriate term.  
Unisexual male flower : Staminate  
Unisexual female flower : \_\_\_\_\_ 2019 Model
19. Choose the correct answer ;  
Which one of the following is **not** a vegetative propagule ?  
A) Bulbil  
B) Pitcher  
C) Offset  
D) Tuber 2019 1st term

## Chapter1-Reproduction in organisms

20.Observe the figure given below and identify the type of gametes.

2019 2nd term

21.What is a clone ?

2020 March

22.Which among the following is a vegetative propagule?

- (a) Rhizome
- (b) Gemmules
- (c) Zoospores
- (d) Conidia

2021 Model

23.The protective wall layer of fruit is known as...

2021 Model

24.Choose the correct answer.

The Plant which flowers only once in their lifetime:

- (a) Mango
- (b) Bamboo
- (c) Coconut
- (d) Jackfruit

2021 Model

25.Fill in the blank.

During sexual reproduction, the process of syngamy results in the formation of a diploid cell called \_\_\_\_.

2021 March

26.Morphologically and Genetically similar individuals formed from asexual reproduction is called \_\_\_\_.

2021 Say

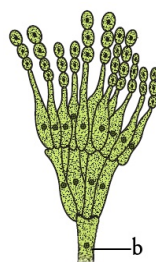
27.What happens to the following parts after fertilisation in angiosperms ?

- (a) Ovule : \_\_\_\_
- (b) Ovary : \_\_\_\_

2021 Say

### 2 Marks Questions

1.In asexual reproduction, offsprings are produced by a single parent with or without the involvement of gamete formation. Name the asexual reproductive structures (a & b) given below.



2012 March

2. Match the following items with regard to vegetative reproduction in plants

Vegetative propagule	Plant
a.Bulbil	a.Bryophyllum
b.Offset	b.Ginger
c.Leaf bud	c. Agave
d.Rhizome	d.Water Hyacinth

2013 Say

3. In many grasses seeds are formed only after fertilization. There are reports that in some grasses seeds are formed without fertilization. Explain the phenomenon

2013 Say

4. Match the column A with column B

A	B
(1) Bulbil	(a) Bulbophyllum
(2) Offset	(b) Sponge
(3) Gemmule	(c) Water hyacinth
(4) Leaf buds	(d) Agave

2015 Say

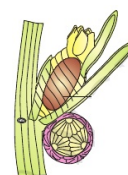
5.Chromosome number in the meiocyte of certain organisms are given below:

- a) Housefly - 12
- b) Maize - 20
- c) Dog - 78
- d) Apple - 34

Find out the number of chromosomes in their gametes.

2017 Ist term

6.Observe the figure of Chara



Write its sexuality. Justify your answer.

2017 Ist term

7.Based on the nature of development of zygote, animals are categorized into two.

- a) Name the two categories
- b) Which category has greater chances of survival of young ones ? Justify your answer.

2017 Ist term

8.The most vital event of sexual reproduction is the fusion of gametes.

- a) Name the process of production of offspring without fusion of gametes.
- b) Name the process of production of seeds without fertilization.

2017 2nd term

## Chapter1-Reproduction in organisms

9. List out any four changes that occur in flower after fertilization. 2018 Model

10. Match the following organisms to their lifespan.

A	B
1. Butterfly	a. 140 years
2. Crow	b. 100-150 years
3. Parrot	c. 1-2 weeks
4. Tortoise	d. 15 years
	e. 60 years

2018 March

11. Primate and non-primate female mammals exhibit cyclic changes in the activities of ovaries and accessory ducts as well as hormones during the reproductive phase. Name the cyclic changes in these group.

2018 Say

12. Bamboo species and Strobilanthus kunthiana exhibit usual flowering phenomena. Explain their flowering characteristics.

2018 Say

13. "The progenies formed by asexual reproduction differ from those formed by sexual reproduction". Justify the statement.

2018 1st term

14. In bony fishes and frogs external fertilization occur. Point out any one advantage and one disadvantage of this type of gametic fusion

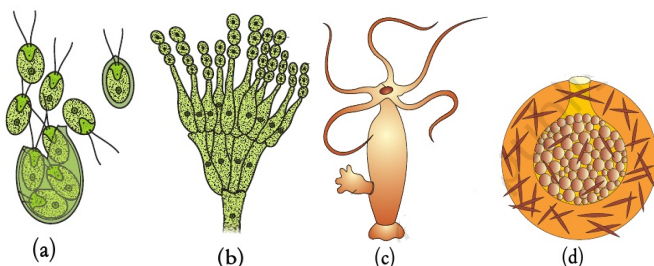
2018 1st term

15. Match the columns A and B

A	B
a. Binary fission	i. Penicillium
b. Conidia	ii. Hydra
c. Gemmules	iii. Amoeba
d. Zoospores	iv. Sponges
	v. Chlamydomonas

2018 1st term

16. Write the asexual reproductive structures given in the diagrams (a), (b), (c) and (d)



2019 March

17. Some organisms develop through parthenogenesis. Define this phenomenon and give an example. 2019 Say

18. Analyse the table given below and fill in the blanks:

Name of organism	Chromosome number in meiocytes	Chromosome number in gametes
_(a)_	46	23
Rice	24	_(b)_
Apple	_(c)_	17
Onion	16	_(d)_

2019 1st term

19. Match the following :

A	B
a. Chlamydomonas	i. Gemmule
b. Conidia	ii. Zoospore
c. Sponge	iii. Bulbil
d. Hydra	iv. Penicillium
	v. Buds

2020 Model

20. Match the columns A and B.

A	B
(a) Rhizome	(i) <u>Agave</u>
(b) Bulbil	(ii) Water hyacinth
(c) Offset	(iii) Ginger
(d) Leaf buds	(iv) Potato
	(v) <u>Bryophyllum</u>

2020 March

21. Notice the organisms given below :

Leech, Cockroach, Dog, Earthworm

- (a) Choose hermaphrodite organism from the above.  
(b) Define hermaphrodite.

2020 Say

22. Match the items of column A with B

A	B
(a) Ginger	(i) Bulbil
(b) Water hyacinth	(ii) Leaf bud
(c) Agave	(iii) Tuber
(d) Bryophyllum	(iv) Rhizome
	(v) Offset

2020 Say

## Chapter1-Reproduction in organisms

23. In some organisms, female gamete undergoes development to form new organisms without fertilization. Name the phenomenon. Give an example. 2021 Model

24. Chromosome number in meiocytes and gametes of some organisms are given in the table. Fill in the blanks.

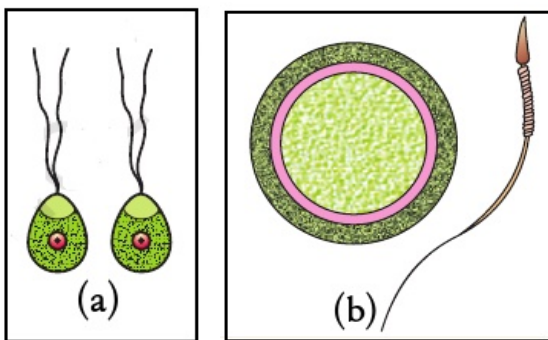
	Name of organism	Chromosome number in meiocytes	Chromosome number in gametes
a	Rice	—	12
b	Onion	—	8
c	Apple	34	—
d	Maize	20	—

2021 Model

25. There are two types of cyclic events that happens in the reproductive phase of female organisms among placental mammals. Which are the cyclic events and give one example for each. 2021 Model

26. Differentiate monoecious and dioecious plants with an example for both. 2021 March

27. Observe the diagrams (a) and (b) given below. Identify the type of gametes. Explain the feature of gametes seen in diagram 'b'



2021 March

28. The females of placental mammals exhibit cyclical changes in the activities of ovaries and accessory ducts during the reproductive phase. 2021 March

29. Observe the table given below and fill up the blanks with appropriate examples..

Vegetative Propagate	Example
Rhizome	__a__
Bulbil	__b__
Stem tuber	__c__
Offset	__d__

2021 Say

30. Differentiate external fertilization and internal fertilisation with examples. 2021 Say

### 3 Marks Questions

1. Observe the figure given below



- Identify this kind of asexual reproduction in yeast.
- Write any two differences between sexual and asexual reproduction

2017 1st term

2. Fertilization may be external or internal

- Write the difference between the two types of fertilization.
- Write the disadvantage of external fertilization.
- Give an example of an organism that shows external fertilization.

2019 1st term

## Chapter 2- Sexual reproduction in flowering plants

### 1Mark Questions

1. In maize the chromosome number present in the meiocyte is 20. Give the number of chromosomes present in the following:

- Maize pollen
- Maize endosperm

2012 March

2. Innermost wall layer of microsporangium which nourishes the developing pollen grain is called \_\_\_\_\_. 2012 Say

3. After syngamy and triple fusion in embryo sac, embryo will be diploid and endosperm will be \_\_\_\_\_. 2013 March



## Chapter 2- Sexual reproduction in flowering plants

4. In flowering plants, double fertilization occurs during sexual reproduction. One of the events of double fertilization is triple fusion. Name the other event. 2013 Say
5. From the following, select the two having haploid chromosome number.
  - a) Egg
  - b) Endosperm
  - c) Zygote
  - d) Pollen 2014 March
6. In flowering plants during double fertilization two events take place in the embryo sac namely \_\_\_\_\_ and \_\_\_\_\_. 2014 March
7. Development of fruit without fertilization and are seedless known as...
  - (a) Polyembryony
  - (b) Apomixis
  - (c) Parthenocarp
  - (d) Parthenogenesis 2015 March
8. In some seeds the nucellus may be persistent. Such nucellus is called
  - (a) Endosperm
  - (b) Scutellum
  - (c) Plumule
  - (d) Perisperm 2016 March
9. What is a false fruit? Cite an example. 2016 March
10. The development of pollen grains in angiosperms is called \_\_\_\_\_.
  - (a) Microsporogenesis
  - (b) Embryogenesis
  - (c) Megasporogenesis
  - (d) Gametogenesis 2016 Say
11. Which of the following part in a flower is haploid?
  - (a) Anther wall
  - (b) Pollen mother cell
  - (c) Synergid
  - (d) Secondary nucleus 2016 Say
12. In aquatic plants like water hyacinth and water Lily the pollinating agent is
  - (a) Wind and insect
  - (b) Water
  - (c) Birds and butterflies
  - (d) Aquatic organisms 2016 Say
13. The hard outer layer of pollen is composed of
  - (a) Exine
  - (b) Intine
  - (c) Integument
  - (d) Sporopollenin 2016 Say
14. A date palm seed discovered during archeological investigation retained viability even after 10000 years. The retention of viability is due to the state of inactivity of embryo called \_\_\_\_\_. 2017 March
15. Observe the relationship between the first two terms and fill in the blank.
 

Intine : Cellulose

Exine : \_\_\_\_\_ 2017 1st term
16. The hard outer layer of pollengrain is composed of
  - (a) cellulose
  - (b) pectin
  - (c) suberin
  - (d) sporopollenin 2018 Model
17. Which among the following is the female gametophyte of angiosperms?
  - a. Nucellus
  - b. Antipodals
  - c. Embryosac
  - d. Endosperm 2018 1st term
18. Choose the correct answer.
 

A parthenocarpic fruit is :

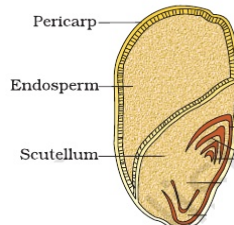
  - (a) Banana
  - (b) Apple
  - (c) Strawberry
  - (d) Guava 2019 Say
19. Observe the relationship between the first two terms and fill in the blank.
 

Funicle : Stalk of the ovule

\_\_\_\_\_ : Protective Envelopes of the ovule 2019 Say
20. Observe the relationship between the first two terms and fill in the blank.
 

Intine : Cellulose and pectin

Exine : \_\_\_\_\_ 2019 1st term
21. Observe the figure given below. Identify the structure.
 



Pericarp

Endosperm

Scutellum

2019 1st term

## Chapter 2- Sexual reproduction in flowering plants

22. Choose the correct answer and fill in the blank.  
\_\_\_\_\_ is the female gametophyte of angiosperms

- (a) Embryosac (b) Nucellus  
(c) Integument (d) Pollen grain *2020 model*

23. Observe the relationship between the first two terms and fill in the blank.

Endothecium : Protection;

Tapetum : \_\_\_\_\_ *2020 Say*

24. Fruit which develop from any part of the flower other than ovary is called... *2021 Model*

25. Fill in the blank.

The portion of embryonal axis above the level of cotyledons in dicot embryo is known as \_\_\_\_\_. *2021 March*

26. Name the female gametophyte in angiosperms.

- (A) Embryo sac (B) Integument  
(C) Funicle (D) Micropyle *2021 Say*

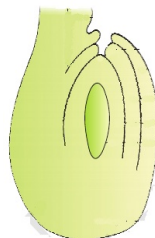
### 2 Marks Questions

1. Raju went to a Rice Research station on his study tour. There he noticed a scientist working on a rice plants using scissors and forceps. To his surprise he saw the scientist covering the inflorescences with paper bags.

- (a) Name the techniques the scientist was doing  
(b) Give the purpose of these techniques *2012 March*

2. Copy the picture given below and mark the following:

- (a) Hilum  
(b) Funicle  
(c) Micropylar pole  
(d) Nucellus  
(e) Chalazal pole  
(f) Embryosac *2012 March*

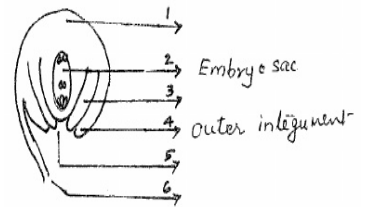


3. In artificial hybridization, it is important to make sure that stigma is protected from unwanted pollen. This is achieved by emasculation and bagging techniques. Can you explain, how emasculation and bagging techniques are performed? *2012 Say*

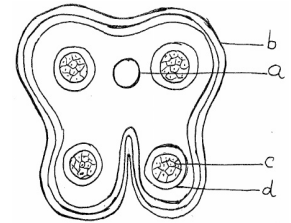
4. In large number of plants, pollination is carried out by insects.. List out four characters of flowers that helps insect pollination. *2012 Say*

5. The diagrammatic view of a typical anatropus ovule is shown below.

Copy the diagram and label the unlabelled parts. *2013 Say*



6. The diagram given below shows the transverse section of a young anther. Identify the parts a, b, c and d. *2014 March*



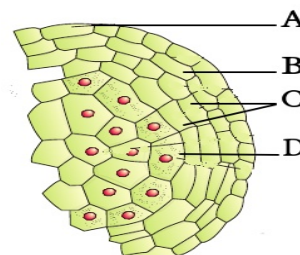
7. Most of the plants produce single type of flowers but Viola, Commelina and Oxalis produce two types of flowers. Explain. *2014 Say*

8. The chromosome number of onion = 16 (2n). Find the chromosome number in the following cells with reasons.

- a) Endosperm cells  
b) Zygote *2015 Say*

9. Many of the flowering plants have developed some devices for discouraging inbreeding. Write any two of them. *2016 March*

10. Observe the following diagram and label A, B, C and D. *2016 Say*



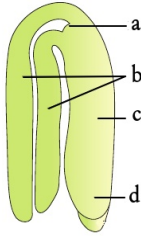
11. Nature has mechanisms to promote outbreeding in plants. Explain any two mechanisms existing in plants to promote outbreeding. *2017 March*

12. When the pollen is transferred from anther to the stigma of the same flower, the pollination is called autogamy.

- a) Cleistogamous flowers are invariably autogamous. Explain.  
b) Geitonogamy is functionally cross pollination, but genetically similar to autogamy. Justify the statement. *2017 March*

## Chapter 2- Sexual reproduction in flowering plants

13. Identify the following parts of a dicot embryo.



2017 Say

14. Analyse the table and fill in the blanks.

A	B
Remnants of nucellus	_____a_____
_____b_____	Filiform apparatus
_____c_____	Pericarp
Embryonal axis above the level of cotyledon	_____d_____

2017 1st term

15. Wind is a common abiotic agent of pollination. Write any four features of wind pollinated flowers.

2017 1st term

16. Fruit formation in apple is different from that in banana.

- How do fruits develop in them ?
- Write the name of these fruits.

