



NEET

Chapter-wise & Topic-wise
Solved Questions

38 YEARS
2025-1988

BIOLOGY

**EXTRA
PYQs**

From
2024 Re-NEET,
2023 Manipur
& More

**REVISION
FRIENDLY**

Highlighted must
Revise Questions
for Last time
Revision

**100%
VERIFIED**

100% Verified
From NTA
Answers
Keys

**NMC
UPDATED**

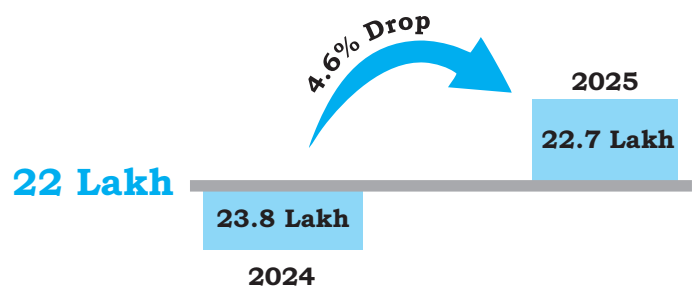
Updated as per
Latest NMC
syllabus



**NEW
TOPICS**

Practice
Questions for
Newly added
NEET Topics

NEET BLUEPRINT: ANALYZING PATTERNS FOR EXAM MASTERY

Registered Candidate Comparison

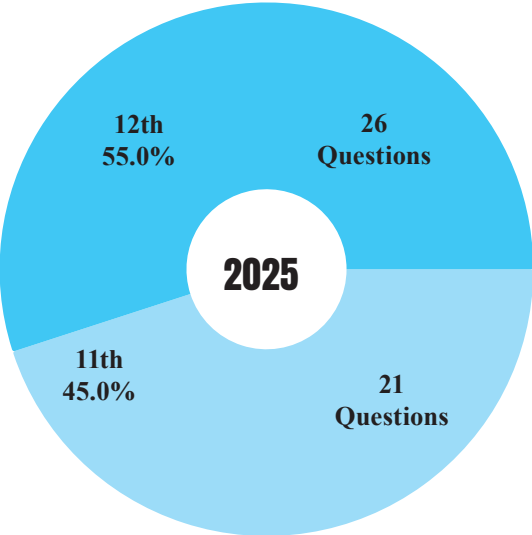


		2024	2025
Female		13.6 Lakh	12.41 Lakh
Male		10.18 Lakh	10.29 Lakh

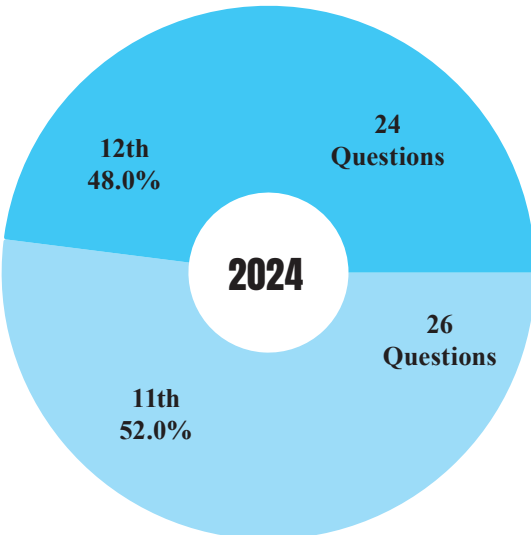


Class-wise Comparison

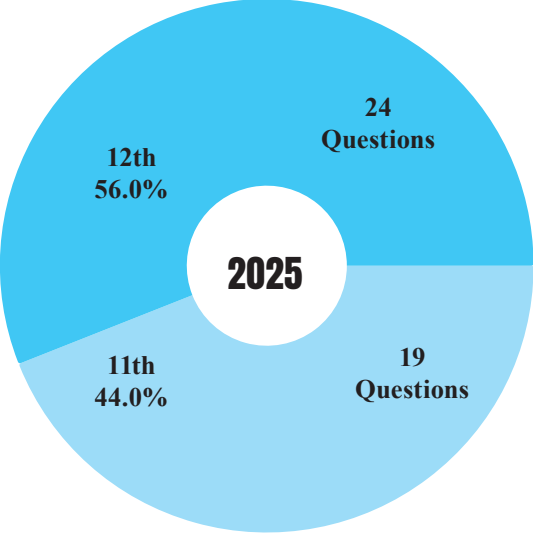
BOTANY



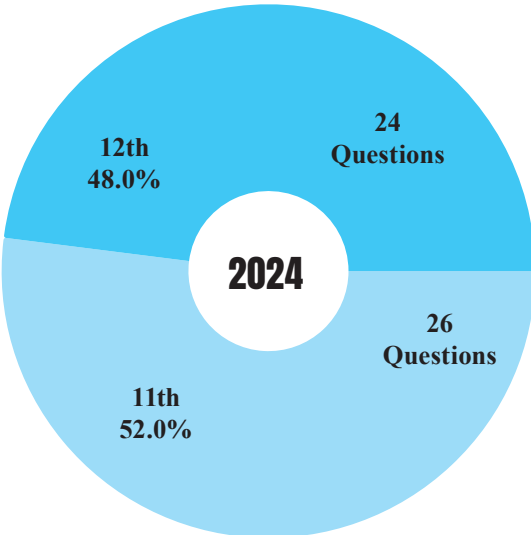
BOTANY



ZOOLOGY



ZOOLOGY



YEAR WISE NUMBER OF QUESTIONS

Biology Class-XI															
Chapters'/Units' Name	Year Wise Number of Questions														
	2025	2024 Re	2024	2023	2023 Manipur	2022	2022 Re	2021	2020	2020 Covid	2019	2018	2017	2016 II	2016 I
The Living World	0	0	0	0	2	1	1	1	0	0	1	1	0	2	0
Biological Classification	1	1	2	0	0	2	2	1	1	1	2	5	3	3	5