2017 1st term

17. A microsporangium is surrounded by four layers. Name the first three layers and write their function.

2017 1st term

18. A plant breeder is interested in producing superior varieties of crops by artificial hybridization. Write the events of artificial hybridization in correct order.

2017 2nd term

19. Artificial hybridisation is one of the major approaches for crop improvement programme. Suggest the techniques used to protect the stigma of bisexual flowers during hybridisation.

2018 Model

20. Flowering plants have developed many devices to discourage self pollination and to encourage cross pollination. List out such features found in plants.

2018 Model

21. In angiosperms during fertilization two types of fusion occur in the embryo sac.

- Name the types of fusion
- Which are the nuclei involved in each fusion

2018 Model

22. Synergids have special cellular thickening at micropylar end. Write the name and function of this structure.

2018 March

23. Pollination by water is seen in Zostera and Vallisneria. Enumerate its adaptations.

2018 Say

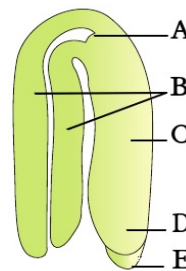
24. Explain how self pollination is favoured in cleistogamous flowers ?

2018 1st term

25. We can see many embryos in the seeds of some plants. What is this phenomenon called ? Give two examples.

2018 1st term

26. Draw the following diagram in your answer sheet and label any four parts.

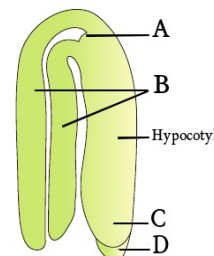


2018 1st term

27. Name the special cellular thickenings present in the synergids. Write its function.

2018 2nd term

28. Observe the figure and label the parts A, B, C and D



2019 Model

29. Double fertilization is a characteristic feature of angiosperms.

- Which are the events in double fertilization ?
- Name the triploid nucleus formed as a result of double fertilization.

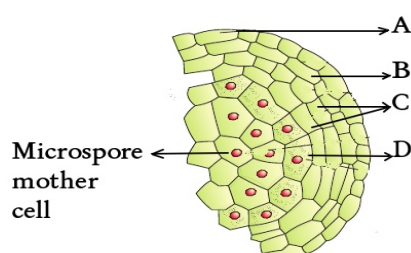
2019 March

## Chapter 2- Sexual reproduction in flowering plants

30. The early stages of embryo development are similar in both dicots and monocots. However, mature embryos have differences. Write two differences between dicot embryo and monocot embryo  
*2019 March*

31. Observe the diagram of young anther given below.

- (a) Identify the parts labelled as A, B, C and D
- (b) Which layer nourishes the developing pollengrains?



*2019 March*

32. Certain floral features that help for pollination are given below.

- Flowers are colourful and rich in nectar
- Pollen grains are dry and non-sticky
- Pollen grains are protected from wetting by a mucilaginous covering
- Feathery stigma
- Pollen grains are sticky

Choose the features of wind and insect pollinated flowers from the above.

*2019 1st term*

33. Define microsporogenesis. Write the ploidy of microspore.

*2019 1st term*

34. Analyse the table given below and fill in the blanks.

Peculiarity (A)	Name (B)
Stalk of the ovule	__ (a) __
__ (b) __	Nucellus
Protective envelopes of the ovule	__ (c) __
Junction between ovule and funicle	__ (d) __

*2019 1st term*

35. In some plants residual, persistent nucellus can be seen. Name this kind of nucellus. Give an example of a seed that contains this kind of nucellus

*2019 1st term*

36. In certain seeds, more than one embryo can be seen. Name this condition and give an example.  
*2019 1st term*

37. Observe the events given below.

Emryogenesis, Gametogenesis, Syngamy

Choose a post-fertilization event from the above and define it  
*2019 1st term*

38. The innermost wall layer of Microsporangium is Tapetum.

- (a) What is its function?
- (b) Write two features of tapetal cells.

*2020 model*

39. How can you differentiate true fruits from false fruits?

*2020 March*

40. Flowers are classified into Chasmogamous and Cleistogamous flowers.

- (a) Cleistogamous flowers are autogamous. Justify.
- (b) Define autogamy

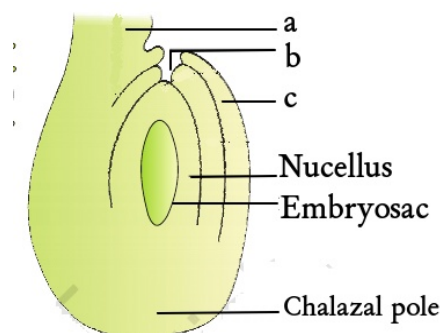
*2020 Say*

41. A typical angiosperm embryo sac is 8-nucleate and 7-celled.

- (a) Name the cells that constitute egg apparatus.
- (b) Explain monosporic type of embryo sac development.

*2020 Say*

42. Observe the figure given below.



- (a) Identify the parts a, b, c.
- (b) Write the functions of c.

*2020 Say*

43. The outer layer of pollengrain is made up of sporopollenin. What is the importance of sporopollenin?

*2021 Model*

44. Differentiate between Autogamy and Xenogamy.

*2021 Model*



## Chapter 2- Sexual reproduction in flowering plants

45.If the female parent produces bisexual flowers, emasculation is necessary in artificial hybridization.

- What is emasculation ?
- Write down the importance of emasculation.

2021 Model

46.Fusion of polar nuclei with male gamete in double fertilisation result in formation of endosperm.

- Write down the function of endosperm.
- Write briefly about the endosperm development in coconut.

2021 Model

47.Write four peculiarities of insect pollinated flowers.

2021 March

48.Banana is a Parthenocarpic fruit. What are parthenocarpic fruits? How can be parthenocarpy induced ?

2021 March

49.Different stages of development in a dicot embryo are given below. Arrange them the correct sequential order.

Heart shaped embryo, globular embryo, mature embryo, pro-embryo

2021 March

50.Self incompatibility is an outbreeding mechanism seen in plants. Explain self incompatibility.

2021 March

51.What is the vital link that ensures continuity of species between organisms of one generation to next generation and define embryogenesis.

2021 Say

52.Banana is a Parthenocarpic fruit.

- What are Parthenocarpic fruits ?
- How Parthenocarpy can be induced ?

2021 Say

53Arrange the steps of artificial hybridisation in a correct sequential order.

Bagging → Self pollination → Selection of parents → Emasculation.

2021 Say

54.Write any four devices to discourage self-pollination and to encourage cross pollination in flowering plants.

2021 Say

55.Wind pollinated flowers have many peculiarities. Write down any four such peculiarities.

2021 Say

### 3 Marks Questions

1.The developmental stages of male gametes in plants consists of microsporogenesis and male gametophyte. Arrange the following terms in their correct developmental sequence.

Pollen grain  
Sporogenous tissue  
Anther  
Microspore tetrad  
Pollen mother cell  
Male gamete

2014 March

2.Double fertilization and triple fusion are the two terms associated with angiosperm fertilization.

- What is double fertilization ?
- Explain triple fusion
- Give the ploidy level of
  - endosperm
  - zygote

2017 Say

3.Rose is a flower pollinated by insect while in paddy pollination is by wind. Give any three adaptations existing in these plants to facilitate their respective mode of pollination

2017 Say

4.Double fertilization involves two types of fusions.

- Explain the two types of fusions.
- What happens to synergids and antipodals after double fertilization ?

2017 1st term

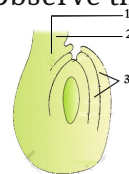
5.Certain parts of the embryo are given below:

**Coleorrhiza, Root cap, Radicle, Scutellum, Plumule**

- Choose the parts seen only in monocot embryo.
- Write the stages of embryogeny in a dicot embryo.

2017 1st term

6.Observe the figure given below.



- Name the parts 1, 2, and 3
- Write the peculiarities of the identified parts

2017 1st term

7. In angiosperms female gametophyte is known as embryo sac. Explain its structure.

2018 March

8. Depending on the source of pollen, pollination can be divided into three types. What are they ? Explain each.

2018 Say

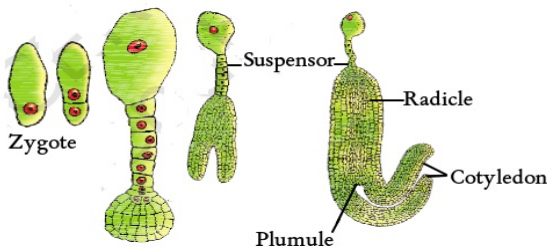
## Chapter 2- Sexual reproduction in flowering plants

9. Suppose you are provided with the flowers of the plants - Sunflower, Maize and Vallisneria. Find out any two adaptations in each flower for successful pollination. *2018 1st term*

10. Pollen grains represent the male gametophyte.  
a. Outer hard layer of pollen is made of \_\_\_\_  
b. Name the two cells present inside a typical pollen grain.  
How these cells differ from each other? *2018 1st term*

11. Flowering plants have developed many devices to encourage cross pollination. Find out any three such devices in angiosperms. *2018 1st term*

12. Observe the figure given below.

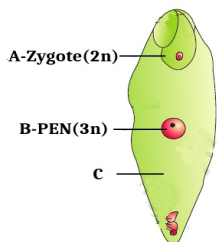


(a) Name the process  
(b) Write the stages involved in this process in correct sequential order. *2019 Model*

13. Wind pollination is common in grasses. Write any three floral features in grasses that help in wind pollination. *2019 Say*

14. Write any three parts of a monocot embryo and write one peculiarity of each of these three parts. *2019 Say*

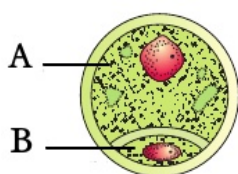
15. Observe the figure given below.



(a) Explain the process that lead to the formation of A and B in the figure.  
(b) Label part C *2019 1st term*

16. Continued self pollination result in inbreeding depression. So flowering plants have developed many devices to discourage self pollination. Write any three such devices. *2019 1st term*

17. Observe the figure given below.



a) Identify the cells A and B.  
b) Write any two peculiarities of A. *2019 2nd term*

18. Mention the out-breeding devices in plants to prevent self pollination. (any 3 points) *2020 model*

19. Define the following terms :

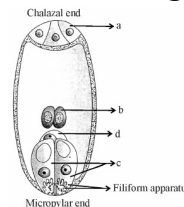
- Autogamy
- Geitonogamy
- Xenogamy

*2020 March*

20. Pollination is the transfer of pollen grains from anther to stigma of pistil. Write any three adaptations seen in wind pollinated plants. *2021 Model*

21. A typical microsporangium is surrounded by four wall layers. Name the wall layers and state the function of the innermost wall layer. *2021 March*

22. Observe the figure given below.



(a) Label a, b, c, and d.  
(b) What is the function of filiform apparatus? *2021 Say*

### 4 Marks Questions

1. Artificial hybridization is one of the major approaches for crop improvement programme. In such crosses it is important to avoid unwanted pollen.

- Explain how can we protect stigma from unwanted pollen.
- How artificial pollination can be performed? *2013 March*

2. Flowering plants evolved an array of adaptations to achieve pollination.

- Explain pollination
- Point out adaptations found in flowers for insect pollination and wind pollination
- Illustrate pollination in Vallisneria *2013 March*

3. Egg cell formation in angiosperms involves megasporogenesis and female gametophyte development.

- Briefly write the various steps involved in female gametophyte development.
- Mature angiosperm embryo sac at maturity, though 8 nucleated is 7 celled.

What is your explanation related to this statement, explain? *2014 Say*

## Chapter 2- Sexual reproduction in flowering plants

4. Reeja a science student observed the structure of a mature embryo sac comprising antipodals, central cells and egg apparatus. Explain each one of them. 2015 March

5. Three different flowers are given to you in the practical class.

- (i) Maize
- (ii) Vallisneria
- (iii) Rose

You are asked to group them based on pollinating agents.

Describe the adaptations of each flower related with the agents of pollination. 2015 March

6. You are supplied with three different flowers such as Maize, Vallisneria and Rose and they have different pollinating agents also.

- a) Differentiate the type of pollination
- b) Write their various adaptability in the plants suited to pollination 2015 Say

### 5 Marks Questions

1. Sunflower is pollinated by insects while rice is pollinated by wind.

- a) How these plants are adapted to their respective type of pollination method ? (Hint-any 4 points)
- b) Plants can be self or cross pollinated. Write any two mechanisms existing in nature to promote cross pollination 2014 March

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## Chapter 3- Strategies for enhancement in food production

### 1 Mark Questions

1. The regeneration of whole plants from any part of the plant grown under sterile conditions is called tissue culture.

- (a) The general term for the part of the plant taken out for tissue culture is.....
- (b) The capacity to generate a whole plant from any plant cell is..... 2012 March

2. Continued inbreeding, usually reduces fertility and causes non productivity. This is called..... 2012 Say

3. MOET is a programme for herd improvement. Expand MOET. 2013 March

4. A plant breeder finds that genetic variations in a crop are completely used up and hence genetic variations are to be created for crop improvement. Suggest any one method for creating genetic variation. 2013 Say

5. Vidya got a plant which was affected with a viral disease. Her objective is to raise a disease free plant from this infected plant through tissue culture.

- a) Which part of the plant should be selected as the explant ?
- b) State the reason for the selection of this part as the explant. 2014 March

6. Observe the relation in the first pair and fill up the blank in the second .

a)

Crop	Variety	Resistant to disease
Chilli	Pusa sadabahar	Chilli or tobacco mosaic virus
Brassica	_____	White rust



### Chapter 3- Strategies for enhancement in food production

b)

Crop	Variety	Insect pest
Flat been	Pusa sawani	Jassids, fruit borer and aphids
Okra	_____	Shoot and fruit borer

2014 Say

7. 250 kg cow produces 200g of protein/day. In the same period 250g of Methylophilus methylotropus produces 25 tonnes of protein. Then what is single cell protein?

2015 March

8. Observe the relation in the first pair and fill up the blank in the second .

a)

Crop	Variety	Resistant to disease
Brassica	Pusa Swarnim	White rust
Chilli	_____	Chilli mosaic virus

b)

Crop	Variety	Insect pest
Okra	Pusa sawani	Shoot & fruit borer
Flat been	_____	Jassids, fruit borer and aphids

2015 Say

9. Breeding crops with the objective of increased nutritional quality is called \_\_\_\_\_

2017 March

10. The practice of maintenance of honeybees for the production is called \_\_\_\_\_ 2017 Say

11. Choose the correctly matched pair.

- (a) Hilsa - Freshwater fish  
(b) Sonalika - Rice  
(c) Atas 66 - Wheat 2017 1st term

12. Insects feeding on plant sap and other parts are known to be ..... 2018 Model

13. MOET is a programme for herd improvement. Name the hormone used in it. 2018 Model

14. Select the disease resistant variety of Bhindi produced by mutation breeding

- (a) Himgiri (b) Prabhani Kranti  
(c) Pusa Gaurav (d) Pusa Komal 2018 March

15. Identify the fresh water fish from the following :

- (a) Sardine (b) Mackerel  
(c) Rohu (d) Hilsa 2018 Say

16. 'Sonalika' is a semi-dwarf variety of \_\_\_\_\_ 2018 1st term

17. Fill in the blank.

Kalyan Sona is a semi-dwarf variety of \_\_\_\_\_ 2019 Say

18. Fill in the blank:

The wheat variety having high protein content used as donor in bio-fortification is \_\_\_\_\_ 2020 Model

19. Find the odd one

Hilsa, Sardine, Rohu, Mackerel 2020 Model

20. \_\_\_\_\_ is a better yielding semi dwarf variety of rice developed in India.

- (a) Sonalika (b) Kalyan Sona  
(c) IR-8 (d) Jaya 2020 March

21. Name any two products obtained through Beekeeping. 2021 Model

22. Name the process of breeding crops for improved Food quality. 2021 March

23. Expand SCP. 2021 Say



## Chapter 3- Strategies for enhancement in food production

### 2 Marks Questions

1. A newspaper report read like this.  
"Conventional agricultural products like cereals, pulses and other seeds may not be able to meet the demand of food according to the increase in population. So focus has to be shifted to alternate food sources like SCPs."  
(a) What are SCPs ?  
(b) Give one example of SCPs.  
(c) What are the advantages of SCPs ?  
2012 March
2. Bee keeping requires some specialised knowledge for success.  
(a) What is the alternate name for Bee keeping ?  
(b) Give your suggestions for successful bee keeping.  
2012 Say
3. Plant breeding programmes are carried out in a systematic way in research organizations. Explain main steps in breeding to produce a new genetic variety.  
2013 March
4. It is observed that continued inbreeding of animals for 4 - 6 generations produce progeny with reduced fertility and productivity. What measures can be taken to improve fertility and productivity of progeny ?  
2013 Say
5. Plant breeding involves techniques for manipulating plants in order to create the desired plant types. State the steps involved in the production of a new genetic variety of a crop.  
2014 March
6. Local people in a village wanted to produce a crop with improved nutritional qualities. What are the major objectives to be included to improve the nutritional qualities ? (4 points)  
2014 Say
7. In a debate one of the speaker reported like this:  
"Continuous inbreeding leads to inbreeding depression" If so define the following :  
(a) Outcross  
(b) Cross breeding  
2015 March
8. In a Grama Panchayat, Members wanted to start a Bee-keeping industry. What are your suggestions for successful bee-keeping ? (4 points)  
2015 Say
9. Match the following varieties with their respective crops :  

<b>Variety</b>	<b>Crop</b>
(a) Pusa Swarnim	(i) Chilli
(b) Pusa Snowball	(ii) Bhindi
(c) Pusa Sawani	(iii) Cauliflower
(d) Pusa Sadabahar	(iv) Brassica

2017 March
10. Out crossing and cross breeding are two different aspects of outbreeding in animals. How out crossing is different from cross breeding ?  
2017 Say
11. Given below are names of certain organisms.  
**Mule, Hisardile, Rohu, Sardine**  
Find out the breed of sheep from the above. How this sheep was developed ?  
2017 1st term
12. Atlas-66 is a variety of wheat developed by a novel plant breeding technique called biofortification. What are the objectives of this process ?  
2017 2nd term
13. Bee keeping though relatively easy does require some specialised knowledge. List out the important points to its success.  
2018 Model
14. Controlled breeding experiments can be carried out using artificial insemination. What are the advantages of this process ?  
2018 March
15. Bio-fortification is a practical approach to improve the public health. Name any four such crops release by IARI.  
2018 March
16. Your friend wishes to start a poultry farm. What are the important suggestions given to him for successful management of the farm ?  
2018 Say
17. One of the alternate sources of proteins for human nutrition is SCP.  
a. Expand SCP  
b. Give two examples  
2018 1st term

### Chapter 3- Strategies for enhancement in food production

18. Explain how MOET is helpful to increase the herd size of cattles in a short time.

2018 1st term

19. "Healthy plants can be recovered from diseased plants by tissue culture."  
How is it possible ?

2018 1st term

20. Define cross breeding. Name the breed of sheep developed in Punjab through cross breeding.

2018 2nd term

21. Match the following:

	Breeding techniques		Definition
a	Inbreeding	i)	Superior males of one breed are mated with superior females of another breed
b	Out crossing	ii)	Male and female animals of two different species are mated
c	Cross breeding	iii)	Mating of more closely related individuals within the same breed for 4 to 6 generations
d	Inter specific hybridisation	iv)	Mating of animals within the same breed but having no common ancestor

2019 Model

22. *Explant* and *totipotency* are two terms related to tissue culture. Explain the two terms.

2019 1st term

23. Mule is produced through a particular type of cross. Name that cross. Define that cross.

2019 1st term

24. Spirulina is a SCP.

(a) Expand SCP.

(b) How can Spirulina be grown ?

2019 1st term

25. Match the items of Column A with B

A	B
a. Pusa Swarnim	i) Semi-dwarf variety of rice
b. Jaya	ii) Insect pest resistant brassica
c. Pusa Sawani	iii) Disease resistant variety of brassica
d. Himgiri	iv) Insect pest resistant bhindi
	v) Disease resistant wheat

2019 2nd term

26. Explain the terms:

(a) Micropropagation

(b) Totipotency

2020 Model

27. What is biofortification? Write any two objectives of biofortification.

2020 March

28. 'Hisardale' is a new breed of sheep developed in Punjab.

(a) Identify the method by which the breed is developed.

(b) Name the parental breeds of 'Hisardale'.

2021 Model

29. Expand MOET. Write its significance.

2021 March

30. Differentiate out crossing and cross breeding.

2021 Say

### Chapter 3- Strategies for enhancement in food production

#### 3 Marks Questions

1. Resistance is the ability to prevent the pathogen from causing disease.
  - (1) Elucidate the steps in breeding for disease resistance.
  - (2) Cite two examples for virus resistant plants.

*2016 March*
2. Tissue culture is an achievement in plant breeding. What is a somaclone ? Describe the production of somatic hybrid.

*2016 March*
3. (a) Describe the major steps followed for the production of new genetic variety starting from the collection of germplasm upto elucidating the cultivars.  
(b) A plant breeder has a rare variety of cultivar with him but unfortunately it has become infected with virus. Suggest a suitable technique to produce many viable number of progenies with a short note.

*2016 Say*
4. MOET is a programme for herd improvement.
  - (a) Expand MOET
  - (b) Explain the procedure of MOET

*2017 1st term*
5. Breeding a new variety of a crop involves different steps. Write these steps.

*2017 1st term*
6. Dairying is the management of animals for milk and its products. Write any six components of dairying that help to increase yield and quality.

*2017 1st term*
7. Apiculture is the maintenance of beehives for the production of honey.
  - a. Name the common species of honey bee used in India.
  - b. Suggest any two aspects that are important for successful beekeeping.

*2018 1st term*
8. Plant breeding programme is carried out for producing new genetic varieties.
  - a. \_\_\_\_\_ is a semi-dwarf variety of rice developed at International Rice Research Institute.
  - b. Which are the main steps in developing a new genetic variety of a crop by plant breeding ?

*2018 1st term*
9. Biofortification is the most practical means to improve public health.
  - a) Write two aims of Biofortification.
  - b) Write the name of biofortified rice which enriched with vitamin A.

*2019 Model*
10. Outbreeding in animals may be outcrossing, crossbreeding and interspecific hybridisation.
  - (a) Give an example for a progeny obtained by interspecific-hybridisation .
  - (b) How does outcrossing differs from crossbreeding ?

*2019 March*
11. Explant and totipotency are two terms related to tissue culture.
  - (a) Define these two terms.
  - (b) What is a somaclone ?

*2019 Say*
12. Maintenance of hives of honeybees for the production of honey is called bee-keeping.
  - (a) Give the technical term for bee-keeping.
  - (b) Write any four points that are important for successful bee-keeping.

*2019 1st term*
13. There are five main steps in breeding a new genetic variety of a crop.
  - (a) Write that five steps.
  - (b) Name a semi-dwarf variety of wheat produced in India.

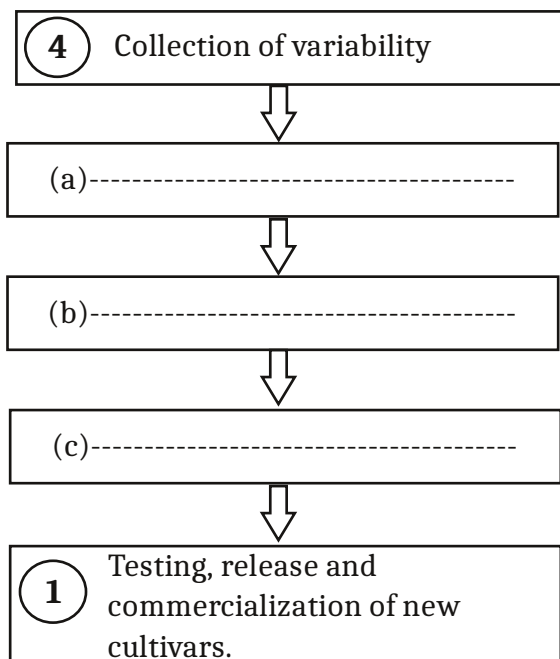
*2020 Say*

### Chapter 3- Strategies for enhancement in food production

14. Different steps of plant breeding is given below :

- (1) Testing, release and commercialization of new cultivars.
- (2) Cross hybridization among the selected parents.
- (3) Evaluation and selection of parents.
- (4) Collection of variability.
- (5) Selection and testing of superior recombinants.

Create a flow chart of plant breeding from the above steps in sequential manner.



2021 Model

15. Dairying is the management of animals for milk and its products for human consumption. List out various management measures that should be undertaken for a successful management of dairy farm.

2021 March

16. Bee keeping is the maintenance of hives of honey bees for the production of honey.

- (a) Give the technical term for bee keeping.
- (b) List out any four important points for successful bee keeping.

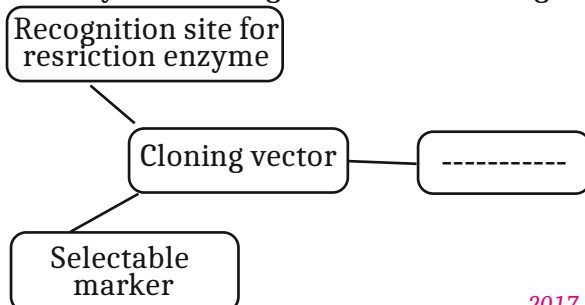
2021 Say

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### Chapter 4- Biotechnology : Principles and Processes

#### 1 Mark Questions

1. Identify the missing feature of a cloning vector.



2017 2nd term

2. In Gel electrophoresis the separated DNA fragments can be visualized after staining. Name the stain used for it.

2018 Say

3. What is the function of Restriction Endonuclease in recombinant DNA technology ?

- (a) Link together fragments of DNA
- (b) Make millions of copies of DNA
- (c) Cut DNA into many fragments
- (d) Separate fragments of DNA

2019 March

4. Choose the correct answer.

DNA fragments with same kind of sticky ends can be joined by :

- (A) Ligase
- (B) Endonuclease
- (C) Exonuclease
- (D) Polymerase

2019 1st term



## Chapter 4- Biotechnology : Principles and Processes

5. Choose the correct answer.

The first restriction endonuclease isolated is

- A) Bam HI
- B) Eco RI
- C) Hind II
- D) Cla I

2019 2nd term

6. Which among the following is a selectable marker in pBR 322 ?

- (a) "Ori" (b) Hind III
- (c) amp<sup>R</sup> (d) rop

2020 March

7. Identify palindrome sequence from the following.

- 1) 5' - GAATTC - 3'  
3' - CTTAAG - 5'
- 2) 5' - ATCG - 3'  
3' - TAGC - 5'
- 3) 5' - AAAAA - 3'  
3' - TTTTT - 5'
- 4) 5' - CCCCC - 3'  
3' - GGGGG - 5'

2013 Say

8. Fill in the blank:

The restriction enzyme EcoRI is isolated from the bacterium.....

2021 Model

9. In recombinant DNA technology, DNA fragments are joined by the help of the enzyme.

- (a) DNA ligase
- (b) DNA polymerase
- (c) Restriction enzyme
- (d) Restriction enzyme

2021 Model

10. Choose the correctly matched pair from the following:

- (a) Gel electrophoresis - Used to produce biological products in large quantity
- (b) Bioreactors - Separation of DNA fragments
- (c) PCR - Amplification of gene

2021 March

11. Fill in the blanks :

In rDNA technology, the DNA fragments can be separated by a technique called \_\_\_\_.

2021 Say

### 2 Marks Questions

1. Genetic engineering includes creation of recombinant DNA with the help of restriction enzymes.

- a) Explain recombinant DNA technology
- b) What are restriction enzymes ?  
Name a restriction enzyme.

2013 March

2. Expand the short forms used in Biotechnology

- 1) PCR
- 2) ELISA
- 3) GEAC
- 4) GMO

2013 Say

3. \_\_\_\_\_ are the enzymes used for cutting the DNA molecule into fragments. An example for this type of enzyme is EcoRI. What does Eco, R and I stand for ?

2014 March

4. Use of a thermostable DNA polymerase from the bacterium, *Thermus aquaticus*, made it possible to generate billion copies of DNA in a very short time using a process.

- a) Name the process.
- b) Name the three important steps involved in this process.

2014 March

5. Consider you are appointed as biotechnologist in a National Institute. What are the basic steps to be designed to produce a genetically modified organism. (Hint 3 points)

2014 Say

6. There are many features required to facilitate successful cloning into a vector. Write shortly any two such features required by a vector.