Plant Kingdom	5	2	1	3	3	3	2	4	3	3	2	3	5	2	1
Animal Kingdom	4	4	3	4	2	2	2	4	4	4	2	3	4	1	4
Morphology of Flowering Plants	3	3	5	2	3	3	3	2	3	3	1	2	4	4	4
Anatomy of Flowering Plants	1	4	3	4	3	3	3	1	2	2	3	4	3	2	1
Structural Organisation in Animals	4	4	4	4	4	4	5	4	3	3	2	1	1	2	2
Unit – Cell : Structure and Functions	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cell: The Unit of Life	4	5	4	2	2	4	1	2	4	4	6	2	3	2	2
Biomolecules	4	6	6	3	4	3	6	4	4	2	3	1	2	3	1
Cell Cycle and Cell Division	1	3	4	6	5	4	5	5	4	4	2	1	3	3	2
Photosynthesis in Higher Plants	2	3	3	3	3	2	2	2	2	2	0	1	2	2	3
Respiration in Plants	1	2	2	2	2	3	3	1	1	1	2	2	1	2	0
Plant Growth and Development	2	3	3	3	3	3	3	3	3	3	2	0	1	1	1
Breathing and Exchange of Gases	0	2	3	3	3	2	2	2	2	2	0	1	2	2	3
Body Fluids and Circulation	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1
Excretory Products and their Elimination	1	2	2	2	2	1	0	0	2	0	2	2	2	1	1
Locomotion and Movement	1	2	2	2	1	2	2	3	1	1	2	1	3	2	1
Neural Control and Coordination	0	1	2	2	2	1	2	0	1	1	2	3	2	1	1
Chemical Coordination and Integration	4	2	2	2	2	1	3	1	4	3	2	2	2	4	2

Contents Cum Topic Weightage

The following abbreviations have been used in the book:

[MR^{*}] - Must Revise Questions

[OS] - Outside NCERT Questions

❖ NEET 2025 Solved Paper

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4	Taxonomic Categories

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- The complex II of mitochondrial electron transport chain is also known as
 - Cytochrome bc_1
 - Succinate dehydrogenase
 - Cytochrome c oxidase
 - NADH dehydrogenase
- Polymerase chain reaction (PCR) amplifies DNA following the equation.
 - N^2
 - 2^n
 - $2n + 1$
 - $2N^2$
- What are the potential drawbacks in adoption of the IVF method?
 - High fatality risk to mother
 - Expensive instruments and reagents
 - Husband/wife necessary for being donors
 - Less adoption of orphans
 - Not available in India
 - Possibility that the early embryo does not survive

Choose the correct answer from the options given below:

 - B, D, F only
 - A, C, D, F only
 - A, B, C, D only
 - A, B, C, E, F only
- What is the name of the blood vessel that carries deoxygenated blood from the body to the heart in a frog?
 - Aorta
 - Pulmonary artery
 - Pulmonary vein
 - Vena cava
- Which one of the following statements refers to Reductionist Biology?
 - Physico-chemical approach to study and understand living organisms.
 - Physiological approach to study and understand living organisms.
 - Chemical approach to study and understand living organisms.
 - Behavioural approach to study and understand living organisms.
- Given below are two statements:
Statement I: In the RNA world, RNA is considered the first genetic material evolved to carry out essential life processes. RNA acts as a genetic material and also as a catalyst for some important biochemical reactions in living systems. Being reactive, RNA is unstable.
Statement II: DNA evolved from RNA and is a more stable genetic material. Its double helical strands being complementary, resist changes by evolving repairing mechanism.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

- Both Statement I and Statement II are correct
 - Both Statement I and Statement II are incorrect
 - Statement I is correct but Statement II is incorrect
 - Statement I is incorrect but Statement II is correct
- Epiphytes that are growing on a mango branch is an example of which of the following?
 - Commensalism
 - Mutualism
 - Predation
 - Amensalism
 - From the statements given below choose the **correct** option:
 - The eukaryotic ribosomes are 80S and prokaryotic ribosomes are 70S.
 - Each ribosome has two sub-units.
 - The two sub-units of 80S ribosome are 60S and 40S while that of 70S are 50S and 30S.
 - The two sub-units of 80S ribosome are 60S and 20S and that of 70S are 50S and 20S.
 - The two sub-units of 80S are 60S and 30S and that of 70S are 50S and 30S.
 - A, B, C are true
 - A, B, D are true
 - A, B, E are true
 - B, D, E are true
 - Which one of the following is an example of ex-situ conservation?
 - National Park
 - Wildlife Sanctuary
 - Zoos and botanical gardens
 - Protected areas
 - Given below are two statements:
Statement I: The primary source of energy in an ecosystem is solar energy.
Statement II: The rate of production of organic matter during photosynthesis in an ecosystem is called net primary productivity (NPP).
 In the light of the above statements, choose the **most appropriate** answer from the options given below:
 - Both Statement I and Statement II are correct
 - Both Statement I and Statement II are incorrect
 - Statement I is correct but Statement II is incorrect
 - Statement I is incorrect but Statement II is correct



11. Match List-I with List-II:

	List-I		List-II
A.	Emphysema	I.	Rapid spasms in muscle due to low Ca^{++} in body fluid
B.	Angina Pectoris	II.	Damaged alveolar walls and decreased respiratory surface
C.	Glomerulonephritis	III.	Acute chest pain when not enough oxygen is reaching to heart muscle
D.	Tetany	IV.	Inflammation of glomeruli of kidney

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

- a. A-III, B-I, C-IV, D-II b. A-III, B-I, C-II, D-IV
c. A-II, B-IV, C-III, D-I d. A-II, B-III, C-IV, D-I

12. Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A): Both wind and water pollinated flowers are not very colourful and do not produce nectar.

Reason (R): The flowers produce enormous amount of pollen grains in wind and water pollinated flowers.