2014 Say

7. Recombinant DNA technology can be accomplished only if we have the following key tools i.e., Restriction enzymes, Polymerase enzyme, Ligases and Vectors.

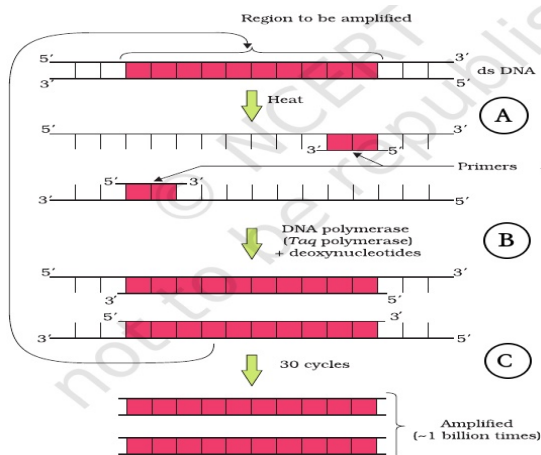
State the functions of

- (a) Ligases
- (b) Restriction enzymes

2015 March

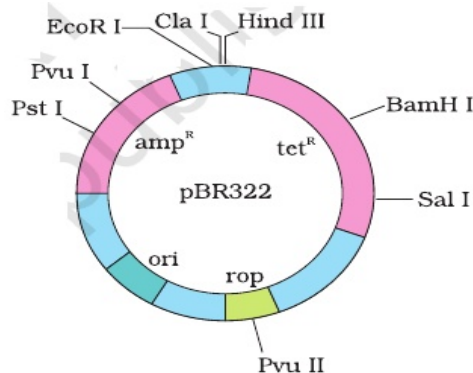
## Chapter 4- Biotechnology : Principles and Processes

8. Figure representing the reactions associated with Polymerase Chain Reaction (PCR). Name the steps A,B,C in the process.



2015 March

9. Observe the cloning vector and explain the following:



- a) Ori  
b) Bam HI

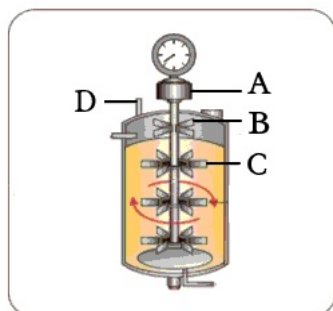
2015 Say

10. A multinational company successfully cloned a gene of interest and also optimized the conditions to induce the expression of target protein.

- (a) Name the apparatus for large scale production of such proteins.  
(b) Briefly explain the apparatus.

2015 Say

11.



Observe the sketch of stirred-tank bioreactor and label the parts A, B, C and D.

2016 March

12. Manipulating with nucleic acid is a trend in Biotechnology.

- (a) Name any one organism used as vector  
(b) What are DNA Polymerase ?

2016 March

13. Electrophoresis is a method commonly used in Biotechnology. Write briefly about Gel Electrophoresis.

2016 Say

14. Genetic engineering is a promising branch recently developed in biological science.

- (a) Expand PCR and name three steps in each cycle.  
(b) What is a plasmid ? Name three features required for cloning vectors.

2016 Say

15. Origin of replication and selectable markers are the two important features required for a cloning vector. Explain their role in facilitating cloning.

2017 Say

16. Denaturation, Annealing and Extension are three steps of a process used for gene amplification:

- (a) Name the process.  
(b) Name the organism from which the DNA polymerase for this process is extracted.

2017 Say

17. Match the items of column A with column B

Column A	Column B
i. Gel electrophoresis	a. Cloning vector
ii. Polymerase Chain Reaction	b. Ethidium bromide
iii. Restriction endonuclease	c. Molecular diagnosis
iv. pBR 322	d. EcoRI

2017 2nd term

18. Distinguish the activity of endonuclease from exonuclease.

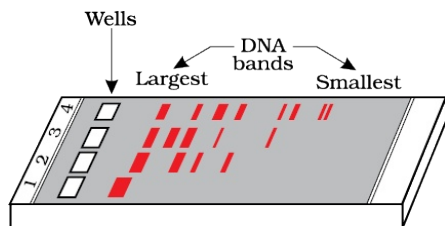
2017 2nd term

19. Isolation of DNA from plant cell involves many steps. Explain the different steps.

2018 Model

## Chapter 4- Biotechnology : Principles and Processes

20. Identify the figure given below and explain the principles behind it.



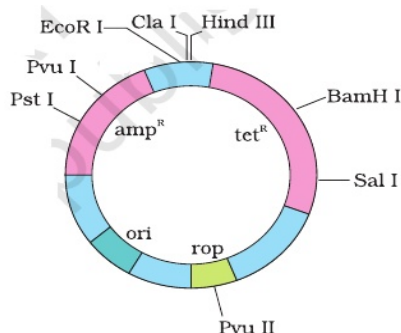
2018 Model

21. The DNA fragments can be separated using gel electrophoresis.

- Name the gel used in this technique.
- Write the name of technique used to remove the DNA from the gel.

2018 March

22. Observe the following figure:



- Identify the figure.
- What does (i)  $tet^R$  (ii)  $rop$  (iii)  $ori$  denote ?

2018 March

23. Genetically modified plants have been used in many ways. Give any four advantages of such plants.

2018 March

24. Multiple copies of gene of interest can be synthesised in vitro. Name the technique and its requirements.

2018 Say

25. Given below is a DNA sequence.

5' — GAATTC — 3'  
3' — CTTAAG — 5'

- What is this type of DNA sequence called ?
- Name the enzyme which can cut DNA strand by recognising this sequence.

2018 1st term

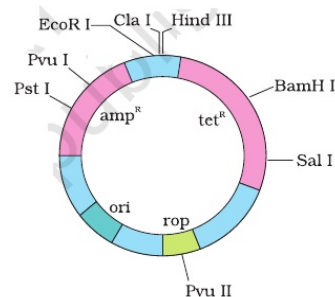
26. Multiple copies of gene of interest can be synthesised through PCR. Expand PCR and write its steps.

2018 2nd term

27. Name the enzymes known as 'molecular scissors'. Give an example of such enzyme.

2018 2nd term

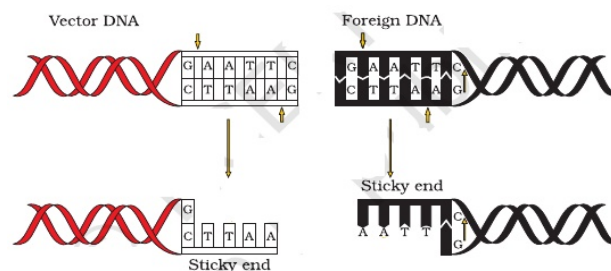
28. Observe the figure of a cloning vector.



- Identify the cloning vector.
- Write down three characteristic features of the above cloning vector.

2019 Model

29. The given figure shows a sequence of DNA that can be cut down by restriction endonuclease.



- Name the sequence.
- Write down the name of restriction endonuclease, which recognises the above sequence.

2019 Model

30. PCR and ELISA are two molecular diagnostic techniques.

- How is PCR useful in molecular diagnosis ?
- What is the principle of ELISA ?

2019 March

31. Restriction Endonuclease recognises a specific sequence in the DNA. Name that sequence and write its peculiarity.

2019 Say

32. Match the items of column A with B:

A	B
(a) Cloning Vector	(i). Bioreactor
(b) Separation of DNA fragments	(ii) Taq polymerase
(c) PCR	(iii) Electrophoresis
(d) Converts raw materials into specific products	(iv) Hind II
	(v) pBR322

2019 Say

## Chapter 4- Biotechnology : Principles and Processes

33. The cutting of DNA at specific locations became possible with the discovery of restriction enzymes. Explain the method of naming these enzymes.

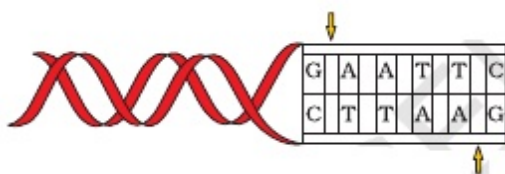
2019 1st term

34. Polymerase chain reaction has 3 steps.

- a) Write the 3 steps.
- b) Name the bacterium from which Taq polymerase is isolated.

2019 2nd term

35. Observe the nucleotide sequence given below:



- a) Name this kind of nucleotide sequence.
- b) Define this sequence.

2019 2nd term

36. Explain the separation of DNA fragments using gel electrophoresis

2020 Model

37. Write notes on :

- (a) Microinjection
- (b) Biolistics

2020 Model

38. Amplification of gene of interest is done using PCR.

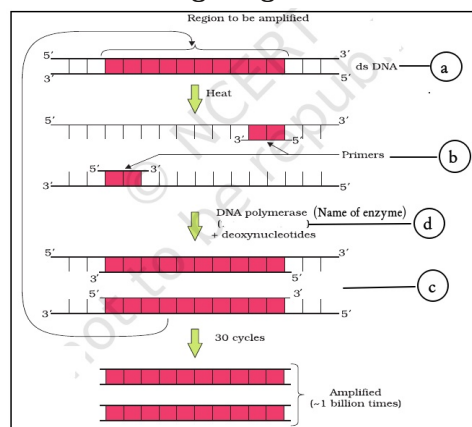
- (a) Expand PCR.
- (b) Mention the three steps of this process

2020 Model

39. How can we make a host cell competent to receive a foreign gene or DNA ?

2020 March

40. Observe the figure given below :



Fill in the blanks a, b, c, d in the figure.  
(Hint : a, b, c – stages, d – enzyme)

2020 Say

41. EcoRI is a restriction endonuclease. What do E, Co, R, I represent ?

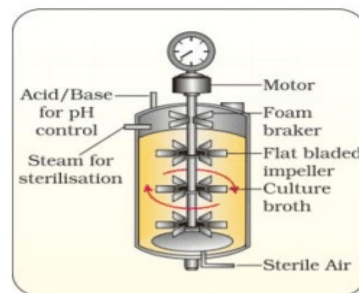
2020 Say

42. In r-DNA technology, amplification of gene is done by a process called PCR.

- (a) Expand PCR.
- (b) What are the three main steps involved in PCR ?

2021 Model

43. Observe the picture given below:



- (a) Identify the instrument in the figure.
- (b) Write any one use of this instrument.

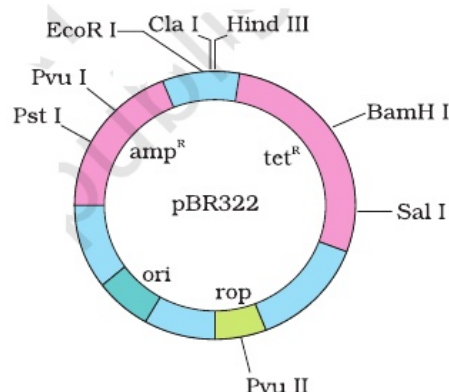
2021 Model

44. EcoRI is an example of Restriction enzyme.

List out the criteria for naming a Restriction enzyme.

2021 March

45. The diagram given below is *E. coli* cloning vector pBR322.



Identify the selectable markers present in it.  
Explain the significance of 'ori'

2021 March

46. Briefly describe downstream processing.

2021 Say

47. What are the two kinds of nuclease enzymes ?

Write their role in rDNA technology.

2021 Say



## Chapter 4- Biotechnology : Principles and Processes

### 3 Marks Questions

- Gel electrophoresis is a technique to separate fragments of DNA from a mixture. Some of the events of electrophoresis are given below.

Arrange the events in order:

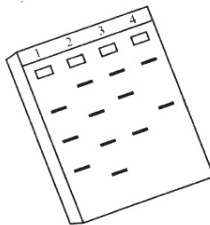
- 1) Cut out DNA bands
- 2) Expose to UV
- 3) Force DNA to move through gel
- 4) Stain DNA with ethidium bromide

2013 Say

- Different methods have been suggested to introduce alien DNA into host cells. Give and explain any three methods adopted for this purpose.

2017 March

- The following photograph shows the result of a technique showing the separation of DNA.



- Name the technique.
- How the separated DNA is visualized ?
- DNA fragments of size 500 bp, 1600 bp and 2000 bp are separated by this process. Which fragment will migrate fast ? Why ?

2017 March

- Amplification of gene can be done using PCR.

- Name the thermostable enzyme used in PCR.
- What is a primer ?
- Write the steps in PCR.

2017 2nd term

- Restriction endonuclease enzymes are used to cut the DNA at specific sequence.

- Write the name of first isolated one.
- Write the convention for naming these enzymes.

2018 Say

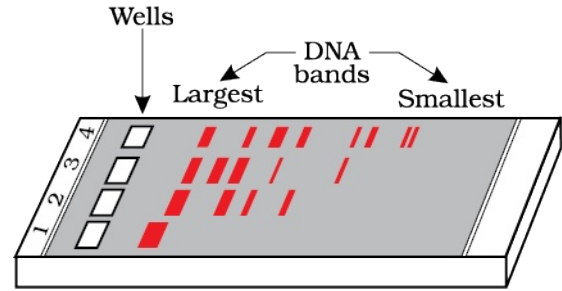
- One of the important features of a cloning vector is the presence of selectable marker.

- Write the role of selectable marker.  
Name the selectable markers used in pBR 322.

- Write the other two features of cloning vector.

2018 2nd term

- Observe the figure given below.



- Name the technique illustrated in the figure.

- Explain the process of separation of DNA fragments through this method.

2018 2nd term

- Recombinant DNA technology is a complex process which involves several steps. Write down the major steps in recombinant DNA technology

2019 March

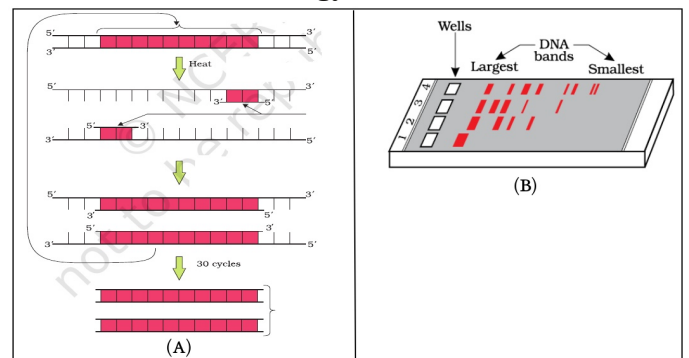
- The discovery of Restriction Endonuclease is considered as "milestone" in the history of genetic engineering.

- Which is the first discovered restriction endonuclease ?
- What are the criteria for naming restriction endonuclease ?

2019 March

- The following are the diagrams of two important processes used in rDNA technology.

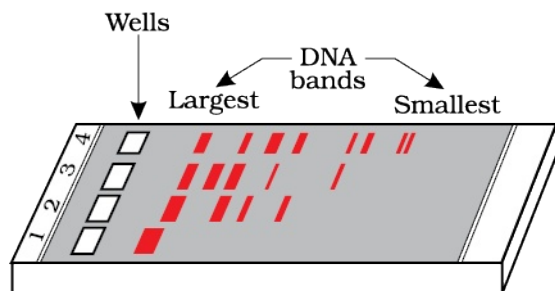
- Identify A and B.
- Write the uses of A and B in rDNA technology.



2020 March

## Chapter 4- Biotechnology : Principles and Processes

11. Given diagram shows a technique used in r-DNA technology.



- Identify the process.
- What is the purpose of this technique in r-DNA technology?
- Name the stain used in this technique for visualizing DNA under UV-light.

2021 Model

12. Different steps in rDNA technology are given below. Arrange them in correct sequential order.

- Ligation of DNA fragment into a vector
- Culturing of host cells in a medium at large scale
- Isolation of DNA
- Transferring the rDNA into the host
- Fragmentation of DNA
- Isolation of desired DNA fragment

2021 March

13. In rDNA technology amplification of gene of interest is done by a technique called PCR.

- Expand PCR
- What are the main steps involved in PCR?
- Name the DNA polymerase enzyme used in PCR.

2021 Say

### 4 Marks Questions

- Restriction endonucleases are the enzymes used to cut the DNA molecules.
  - Give the general term for the specific sequences where these enzymes cut the DNA.
  - Name the enzyme that joints the foreign DNA and vector DNA.
  - Give any two procedures to introduce the recombinant DNA into the host cell.
- During genetic engineering Vector with foreign DNA is transferred into a host bacterium. The next target will be the selection of transformants from nontransformants.

2012 March

How antibiotic resistance and insertional inactivation is exploited for this purpose?

2012 March

- While studying nucleotide sequence, Raj found the following sequence which can be recognized by some enzymes:

5' - GAATTC - 3'  
3' - CTTAAG - 5'

- Give salient features of this sequence.
- Write name of enzymes which recognize such sequences.
- Elaborate importance of this enzyme in Genetic engineering.

2012 Say

- A group of students came to know about recombinant DNA technology. They want to know how scientists can produce a desired product using rDNA technology. Can you give them an idea about the important steps involved in this process?

2012 Say

## Chapter 5- Biotechnology and its applications

### 1 Mark Questions

- Bt cotton is regarded as an important achievement of genetic engineering. What does Bt stands for?
- In 1997, an American company got patent rights on Basmati rice through the U.S. Patents and Trademark Office. Variety of Basmati had actually been derived from Indian farmer's varieties. If so, what is Biopiracy?

2014 March

2015 March

- Biotechnology in agriculture will lead to pest resistant plants, which could decrease the amount of pesticides used. For example Bt cotton. Expand the letter 'B' and 't'.

2015 March

- Antigen- antibody reaction is the basis of the technique called

- ELISA
- PCR
- RNA interference
- Gene therapy

2017 Say

## Chapter 5- Biotechnology and its applications

5. Name the first transgenic cow.  
*2018 Model*
6. Infestation of Meloidegryne incognitia in the roots of tobacco plants can be prevented through a novel strategy. Name that strategy.  
*2018 2nd term*
7. Fill in the blank.  
A method of molecular diagnosis, based on antigen-antibody interaction is \_\_\_\_\_.  
*2019 2nd term*
8. Fill in the blank :  
Alpha 1-antitrypsin is used to treat the disease \_\_\_\_\_.  
*2020 Say*
9. Which of the following is a curative method of ADA deficiency?  
(a) ELISA (b) Autoradiography  
(c) PCR (d) Bonemarrow-transplantation  
*2021 March*
10. What does Bt stand for in Bt cotton?  
*2021 Say*

### 2 Marks Questions

1. In human beings, certain diseases are caused due to genetic disorders.  
(a) Name the method that allows the correction of a gene defect that has been diagnosed in a child or embryo.  
(b) How this method has been used for treating ADA(Adenosine deaminase deficiency) ?  
*2012 March*
2. Infection by nematodes cause threat to cultivation and yield loss of tobacco plants. A strategy has been developed at RNA level to control this infestation.  
(a) Name the process.  
(b) Explain how this process works at the molecular level.  
*2012 March*
3. Using genetically modified crops, farmers can minimize use of insecticides and pesticides during cultivation.  
(a) Give name of one such genetically modified pest resistant crop .  
(b) Which gene is used for its producton ?  
(c) Name the source of pest resistant gene.  
(d) Write about its mode of action.  
*2012 Say*
4. Nita found that her Grandma used to inject human insulin that is genetically engineered. She wants to know how such insulin can be produced. Give her an idea about structure of insulin and production of genetically engineered insulin.  
*2012 Say*
5. A novel strategy to prevent nematode infestation is based on 'RNA interference'.  
a) Explain RNA interference .  
b) Can you suggest, how it can be used for producing nematode resistant plant.  
*2013 March*
6. Sophic was born with a genetic disorder - ADA deficiency.  
a) What is ADA deficiency ?  
b) Can you suggest methods to treat this ADA deficiency ?  
*2013 March*
7. Gene therapy aims in correcting diseases caused by defective genes. A child is suffering from a disease due to deficiency of ADA enzyme. ADA gene which normally produce the enzyme is missing in the patient. Rcommend any two methods to treat the child.  
*2013 Say*
8. Pharmaceutical companies are producing large quantities of insulin by genetic engineering. Briefly explain the process.  
*2014 Say*
9. In the 2012 childrens science congress one of the speakers summarised like this - if we are not vigilant, countries or individuals encash our resources as their right. Explain this with an example.  
*2014 Say*
10. Genetically Modified Organism (GMO) is always a debatable topic among scientists academicians and public. State any four usefulness of GMOs.  
*2015 March*
11. A farmer approached an Agriculture officer to tell his grievance i.e., reduction in tobacco yield due to root damage by nematodes.  
(a) What is your suggestion to prevent this infestation ?  
(b) Briefly explain the process.  
*2015 Say*

## Chapter 5- Biotechnology and its applications

12. One of the speaker in the National Children's Science Congress delivered a talk about transgenic animals. Explore any 2 benefits of transgenic animals. 2015 Say

13. The recombinant DNA technological process have made immense impact in the area of healthcare. How Eli Lilly produced Insulin ? 2016 March

14. Some ethical standards are required to evaluate the morality of all human activities. Explain Biopiracy. 2016 March

15. RNA can suppress the activity of a gene. Explain it with suitable example. 2016 Say

16. Many diseases could be treated by an advanced technique called gene therapy. Assess its role in the treatment of lymphocyte disorder, giving any suitable example. 2016 Say

17. Match the following:

- |                                 |                    |
|---------------------------------|--------------------|
| (a) Antigen - antibody reaction | (i) ADA deficiency |
| (b) $\alpha$ -lactalbumin       | (ii) Emphysema     |
| (c) $\alpha$ -1-antitrypsin     | (iii) Rosie        |
| (d) Gene therapy                | (iv) ELISA         |

2017 March

18. Insulin getting assembled into a mature form was a major challenge in commercial insulin production by rDNA technology. How did Eli Lilly Company found a solution to this problem ? 2017 March

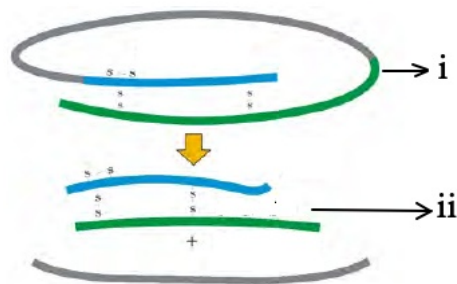
19. Infection of *Meloidogyne incognitia* in tobacco plant was prevented using a novel strategy of r-DNA technology. Identify the strategy and explain it. 2017 2nd term

20. Animals that have their DNA manipulated to possess and express extra genes are called transgenic animals. Write any four uses of transgenic animals 2017 2nd term

21. The first clinical gene therapy was given to a 4 year old girl child. What was her disorder and what is the cause of this disorder ? 2017 2nd term

22. The first clinical gene therapy was given to a four year old girl child.  
(a) What was her genetic disorder ?  
(b) Briefly describe the clinical procedure adopted in this case. 2018 Model

23.



Observe the above figure

(a) Identify i and ii

(b) Distinguish i and ii 2018 Model

24. In 1983 American company Eli Lilly produced human insulin artificially. Write down the method followed in this technique. 2018 March

25. Match the Column A with Column B:

Column A	Column B
(a) Human Alpha lactalbumin	(1) ELISA
(b) Antigen Antibody interaction	(2) ELI LILY
(c) Genetically engineered Insulin	(3) CORN BORER
(d) Cry IAb	(4) ROSIE
	(5) BOLL WORM

2018 Say

26. Write the steps involved in the production of genetically engineered insulin. 2018 2nd term

27. Transgenic animals have many uses to humans. Name the first transgenic cow. Name the protein contained in the milk of this cow. 2018 2nd term

28. Name the bacterium from which cry genes were isolated. Name any two kinds of cry genes. 2018 2nd term



## Chapter 5- Biotechnology and its applications

29. A nematode infects the roots of tobacco plants and causes a great reduction in yield.

- (a) Name the nematode
- (b) Name the strategy developed through biotechnology to prevent the infection of nematode

2019 Model

30. Transgenic animals can produce useful Biological products. What are transgenic animals and write two biological products produced by them.

2019 Model

31. Many countries encourage the cultivation of Genetically Modified Crops (G.M Plants). Write any two advantages of GM plants.

2019 March

32. Alpha -1 antitrypsin and alpha-lactalbumin are two biological products produced from transgenic animals. Write the uses of these two products.

2019 Say

33. Bt cotton is an insect resistant plant that contains gene from a bacterium. Name that bacterium and gene.

2019 Say

34. A novel strategy was adopted to prevent the infestation of a nematode in the roots of tobacco plants. Write that strategy. Name that nematode.

2019 2nd term

35. Transgenic animals are produced to obtain biological products.

- a) Name the human protein obtained from transgenic animal, used to treat emphysema.
- b) Name the first transgenic cow. Write the peculiarity of its milk.

2019 2nd term

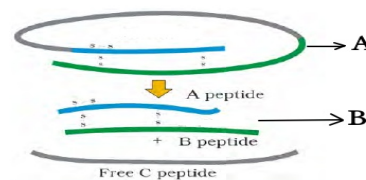
36. Notice the genes given below.

**Cry I Ac, Cry I Ab, Cry II Ab**

- a) Choose the gene that controls corn borer from the above.
- b) Name the bacterium from which cry genes were isolated.

2019 2nd term

37. Observe the diagram and answer A and B.



2020 Model

38. (a) Define transgenic animals.

(b) Write any two uses of transgenic animals.

2020 Model

39. How does the inactive protoxin of Bacillus thuringiensis get converted into active toxin when an insect ingests it?

2020 March

40. Early diagnosis is essential for the effective treatment of a disease. Write any two molecular diagnostic methods.

2020 March

41. Bt cotton contains cry genes from a bacterium.

(a) Name that bacterium

(b) Give two examples for cry genes.

2020 Say

42. Expand GEAC and ADA.

2020 Say

43. List any two uses of GMO (Genetically Modified Organism) in agriculture.

2021 Model

44. Expand GEAC. Mention its function.

2021 Model

45. Write any two critical research areas of biotechnology.

2021 March

46. What is the structural difference between proinsulin and mature functional insulin?

2021 March

47. Expand ELISA and write down the principle involved in this technique.

2021 Say

48. Bt cotton is an example for genetically modified organism.

(a) Name the foreign gene present in it.

(b) How does this gene help the plant to resist insect pests?

2021 Say

### 3 Marks Questions

1. Animals that have had their DNA manipulated to possess and express foreign DNA are called transgenic animals. Write briefly any three benefits of such transgenic animals to human beings.

2014 March

## Chapter 5- Biotechnology and its applications

2. Bt cotton is an example of genetically engineered cotton.
  - (a) What does Bt stands for ?
  - (b) Name the gene responsible for Bt toxin production.
  - (c) How does the toxin kill the insect ? 2017 Say
3. Gene therapy is a corrective therapy for a hereditary disease.
  - (a) Name the disease which was successfully corrected by gene therapy for the first time.
  - (b) How gene therapy is practiced for a permanent cure of the disease ? 2017 Say
4. The following figures represent the maturation of pro-insulin into insulin.
 
  - a) Identify i, ii and iii.
  - b) How did Eli Lilly company overcome the problems associated with insulin production ? 2017 2nd term
5. Meloidogyne incognita is a nematode parasite infects the roots of tobacco plants. Its infection can be prevented by biotechnological methods.
  - (a) Name the strategy.
  - (b) Explain the principle behind this strategy. 2018 March
6. Bt cotton is a transgenic pest resistant plant.
  - (a) How this was achieved ?
  - (b) How do this plant survive on pest attack ? 2018 Say
7. Insulin consists of two short polypeptide chains.
  - a) Name the chains.
  - b) Write the steps involved in the preparation of genetically engineered insulin 2019 2nd term
8. Bt-cotton is a transgenic plant.
  - (a) What does 'Bt' stands for ?
  - (b) Explain the mechanism of insect resistance in Bt-cotton. 2021 Model
9. Bt cotton is a transgenic plant with insecticidal protein named Bt toxin.
  - (a) Name the specific gene which produce Bt toxin.
  - (b) Name the organism from which this gene is isolated
  - (c) Explain the mechanism behind the insect resistance in Bt cotton. 2021 March
10. The genes of organisms can be altered by manipulation. Then such organisms are called genetically modified organisms (GMOs). List the merits of GM plants. 2021 Say

\*\*\*\*\*

## Chapter 6 - Organisms and populations

### 1Mark Questions

1. The size of a population is not static. Which of the following leads to decrease in population ?
  - 1) Natality and Mortality
  - 2) Mortality and Emigration
  - 3) Mortality and Immigration
  - 4) Natality and Immigration 2013 Say
2. Some type of Orchids live on the branches of mango trees. The relationship between mango tree and Orchid is an example of
  - 1) Mutualism
  - 2) Predation
  - 3) Commensalism
  - 4) Parasitism 2013 Say
3. The density of population in a given habitat increase or decrease due to different reasons. Name two factors responsible for increase in population in a given area. 2014 March
4. Sucker fish and shark live in close association, is a classic example of commensalism. What is commensalism? 2015 March
5. Desert plants like Opuntia are able to grow in extreme conditions. Suggest any two adaptations of this plant. 2015 March
6. On earth, life exists even in extreme and harsh conditions. Mention any two major biomes in India. 2016 March

## Chapter 6 - Organisms and populations

7. In a given habitat, the maximum number possible for a species is called \_\_\_\_\_ of that species in that habitat.  
*2017 March*

8. Plants have evolved astonishing varieties of morphological and chemical defences against herbivores. Which is the most common morphological means of defence in plants ?  
*2017 2nd term*

9. Under unfavourable conditions many zooplankton species in lakes and ponds are known to enter a stage of suspended development.  
*2018 March*

10. Choose the correctly matched pair from the following.

- a) Hibernation - Snail
- b) Diapause - Zooplankton
- c) Aestivation - Bear

*2019 2nd term*

11. Observe the relationship between the first two terms and fill in the blank.

Lichen : Mutualism

Orchid growing on a mango tree : \_\_\_\_\_

*2019 2nd term*

12. Name the type of interaction between an Orchid plant and a Mango tree.  
*2020 Model*

13. Fill up the blank suitably.

Mortality : No. of deaths in the population during a given period.