In the light of the above statements, choose the **correct** answer from the options given below:

- a. Both **A** and **R** are true and **R** is the correct explanation of **A**
b. Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**
c. **A** is true but **R** is false
d. **A** is false but **R** is true

13. Which of the following is an example of non-distilled alcoholic beverage produced by yeast?

- a. Whisky b. Brandy
c. Beer d. Rum

14. Given below are two statements:

Statement I: In a floral formula \oplus stands for zygomorphic nature of the flower, and $\underline{\text{G}}$ stands for inferior ovary.

Statement II: In a floral formula \oplus stands for actinomorphic nature of the flower and $\underline{\text{G}}$ stands for superior ovary.

In the light of the above statements, choose the **correct** answer from the options given below:

- a. Both Statement I and Statement II are correct
b. Both Statement I and Statement II are incorrect
c. Statement I is correct but Statement II is incorrect
d. Statement I is incorrect but Statement II is correct

15. Streptokinase produced by *bacterium Streptococcus* is used for

- a. Curd production
b. Ethanol production
c. Liver disease treatment
d. Removing clots from blood vessels

16. Which chromosome in the human genome has the highest number of genes?

- a. Chromosome X b. Chromosome Y
c. Chromosome 1 d. Chromosome 10

17. Which of the following statement is **correct** about location of the male frog copulatory pad?

- a. First and second digit of fore limb
b. First digit of hind limb
c. Second digit of fore limb
d. First digit of the fore limb

18. Which one of the following phytohormones promotes nutrient mobilization which helps in the delay of leaf senescence in plants?

- a. Ethylene b. Absciscic acid
c. Gibberellin d. Cytokinin

19. While trying to find out the characteristic of a newly found animal, a researcher did the histology of adult animal and observed a cavity with presence of mesodermal tissue towards the body wall but no mesodermal tissue was observed towards the alimentary canal. What could be the possible coelome of that animal?

- a. Acoelomate b. Pseudocoelomate
c. Schizocoelomate d. Spongocoelomate

20. Match List-I with List-II.

	List-I		List-II
A.	Head	(I)	Enzymes
B.	Middle piece	(II)	Sperm motility
C.	Acrosome	(III)	Energy
D.	Tail	(IV)	Genetic material

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

- a. A-IV, B-III, C-I, D-II b. A-IV, B-III, C-II, D-I
c. A-III, B-IV, C-II, D-I d. A-III, B-II, C-I, D-IV

21. Given below are the stages in the life cycle of pteridophytes. Arrange the following stages in the correct sequence.

- A. Prothallus stage
B. Meiosis in spore mother cells
C. Fertilisation
D. Formation of archegonia and antheridia in gametophyte
E. Transfer of antherozoids to the archegonia in presence of water

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

- a. B, A, D, E, C b. B, A, E, C, D
c. D, E, C, A, B d. E, D, C, B, A

22. Cardiac activities of the heart are regulated by:

- A. Nodal tissue
B. A special neural centre in the medulla oblongata
C. Adrenal medullary hormones
D. Adrenal cortical hormones

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

- a. A, B and C Only b. A, B, C and D
c. A, C and D Only d. A, B and D Only

23. Which of following organisms *cannot* fix nitrogen?
 A. *Azotobacter* B. *Oscillatoria* C. *Anabaena*
 D. *Volvox* E. *Nostoc*

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

- a. A only b. D only c. B only d. E only

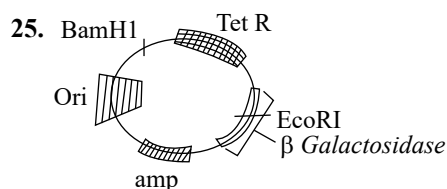
24. Given below are two statements:

Statement I: Transfer RNAs and ribosomal RNA do not interact with mRNA.

Statement II: RNA interference (RNAi) takes place in all eukaryotic organisms as a method of cellular defence.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

- a. Both Statement I and Statement II are correct
 b. Both Statement I and Statement II are incorrect
 c. Statement I is correct but Statement II is incorrect
 d. Statement I is incorrect but Statement II is correct



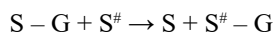
In the above represented plasmid an alien piece of DNA is inserted at EcoRI site. Which of the following strategies will be chosen to select the recombinant colonies?