\_\_\_\_\_ : No. of births in the population during a given period.

*2020 March*

14. Select the non-parasitic organism from the list given below:

- (a) Lice
- (b) Cuscuta
- (c) Epiphytic orchid
- (d) Ticks

*2021 Model*

15. Observe the relationship between the first two terms and fill in the blank.

Mycorrhizae : Mutualism

Lice on humans : \_\_\_\_\_

*2021 March*

16. Which among the following features is not present in desert plants ?

- (A) Stomata in deep pits. (B) Smaller spiny leaves.
- (C) Thick cuticle. (D) Large number of stomata.

*2021 Say*

### 2 Marks Questions

1. Read the statements below and identify the mode of interaction between the species.

- a) Tiger eating deer
- b) Butterfly feeding pollen
- c) Human liver fluke feeds on snail
- d) Lice on humans
- e) Orchid attached to a tree
- f) Mycorrhizal association of fungi and roots of higher plants
- g) Sparrow eating seed
- h) Egrets foraging close to cattle

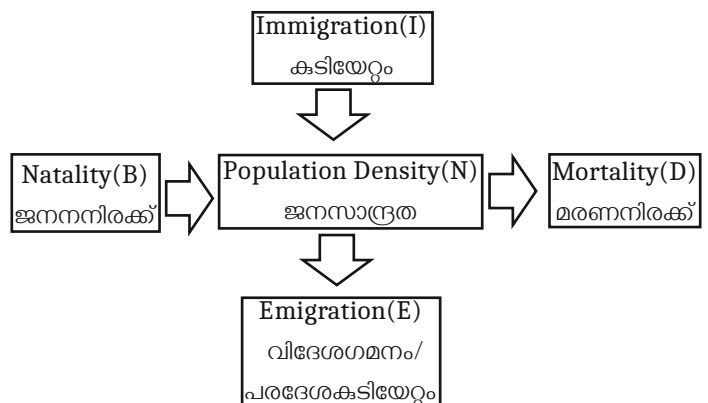
*2013 March*

2. In summer we use air conditioners and in winter we use heaters. Here homeostasis is accomplished by artificial means. Explain four ways by which other living organisms cope with the situation.  
*2013 March*

3. Many desert plants have adaptations to prevent loss of water from their body. Mention any two adaptations to minimise water loss from plant body.  
*2013 Say*

4. Response of organisms to abiotic stress involves different methods. Explain any two such responses with suitable examples  
*2014 Say*

5. Observe the diagram:



Define the following terms:

- a) Natality
- b) Mortality
- c) Emigration
- d) Immigration

*2014 Say*

## Chapter 6 - Organisms and populations

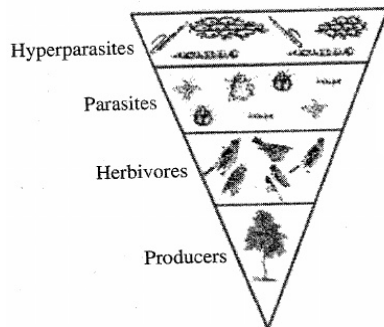
6. With regard to population growth rate, when resources are limiting the plot is logistic. Verhulst-Pearl Logistic growth is represented by the equation
- $$\frac{dN}{dt} = rN \left( \frac{K-N}{K} \right)$$

what are;

- (a) r  
(b) K

2015 March

7. Field survey by a group of students recorded the following data related to number of organisms in an ecosystem and plotted that into a figure shown below:



Observe the figure and explain the pyramid.

2015 Say

8. Observe the equation.

$$\frac{dN}{dt} = rN \left( \frac{K-N}{K} \right)$$

- (a) Which type of growth curve does it represent?  
(b) What do the following notations represent ?  
(a) N  
(b) r  
(c) K

2015 Say

9. Population growth may be exponential or logistic. Differentiate between them.

2016 Say

10. Plants are adapted to grow in different habitats. Write any four adaptations of plants in desert habitat.

2016 Say

11. Natality, Mortality, Immigration & Emigration are the four factors that affects population density in a region. Explain any two terms.

2017 Say

12. There are four mechanisms by which living organisms other than human beings maintain a constancy of internal environment. Name these processes.

2017 Say

13. List out four features that enable the plants to survive in deserts.

2017 2nd term

14. Given below is a table which shows inter-specific interaction of populations. We assigned '+' for beneficial, '-' for detrimental and '0' for neutral interaction. Fill in the blanks.

Species A	Species B	Name of interaction
+	-	Parasitism
-	-	.....
+	+	.....
+	0	.....
-	0	.....

2017 2nd term

15. A population has certain attributes that an individual organism does not. What are they?

2018 Say

16. Parasites evolved special adaptations to live on host. What are they?

2018 Say

17. Aquatic mammals like seals have a thick layer of fat below their skin. Name this layer of fat. Write the function of this layer.

2018 2nd term

18. Match the items of column A with B

A	B
a. Desert Lizard	i) Concentrated urine
b. Kangaroo rat	ii) Diapause
c. Snail	iii) Bask in the sun
d. Zooplankton	iv) Aestivation
	v) Hibernation

2018 2nd term



## Chapter 6 - Organisms and populations

19. Analyse the table given below and fill in the blanks.

A	B	C
Monarch butterfly and bird	_____a_____	Predation
Cattle egret and cattle	Beneficial to one species and the other species has neither benefit nor harm	_____b_____
Ticks and dogs	_____c_____	_____d_____

2018 2nd term

20. Observe the table given below and analyse the effect on species A and species B and identify the name of interaction

Species A	Species B	Name of Interaction
+	0	a
-	0	b
+	+	c
-	-	d

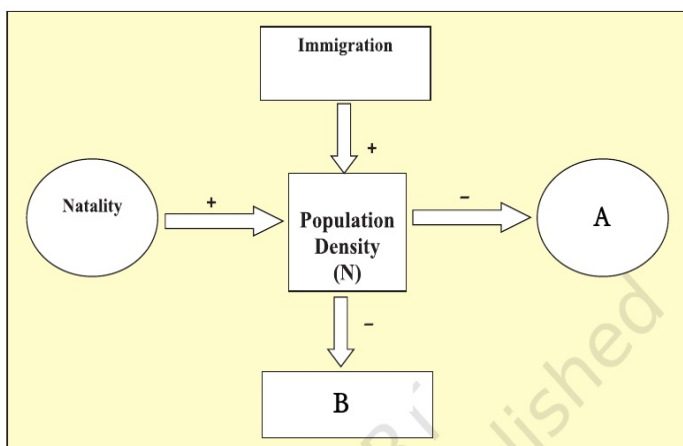
2019 Model

21. Predation is an interaction which has great significance in nature. Write down two significance of predation.

2019 Model

22. Observe the flow chart given below:

- Name the processes represented as A and B.
- If 'Nt' is the population density at time t, then write down the population density equation at time t+1.



2019 March

23. Match the columns (A) and (B)

(A)	(B)
(i) Mutualism	(a) An orchid growing on a tree trunk
(ii) Predation	(b) Gauss's Exclusion principle
(iii) Commensalism	(c) Biological control
(iv) Competition	(d) Derives nutrition from the host organism
	(e) Mycorrhizae

2019 March

24. Differentiate natality and mortality. Write the alphabets used to indicate natality and mortality.

2019 Say

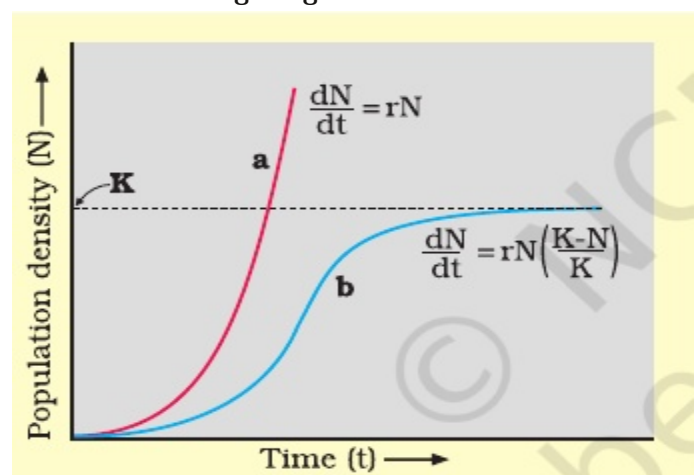
25. Name the interaction between sea anemone and clown fish. Justify your answer with suitable explanation.

2019 Say

26. Based on the nature of tolerance of temperature, organisms are classified as eurythermal and stenothermal. Differentiate the two.

2019 2nd term

27. Observe the figure given below:

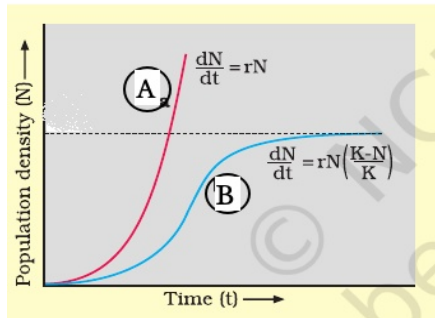


- Identify the population growth curve a, b.
- What do r and K stand for in the equation given in the figure?

2019 2nd term

## Chapter 6 - Organisms and populations

28. Identify the types of population growth noted in the graph as 'A' and 'B'



2020 March

29. Comment on Brood parasitism with an example.

2021 Model

30. Fill in the blanks with appropriate symbols (+, -, 0) of name of interaction.

Species A	Species B	Name of population interaction
___(a)___	___(b)___	Mutualism
+	___(c)___	Parasitism
+	0	___(d)___

2021 March

31. Differentiate ectoparasites and endoparasites and give an example for ectoparasite.

2021 Say

32. In a primary succession in water, there are several seral stages. Name the pioneer and climax stages.

2021 Say

### 3 Marks Questions

1. Adaptations are the attributes of the organism that enables it to survive and reproduce in its habitat. Give the adaptations of

- Cactus plant in desert
- Kangaroo rat in desert
- Seals in polar region

2014 March

2. Population interactions may be beneficial or not. Write any three interactions in detail.

2016 March

3. Organisms are influenced by biotic and abiotic factors. Write an account of any three abiotic environmental factors.

2016 March

4. Different types of population interaction has been observed in a population. Write the types of interaction observed among the following species:

Species A	Species B	Type of Interaction
Orchid Ophrys	Bees	_____
Cattle	Cattle Egret	_____
Sea Anemone	Clown fish	_____
Ticks	Dogs	_____
Cuscuta	Hedge plant	_____
Tiger	Deer	_____

2017 March

5. Organisms other than human beings manage or adapt to stressful conditions by adopting different mechanisms. Explain any three mechanisms adopted by them to maintain their internal environment.

2017 March

6. The density of population in a given habitat during a given period fluctuates due to changes in four basic process. List out them and how do these process affect the population density.

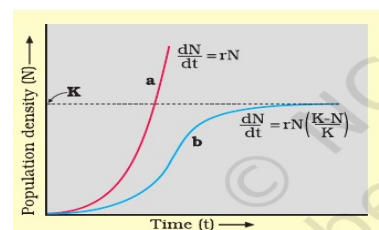
2017 2nd term

7. Identify the following interactions.

- Barnacles on whale
- Wasp on fig
- Ticks on dog
- Abingdon tortoise and goats
- Tiger and deer
- Mycorrhiza

2018 Model

8. The following graph shows two types of population growth curves:



- Name the growth curves.
- What does 'K' stands for?

2018 March

9. Observe the terms given below.

Natality, Mortality, Immigration, Emigration

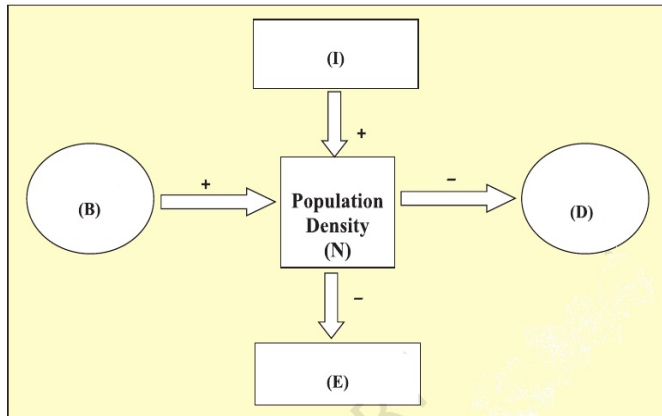
Identify and write the terms that increase population density. Substantiate your answer with suitable explanation.

2018 2nd term

## Chapter 6 - Organisms and populations

10. Observe the flow chart given below:

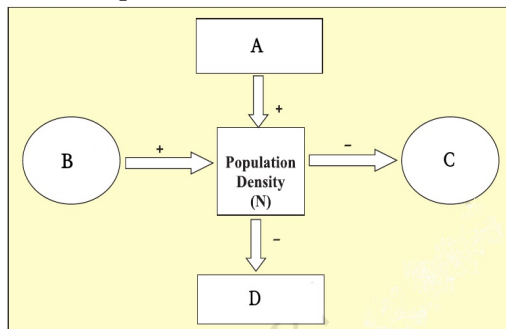
- a) What do B, D, E, I in the flow chart represent?
- b) Define D and B



2019 2nd term

11. Density of a population fluctuates due to changes in four basic processes.

- (a) Complete the diagram by adding the points A, B, C and D.
- (b) Explain A and D.



2020 Model

12. Briefly describe the adaptations of desert plants

2020 Model

13. Given below are examples of some ecological/ population interactions. Place them under suitable columns given below.

- (a) Abingdon tortoise and goat
- (b) Cuscuta and host tree
- (c) Fig tree and wasp
- (d) Algae and fungi in Lichens
- (e) Balanus and Chathamalus barnacles
- (f) Lice on humans

Competition	Parasitism	Mutualism
• •	• •	• •

2020 March

14. Analyse the following table showing population interaction :

Species A	Species B	Name of interaction
+	_(i)_	Commensalism
+	+	_(ii)_

- (a) Identify (i) and (ii).
- (b) Define (ii).
- (c) Give an example of commensalism.

2020 Say

15. Opuntia is a plant well adapted to desert conditions. Write down the various adaptation found in desert plants.

2021 Model

16. The four basic processes that affect the population density are given below.

**Nativity, Mortality, Emigration, Immigration**

Which of the two processes contribute to a decrease in population density and explain them.