- a. Using ampicillin & tetracyclin containing medium plate
 b. Blue color colonies will be selected
 c. White color colonies will be selected
 d. Blue color colonies grown on ampicillin plates can be selected

26. Which of the following genetically engineered organisms was used by Eli Lilly to prepare human insulin?

- a. Bacterium b. Yeast c. Virus d. Phage

27. Name the class of enzyme that usually catalyze the following reaction:



Where, G \rightarrow a group other than hydrogen

S \rightarrow a substrate

S[#] \rightarrow another substrate

- a. Hydrolase b. Lyase
 c. Transferase d. Ligase

28. Find the statement that is **NOT** correct with regard to the structure of monocot stem.

- a. Hypodermis is parenchymatous.
 b. Vascular bundles are scattered.
 c. Vascular bundles are conjoint and closed.
 d. Phloem parenchyma is absent.

29. The correct sequence of events in the life cycle of bryophytes is:

- A. Fusion of antherozoid with egg.
 B. Attachment of gametophyte to substratum.
 C. Reduction division to produce haploid spores.
 D. Formation of sporophyte.
 E. Release of antherozoids into water.

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

- a. D, E, A, C, B b. B, E, A, C, D
 c. B, E, A, D, C d. D, E, A, B, C

30. Which are correct:

- A. Computed tomography and magnetic resonance imaging detect cancers of internal organs.
 B. Chemotherapeutics drugs are used to kill non-cancerous cells.
 C. α -interferon activates the cancer patients' immune system and helps in destroying the tumour.
 D. Chemotherapeutic drugs are biological response modifiers.
 E. In the case of leukaemia, blood cell counts are decreased.

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

- a. B and D only b. D and E only
 c. C and D only d. A and C only

31. Match **List-I** with **List-II**.

	List-I		List-II
A.	Centromere	I.	Mitochondrion
B.	Cilium	II.	Cell division
C.	Cristae	III.	Cell movement
D.	Cell membrane	IV.	Phospholipid Bilayer

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

- a. A-I, B-II, C-III, D-IV b. A-II, B-I, C-IV, D-III
 c. A-IV, B-II, C-III, D-I d. A-II, B-III, C-I, D-IV

32. Match **List-I** with **List-II**:

	List-I		List-II
A.	Chlorophyll a	I.	Yellow-green
B.	Chlorophyll b	II.	Yellow
C.	Xanthophylls	III.	Blue-green
D.	Carotenoids	IV.	Yellow to Yellow-orange

Choose the option with all **correct** matches:

- a. A-III, B-IV, C-II, D-I b. A-III, B-I, C-II, D-IV
 c. A-I, B-II, C-IV, D-III d. A-I, B-IV, C-III, D-II

33. Find the correct statements:

- A. In human pregnancy, the major organ systems are formed at the end of 12 weeks.
 B. In human pregnancy, the major organ systems are formed at the end of 8 weeks.
 C. In human pregnancy heart is formed after one month of gestation.
 D. In human pregnancy, limbs and digits develop by the end of second month.
 E. In human pregnancy the appearance of hair is usually observed in the fifth month.

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

- a. A and E Only b. B and C Only
 c. B, C, D and E Only d. A, C, D and E Only

34. In the seeds of cereals, the outer covering of endosperm separates the embryo by a protein-rich layer called:

- a. Coleoptile b. Coleorhiza
 c. Integument d. Aleurone layer

83. Read the following statements on plant growth and development.

- A. Parthenocarpy can be induced by auxins.
- B. Plant growth regulators can be involved in promotion as well as inhibition of growth.
- C. Dedifferentiation is a pre-requisite for re-differentiation.
- D. Abscissic acid is a plant growth promoter.
- E. Apical dominance promotes the growth of lateral buds.