2021 March

17. Fill in the blank columns in the given table with appropriate terms given in brackets.

[Commensalism, Cuscuta, Mutualism, Lichen, Parasitism, Epiphytic orchid]

Species A	Species B	Type of interaction	Example
+	+	_a_	_b_
+	O	_c_	_d_
+	-	_e_	_f_

2021 Say

## Chapter 6 - Organisms and populations

### 4 Marks Questions

1. Interspecific interaction arise from the interaction of populations of two different species. If we assign '+' for beneficial, '-' for detrimental and '0' for neutral interactions, copy and complete the following chart.

Species A	Species B	Name of interaction
-----	-----	Mutualism
—	—	-----
-----	-----	Commensalism
-----	-----	Amensalism
—	—	-----

2012 March

2. Students involved in nature club activity found some interspecific interactions between organisms in a garden area. They made a table of interaction giving '+' for beneficial interaction, '-' for detrimental and '0' for neutral interaction.

	Species A	Species B
i	+	+
ii	—	—
iii	+	0
iv	—	0

- a) Give name of interaction in each case.  
b) Explain how parasitism differ from predation.  
c) Give the significance of species interaction.

2012 Say

\*\*\*\*\*

## Chapter 7- Ecosystem

### 1Mark Questions

1. Final community that is in near equilibrium with environment in ecological succession is called ...

2013 March

2. Natural interlinked food chains are called...

2013 March

3. Which of the following is a detritivore ?

- 1) Earthworm
- 2) Virus
- 3) Fox
- 4) Cow

2013 Say

4. Teacher pointing to a forest said, "Long back this place was a pond" This gradual change is an example of

- 1) Secondary succession
- 2) Xerarch succession
- 3) Pioneer species
- 4) Hydrarch succession

2013 Say

5. The species that invade a nude area are called \_\_\_\_\_ species. In a primary succession on rocks, the group that invade first are usually \_\_\_\_\_

2014 March

6. The rate of biomass production in an ecosystem is called productivity. They are of two types, gross primary productivity and net primary productivity. How these productivities are related ?

2014 March

7. By observing the relationship of the first pair fill up the blanks:

- a) Grazing food chain : producers and consumers  
Detritus food chain : dead organic matter and \_\_\_\_\_  
b) Nitrogen : Gaseous cycle  
Sulphur : \_\_\_\_\_

2014 Say

8. Gradual, sequential changes of a given area including species composition is known as ecological succession. If so, name the first two stages of succession in hydric area.

2014 Say

9. Hydrosere succession stages are given below. Arrange them in order.

**Scrub stage - Forest - Submerged free floating - Marsh Meadow - Submerged stage - Reed swamp - Phytoplankton.**

2015 Say

## Chapter 7- Ecosystem

10. By observing the relationship of the first pair fill up the blanks:

(a) Net primary productivity = Gross primary productivity - Respiration

Gross primary productivity = \_\_\_\_\_

(b) Carbon : Gaseous cycle

Phosphorus : \_\_\_\_\_ *2015 Say*

11. Earthworms are commonly referred as farmers' friends. Define fragmentation. *2016 Say*

12. In a forest ecosystem different plant species are occupied in different vertical levels. Name such vertical arrangement. *2018 Say*

13. Fill in the blank.

Detritus food chain begins with \_\_\_\_\_

*2018 2nd term*

14. Which one of the following has the largest population in a foodchain?

- (a) Producers (b) Primary consumers  
(c) Secondary consumers (d) Tertiary consumers

*2020 March*

15. Choose the correct answer :

The pioneer species in xerarch succession is :

- (a) Phytoplankton  
(b) Lichen  
(c) Zooplankton  
(d) Bryophyte

*2020 Say*

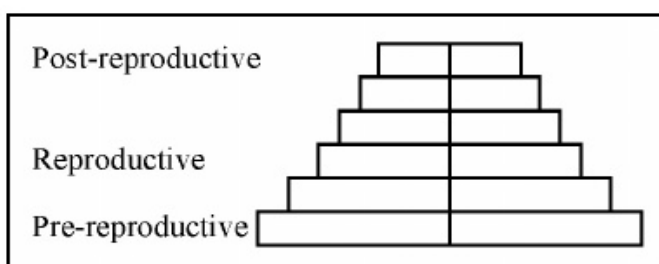
16. Choose the correct answer:

An organism that has the ability to concentrate its urine is :

- (a) Desert Lizard  
(b) Seal  
(c) Flamingo  
(d) Kangaroo rat

*2020 Say*

17. Observe the figure given below and identify the type of age pyramid for human population :



*2020 Say*

### 2 Marks Questions

1. In a marine ecosystem, a population of phytoplankton (1,50,000) supports a standing crop of fishes (40,000).

(a) Draw the pyramid of biomass and

(b) The pyramid of numbers in this ecosystem. *2012 March*

2. The gradual and fairly predictable changes in the species composition in an area is called ecological succession.

(a) Name the pioneer species in the primary succession in water.

(b) Give the sequence of events and climax community in the hydrarch succession. *2012 March*

3. Given number of individuals in a grassland ecosystem:

Grasshopper - 1500

Grass - 5,842,000

Wolf - 28

Birds - 215

a) Draw a pyramid of numbers showing various trophic levels.

b) Explain trophic level. *2012 Say*

4. Rate of biomass production is called productivity and can be divided into GPP and NPP.

a) Define GPP and NPP.

b) How can we relate GPP and NPP ? *2012 Say*

5. A list of organisms are given. Place them in different trophic levels.

**Grass, Man, Fishes, Birds, Lion,**

**Grasshopper, Zooplankton, Trees.**

*2013 March*

6. In the equation,

$GPP - R = NPP$ ;

if NPP = Net Primary Productivity

explain  $GPP - R = NPP$  *2013 Say*

7. A list of different organisms in an ecosystem are given below. Arrange them in 1st, 2nd, 3rd and 4th trophic levels.

i) Phytoplankton

ii) Man

iii) Fish

iv) Zooplankton *2014 March*



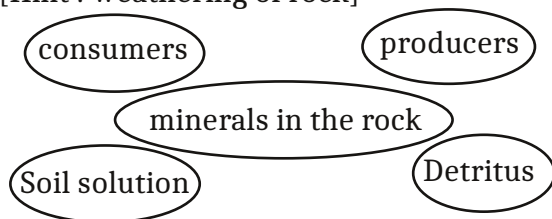
## Chapter 7- Ecosystem

8. Field survey by a team of students recorded the following data related to biomass of the organisms in each trophic level of an ecosystem. Draw, name and explain the pyramid.

Organisms	Biomass(g/m <sup>2</sup> )
Phytoplanktons	4
Zooplanktons	6
Small fishes	8
Carnivorous fishes	12

2014 Say

9. Given below are the components related to simplified model of mineral cycling in a terrestrial ecosystem. Construct a flow chart. [Hint : weathering of rock]



2015 March

- 10 Primary succession on rocks is known as xerosere. Answer the following related with xerosere.

- Name the pioneer community.
- Organic acids have important roles in this succession. Justify.

2015 March

- 11.Nutrients are never lost from the ecosystems and are recycled. Write about

- gaseous cycle
- sedimentary cycle

2016 March

- 12.Ecological pyramids are usually upright. Meanwhile some, pyramid of biomass is inverted. Explain the reason.

2016 March

- 13.An ecosystem consist of the following population:

Phytoplankton  
Man  
Fish  
Zooplankton

Draw a food chain denoting each trophic level.

2017 March

- 14.The different stages of primary succession in water are represented below. Fill the gaps that are unfilled.

- Phytoplankton
- \_\_\_\_\_
- Submerged free floating plant stage
- \_\_\_\_\_
- \_\_\_\_\_
- Shrub stage
- \_\_\_\_\_

2017 March

- 15.The natural reservoir of phosphorus is rock where it is present in the form of phosphates. How this phosphorus is cycled in ecosystem ?

2017 Say

- 16.Grasshopper, Grass, Man and Birds represent members in a foodchain. Draw a food chain representing each of the above in different trophic levels.

2017 Say

- 17.The gradual and fairly predictable change in the species composition of a given area is called ecological succession. Write the sequence of events occuring in a xerarch succession.

2017 2nd term

- 18.Ecological pyramids are very useful in ecological studies. However they have some limitations also. Write the limitations of ecological pyramids.

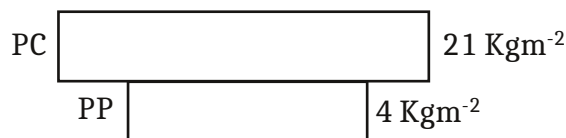
2017 2nd term

- 19.Some organisms are given below. Arrange them in the order of their trophic levels.

**Grasshopper, Birds, Man, Grass.**

2017 2nd term

- 20.



Identify the above pyramid and justify your answer.

2018 Model

- 21.Succession takes place on bare rock is called Xerarch succession. List out its sequential stages.

2018 Model

- 22.The products of ecosystem processes are named as ecosystem services. List out any four such services.

2018 March

## Chapter 7- Ecosystem

23. Pyramid of energy is never been inverted, why ?  
*2018 March*

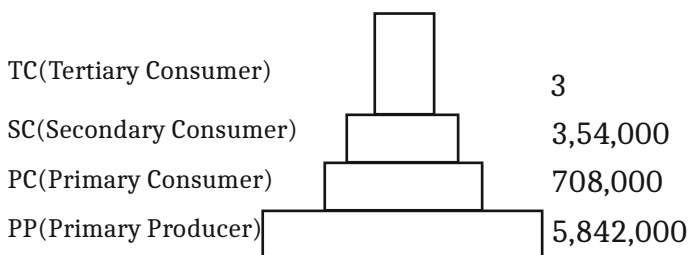
24. Humification leads to accumulation of a dark coloured amorphous substance. Identify the substance and its peculiarities.  
*2018 Say*

25. The seral stages of hydrarch succession are given below in an incorrect order. Arrange them in correct sequence.

Forest, Reed-swamp, Scrub, Phytoplankton, Marsh-meadow, Submerged free floating plants, Submerged plants.

*2018 2nd term*

26. Observe the pyramid given below.



Name the pyramid.

Draw a pyramid using the following data.

PC 21

PP 4

*2018 2nd term*

27. Gradual predictable changes in the species composition of a given area is called ecological succession. Differentiate primary and secondary succession.  
*2019 Model*

28. Observe the equation given below.

$$N.P.P = G.P.P - \text{Respiration}$$

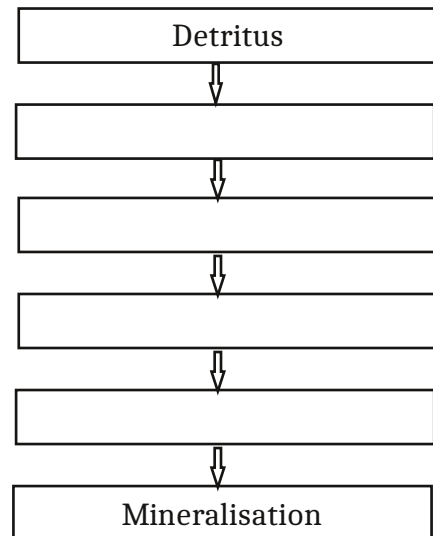
a) What does N.P.P and G.P.P stand for ?

b) Define secondary productivity

*2019 Model*

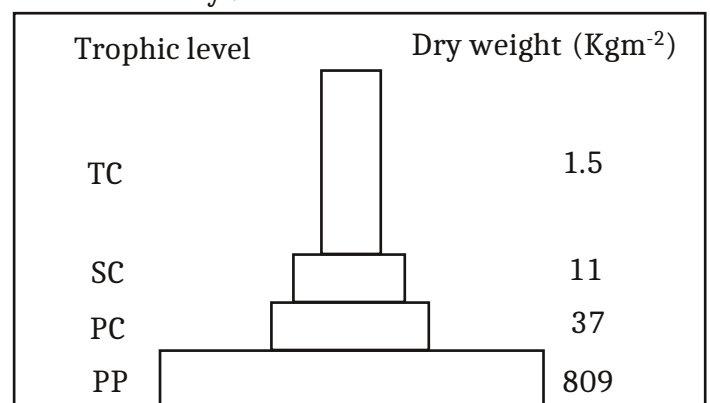
29. Steps involved in the process of decomposition are given below. Construct a flow chart showing correct sequence of decomposition choosing the words from the box.

Detritus, Catabolism, Humification, Fragmentation, Leaching, Mineralisation



*2019 Model*

30. (a) Identify the type of ecological pyramid given below.  
(b) Pyramid of energy is always upright. Why ?



*2019 March*

31. Detritivores play a major role in decomposition.

(a) What are detritivores ?

(b) Write an example for a detritivore.

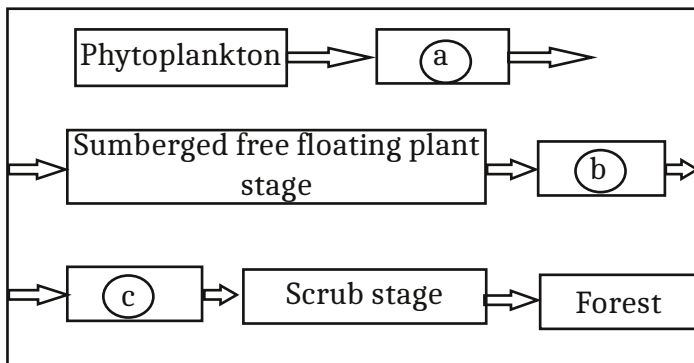
*2019 March*

32. Decomposition takes place through different steps. The first step is fragmentation. Write the other four steps.

*2019 Say*

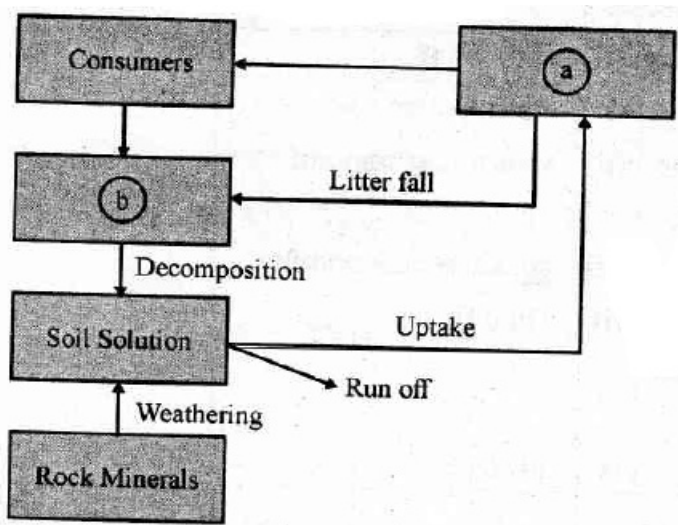
## Chapter 7- Ecosystem

33. Observe the flowchart showing the stages of a kind of succession. Identify and write the kind of succession. Fill in the blanks a, b, c.



2019 Say

34. Observe the figure given below:



Name the nutrient cycle and fill in the blank (a), (b)

2019 Say

35. Expand GFC and DFC. Differentiate the two.

2019 2nd term

36. Primary productivity can be divided into two.

- Name them.
- Primary productivity depends on various factors. Write any two factors.

2019 2nd term

37. Humification and Mineralisation occur during decomposition in soil. Write the difference between these two processes.

2020 Model

38. (a) Construct a grazing food chain using the following organisms:

**Bird, Grass, Grasshopper**

(b) Write the trophic level of grasshopper

2020 Model

39. What is the difference between hydrarch succession and xerarch succession.

2020 March

40. Given below is a data showing number of individuals and dry weight of different trophic levels in a grassland ecosystem. Construct,

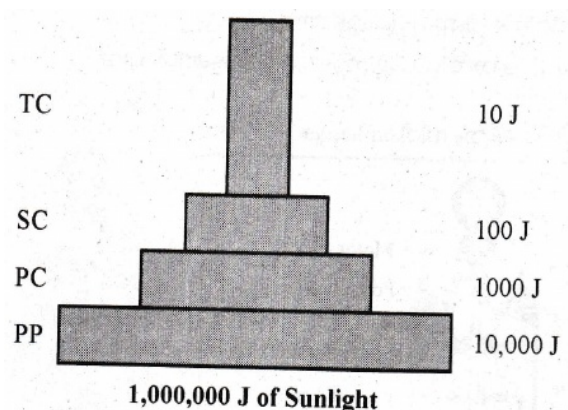
- Pyramid of numbers
- Pyramid of biomass

Trophic level	Number of individuals	Dry weight (Kgm <sup>-2</sup> )
Primary producer	5,842,000	809
Primary consumer	7,08,000	37
Secondary consumer	3,54,000	11
Tertiary consumer	3	1.5

2020 March

41. The figure shows simplified model of phosphorus cycle. Analyse the figure and fill up the blanks.

42. The figure given below indicates a pyramid of energy. Why is a pyramid of energy always upright in position.



2021 Model

## Chapter 7- Ecosystem

43. What is ecological succession? Differentiate Hydrarch succession and Xerarch succession.

2021 Model

44. State the important steps in decomposition.

2021 March

45. Based on the nature of the habitat, succession of plants may be hydrarch or xerarch.

(a) Which is the pioneer community in xerarch succession?

(b) Explain hydrarch succession. 2021 March

46. Organisms belonging to different trophic levels are listed below. Arrange the organisms under appropriate headings in the table provided.

**Man, Phytoplankton, Fish, ZooPlankton**

First trophic level	Second trophic level	Third trophic level	Fourth trophic level

2021 March

47. Pyramid of energy is always upright, can never be inverted. Justify this statement.

2021 Say

48. Write short notes on the following:

(a) food web

(b) 10 percent law

2021 Say

### 3 Marks Questions

1. Biogeochemical cycle is an important phenomenon in every ecosystem. Describe phosphorus cycle.

2016 Say

2. The plant communities in a given area shows successive changes. Mention the stages of succession in a xerosere.

2016 Say

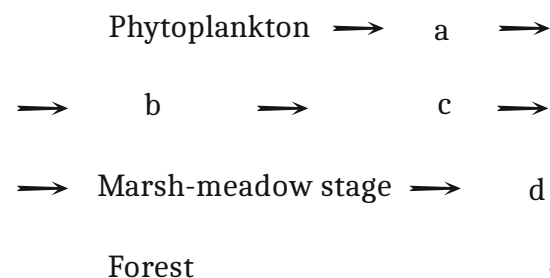
3. Hydrarch succession takes place in wetter areas and the successional series progress from 'hydric' to 'mesic' condition. List out the stages in correct sequence.

2018 Say

4. Succession takes place in wetter areas and dry areas.

a) Name the succession that takes place in wetter areas (water).

b) Fill in the blanks of the flow chart given below:



2019 2nd term

5. Observe the figures A and B given below:

a) Identify the type of pyramid A, B.

b) Which kind of pyramid is always upright? Justify your answer.

2019 2nd term

6. Decomposition has five important steps.

(a) Write that five steps.

(b) Give an example of a detritivore

2020 Say

## Chapter 8- Environmental issues

### 1 Mark Questions

1. Increase in the concentration of toxicants at successive trophic level is called...

(a) BOD

(b) Biomagnification

(c) Eutrophication

(d) Algal Bloom

2016 March

2. Temperature is generally increasing, making the earth a hot plate. Mention any two measures to control global warming

2016 March

3. Among the following which one is used for reducing the emission of poisonous gases from automobiles

(a) Landfills

(b) Catalytic converter

(c) Electrostatic precipitator

(d) Earmuffs

2017 Say

## Chapter 8- Environmental issues

4. Increase in concentration of toxic substance of successive trophic level is called...  
(a) Biofortification  
(b) Bioaccumulation  
(c) Phytoremediation  
(d) Biomagnification *2017 Say*
5. Name the award given by the Government of India to individuals or communities from rural area for protecting wildlife. *2019 Model*
6. The Government of India has introduced the concept of \_\_\_\_\_, so as to work closely with the local communities for protecting and managing forests. *2019 March*
7. Which among the following is *not* a green house gas?  
(a) N<sub>2</sub>O (b) Methane  
(c) Carbon dioxide (d) Ozone *2019 March*
8. Expand CNG. *2019 Say*
9. Choose the correct answer.  
Natural aging of a lake by nutrient enrichment of its water is called  
(a) Biomagnification (b) Algal bloom  
(c) Succession (d) Eutrophication *2020 Model*
- 2 Marks Questions**
1. The increased use of chemicals like CFCs(Chloro Fluoro Carbons) cause adverse ecological impacts. Why CFCs are considered harmful to the environment ? *2012 March*
2. Meena, an environmental activist, noticed a gradual decline in the population of birds in the open agricultural fields near her place. She has heard of the excessive use of pesticides like DDT around that area.  
(a) What might have led to the decline of bird population in that area?  
(b) Name the process that has caused this phenomenon. *2012 March*
3. Ammu read in the newspaper that BOD of a waterbody in a nearby village is high and there is algal bloom.  
a) What is BOD?  
b) What is algal bloom?  
c) Can you give possible reason for these phenomena. *2012 Say*
4. Prakash parked his car in bright sunlight for a few hours, with glass windows fully raised. After sometime the inside of the car was very hot.  
a) Name the phenomenon.  
b) How can you correlate this phenomenon with global warming? *2012 Say*
5. Environmentalists usually say : 'There are many causes for biodiversity losses' Illustrate four major causes of biodiversity loss. *2013 March*
6. An article in the newspaper reports that 'Refrigerants like Chloro Fluoro Carbons(CFCs) pose threat to the environment.'How CFCs are harmful to the environment? *2014 March*
7. Nowadays many farmers are interested in organic farming. What is meant by organic farming ? Can you suggest any two advantages of organic farming ? *2014 March*
8. An aquatic ecosystem having luxurious growth of cyanobacteria(Algal bloom) leads to eutrophication.  
(a) What kind of pollutants cause algal bloom to colonize the aquatic ecosystem ?  
(b) What are the consequences of eutrophication ? *2015 March*
9. During the past century, the temperature of the earth has increased by 0.6°C, most of it during the last few decades. Rise in temperature cause deleterious changes in the environment, thus leading to increased melting of polar ice caps as well as other places like Himalayan snow caps. Suggest any two control measures that will reduce global warming. *2015 March*
10. The major pollution in the environment is caused by automobiles. Expand the term CNG. Mention any two of its merits. *2016 March*

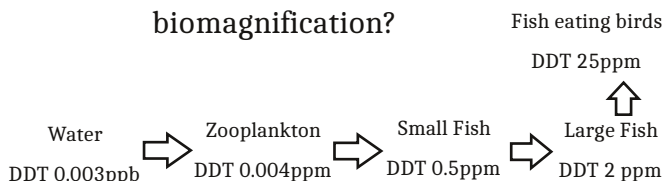


## Chapter 8- Environmental issues

11. Quantity of pollutants increase in successive trophic levels. Observe the flowchart regarding biomagnification of DDT in an aquatic food chain and answer the following:

(a) What is biomagnification?

(b) What are the consequences of biomagnification?



2016 Say

12. Adequate waste management is an environmental issue to be considered. Discuss the advantages of Eco-san toilet.

2016 Say

13. A common cause of deforestation is slash and burn agriculture.

(a) What is the common name attributed to such type of cultivation?

(b) Explain how this type of cultivation is practiced.

2017 March

14. Particulate matter in polluted air is removed by the application of electrostatic precipitator. Explain the working principle of electrostatic precipitator.

2017 March

15. Nutrient enrichment in a fresh water lake leads to eutrophication.

(a) What happens during eutrophication?

(b) How dissolved oxygen level is affected as a result of this?

2017 Say

16. High level of noise is considered as pollution.

(a) What are its effects?

(b) How it can be controlled?

2018 Model

17. Match the column A with B

A	B
1. Catalytic converter	a. Thermal Powerplant
2. Electrostatic precipitator	b. Ozone depletion
3. Montreal protocol	c. Deforestation
4. Jhum cultivation	d. Platinum-Palladium
	e. Joint forest management

2018 Model

18. Ozone acts as a shield for absorbing ultraviolet radiations from the sun

(a) Name the region of atmosphere where ozone is seen.

(b) Write the unit used to measure ozone layer.

2018 March

19. In 1990's Delhi ranked fourth among the most polluted cities of the world. What are the parallel steps taken to reduce vehicular pollution?

2018 March

20. Increase in the level of green house gases leads to global warming. How can it be controlled?

2018 March

21. Catalytic converters are used in automobiles to control air pollution. Briefly comment on its role.

2018 Say

22. Domestic sewage and industrial effluents contain large amount of nutrients. What are the probable effects of these nutrients on water bodies?

2018 Say

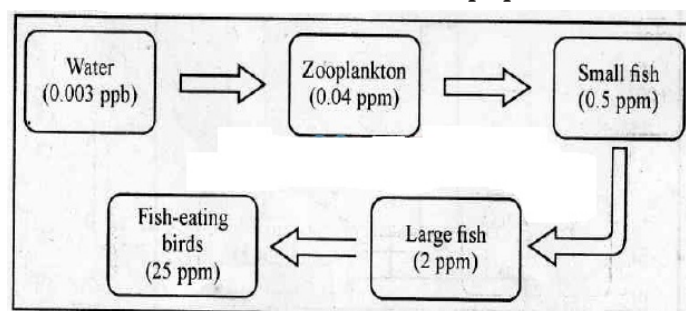
23. Deforestation is a serious issue in the present scenario. Write any two consequences of deforestation.

2019 March

24. Given below is a flow chart showing the accumulation of DDT in different trophic levels:

(a) Name the phenomenon

(b) How does it affect bird population?



2019 March

25. Water bodies around us are getting polluted due to various reasons. Write any four consequences of water pollution.

2019 Say

26. Why is CNG better than diesel or petrol?

2020 Model

27. What are the main consequences of Global warming?

2020 March

28. Suggest any two methods for the disposal of solid wastes.

2020 March

## Chapter 8- Environmental issues

29. One of the effects of water pollution is algal bloom.

- (a) Define algal bloom.
- (b) Write two effects of algal bloom in aquatic ecosystem. 2020 Say

30. Write the uses of scrubber and electrostatic precipitator. 2020 Say

31. The concentration of toxicants like DDT increase in successive trophic levels.

- (a) Name this phenomenon.
- (b) How does this phenomenon affect the fish eating birds in an aquatic food chain ? 2020 Say

32. 'Jhum' cultivation/Slash and burn agriculture is an agricultural practice in north eastern states of India. How this practice enhances deforestation? 2021 Model

33. Write any four measures for controlling Global warming, 2021 Model

34. In 1980 Government of India introduced a management programme, JFM.

- (a) Expand JFM.
- (b) What is its significance ? 2021 Model

35. What is biomagnification? Name any one chemical that cause biomagnification. 2021 March

36. List any four reasons for deforestation. 2021 March

37. Catalytic converters are fitted in automobiles for reducing emission of poisonous gases.

- (a) Name the catalysts used in catalytic converters.
- (b) What happens to the automobile exhaust when it passes through catalytic converters ? 2021 March

38. Global Warming causes so many hazards to the nature. Suggest any two ways to reduce Global Warming. 2021 Say

39. Write short notes on the following :

- (a) Chipko Movement
- (b) Joint forest Management 2021 Say

40. List out any four major consequences of deforestation. 2021 Say

### 3 Marks Questions

1. For reducing the air pollution in Delhi the entire fleet of public transport buses were converted to CNG.

- (a) Expand CNG
- (b) List out its advantages 2018 Model

2. Use of nuclear energy has very serious inherent problems due to the production of radioactive waste.

- a) Write three harmful effects of radioactive waste
- b) Write one measure for safe disposal of nuclear waste 2019 Model

3. Natural ageing of a lake by nutrient enrichment is called eutrophication.

- a) Name the enhanced ageing process due to human activity.
- b) Write down two consequences of eutrophication in water bodies. 2019 Model

4. Observe the figure showing the relative contribution of various greenhouse gases to global warming.

- (a) Identify A, B.
- (b) Write any two consequences of global warming. 2019 Say

5. Air pollution is a serious environmental issue. Give three harmful effects of air pollution. 2020 Model

6. Ozone depletion in stratosphere is a serious environmental issue.

- (a) What is good ozone?
- (b) How do CFCs degrade ozone molecules in stratosphere? 2020 March

### 4 Marks Questions

1. In a study conducted, the concentration of DDT was found to increase in the successive trophic levels. The results of the study is shown below:

Zooplankton  $\Rightarrow$  Small Fish  $\Rightarrow$  Large Fish  $\Rightarrow$  Fish Eating Bird  
DDT 0.4ppm  $\Rightarrow$  DDT 0.05ppm  $\Rightarrow$  DDT -2ppm  $\Rightarrow$  DDT -25ppm

Name the phenomenon. How does DDT accumulation in birds affect their population? Explain. 2013 Say

## Chapter 8- Environmental issues

2. A pond near to your home was with excessive algal bloom.
- What are the possible reasons for this?
  - What will be the level of BOD?
  - Write any one case study for integrated waste water management.
- 2014 Say*
3. The temperature at New Delhi during April 2013 is  $44.5^{\circ}\text{C}$ . The earth's temperature was regularly increasing.
- What are the reasons?
  - Write your suggestion to control this phenomenon.
- 2014 Say*
4. United Nations framework convention on climate change, an international treaty signed by 194 countries to cooperatively discuss global climate change and its impact.
- As a science student,
- What is global warming?
  - Explain the reasons and give suggestions to control global warming.
- 2015 Say*
5. Observe the diagram and answer the following:
- Suggest the reasons for the presence of DDT in the water
  - Fish eating birds of this area have higher DDT concentration in their body. Justify.
  - What will be the impact of DDT in the birds?
- 2015 Say*

\*\*\*\*\*

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Be inspired, but don't copy