Choose the option with all correct statements:

- a. A, B, C only b. A, C, E only
 - c. A, D, E only d. B, D, E only
84. Which factor is important for termination of transcription?
- a. α (alpha) b. σ (sigma)
 - c. ρ (rho) d. γ (gamma)
85. Frogs respire in water by skin and buccal cavity and on land by skin, buccal cavity and lungs.
- Choose the **correct** answer from the following:
- a. The statement is true for water but false for land
 - b. The statement is true for both the environment
 - c. The statement is false for water but true for land
 - d. The statement is false for both the environment
86. Twins are born to a family that lives next door to you. The twins are a boy and a girl. Which of the following must be true?
- a. They are monozygotic twins.
 - b. They are fraternal twins.
 - c. They were conceived through in vitro fertilization.
 - d. They have 75% identical genetic content.
87. Which of the following microbes is **NOT** involved in the preparation of household products?
- A. *Aspergillus niger*
 - B. *Lactobacillus*
 - C. *Trichoderma polysporum*
 - D. *Saccharomyces cerevisiae*
 - E. *Propionibacterium sharmanii*

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

- a. A and B only b. A and C only
- c. C and D only d. C and E only

88. Match **List-I** with **List-II**:

	List-I		List-II
A.	Progesterone	I.	Pars intermedia
B.	Relaxin	II.	Ovary
C.	Melanocyte stimulating hormone	III.	Adrenal Medulla
D.	Catecholamines	IV.	Corpus luteum

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

- a. A-IV, B-II, C-I, D-III b. A-IV, B-II, C-III, D-I
 - c. A-II, B-IV, C-I, D-III d. A-III, B-II, C-IV, D-I
89. The blue and white selectable markers have been developed which differentiate recombinant colonies from non-recombinant colonies on the basis of their ability to produce colour in the presence of a chromogenic substrate.
- Given below are two statements about this method:
- Statement I:** The blue coloured colonies have DNA insert in the plasmid and they are identified as recombinant colonies.
- Statement II:** The colonies without blue colour have DNA insert in the plasmid and are identified as recombinant colonies.
- In the light of the above statements, choose the **most appropriate** answer from the options given below:
- a. Both Statement I and Statement II are correct
 - b. Both Statement I and Statement II are incorrect
 - c. Statement I is correct but Statement II is incorrect
 - d. Statement I is incorrect but Statement II is correct
90. Which one of the following equations represents the Verhulst-Pearl Logistic Growth of population?
- a. $\frac{dN}{dt} = r \left(\frac{K - N}{K} \right)$ b. $\frac{dN}{dt} = rN \left(\frac{K - N}{K} \right)$
 - c. $\frac{dN}{dt} = rN \left(\frac{N - K}{N} \right)$ d. $\frac{dN}{dt} = N \left(\frac{r - K}{K} \right)$

Answer Key

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (b) | 2. (b) | 3. (a) | 4. (d) | 5. (a) | 6. (a) | 7. (a) | 8. (a) | 9. (c) | 10. (c) |
| 11. (d) | 12. (b) | 13. (c) | 14. (d) | 15. (d) | 16. (c) | 17. (d) | 18. (d) | 19. (b) | 20. (a) |
| 21. (a) | 22. (a) | 23. (b) | 24. (d) | 25. (c) | 26. (a) | 27. (c) | 28. (a) | 29. (c) | 30. (d) |
| 31. (d) | 32. (b) | 33. (d) | 34. (d) | 35. (b) | 36. (d) | 37. (c) | 38. (a) | 39. (b) | 40. (b) |
| 41. (d) | 42. (b) | 43. (b) | 44. (c) | 45. (b) | 46. (a) | 47. (c) | 48. (a) | 49. (d) | 50. (b) |
| 51. (a) | 52. (a) | 53. (c) | 54. (a) | 55. (c) | 56. (a) | 57. (b) | 58. (d) | 59. (c) | 60. (d) |
| 61. (a) | 62. (a) | 63. (a) | 64. (c) | 65. (c) | 66. (d) | 67. (b) | 68. (a) | 69. (b) | 70. (b) |
| 71. (b) | 72. (b) | 73. (a) | 74. (b) | 75. (b) | 76. (b) | 77. (b) | 78. (b) | 79. (d) | 80. (c) |
| 81. (d) | 82. (a) | 83. (a) | 84. (c) | 85. (c) | 86. (b) | 87. (a) | 88. (a) | 89. (d) | 90. (b) |

Explanations

1. (b) NCERT XI, Ch-Respiration in Plants, Page-160

Complex II of the mitochondrial electron transport chain is also known as succinate dehydrogenase. It catalyzes the oxidation of succinate to fumarate, generating FADH_2 , which then donates electrons to ubiquinone, contributing to the formation of reduced ubiquinol. This process links the citric acid cycle and the electron transport chain.

2. (b) NCERT XII, Ch-Biotechnology: Principles and Processes, Page-172

Polymerase Chain Reaction (PCR) amplifies DNA exponentially. In each cycle, the number of DNA molecule doubles, so after n cycles, the number of DNA copies is 2^n times the initial amount.

3. (a) NCERT XII, Ch-Reproductive Health, Page-48

The main drawbacks of adoption of IVF methods include high costs due to expensive instruments and reagents (B), reduced rates of orphan adoption (D), and a significant possibility that the early embryo may not survive (F), reducing the success rates.

IVF has a relatively low fatality risk with modern techniques.

Donor sperm/eggs can be used; husband/wife are not always necessary.

IVF is available in India at various public and private centres.

4. (d) NCERT XI, Ch-Structural Organisation in Animals, Page-82

In frogs, the vena cava is the blood vessel that brings deoxygenated blood from various parts of the body to the heart, specifically into the right atrium.

Aorta carries oxygenated blood away from the heart.

Pulmonary artery carries deoxygenated blood from the heart to the lungs.

Pulmonary vein carries oxygenated blood from lungs to the heart.

5. (a) NCERT XI, Unit-Cell: Structure and Functions, Page-85

Reductionist biology refers to the approach of studying living organisms and their processes by breaking them down into their smaller, more fundamental components, like cells, molecules, and genes and analyzing their physical and chemical properties. This approach has led to significant advances in fields like molecular biology and biochemistry, enabling a deeper understanding of biological processes.

6. (a) NCERT XII, Ch-Molecular Basis of Inheritance, Page-88

Statement I is correct :

In the RNA world hypothesis, RNA is considered the first genetic material that evolved to carry out essential life processes. RNA acts as both genetic material and a catalyst for biochemical reactions in living systems. Also, RNA being reactive and unstable is widely accepted in the context of its role in early life forms.

Statement II is correct:

DNA evolved from RNA, providing a more stable and secure means of storing genetic information. Its double-helical strands are complementary and resistant to changes due to the evolving repair mechanisms.

7. (a) NCERT XII, Ch-Organisms and Populations, Page-201

Epiphytes growing on a mango branch exhibit commensalism. In this relationship, the epiphytes benefit by gaining physical support and access to sunlight while the mango tree is neither harmed nor benefited.

Mutualism: Both organisms benefit from each other.

Predation: One organism benefits at the expense of another.

Amensalism: One organism is harmed, while the other remains unaffected.

8. (a) NCERT XI, Ch-Cell: The Unit of Life, Page-98

Statement A is correct: Eukaryotic ribosomes are 80S, and prokaryotic ribosomes are 70S.

Statement B is correct: Each ribosome consists of two subunits (larger and smaller).

Statement C is correct: The subunits of 80S ribosomes are 60S and 40S, while that of 70S ribosomes are 50S and 30S.

9. (c) NCERT XII, Ch-Biodiversity and Conservation, Page-225

Zoos and botanical gardens are examples of *ex-situ* conservation, where threatened species are taken out from their natural habitat and placed in special settings where they can be protected and given special care.

National parks, wildlife sanctuary and protected areas are examples of *in-situ* conservation, where species are protected within their natural habitat.

10. (c) NCERT XII, Ch-Ecosystem, Page-207

Statement I is correct: Solar energy is the primary source of energy in an ecosystem, as it is the fundamental energy source for photosynthesis.

Statement II is incorrect: The rate of production of organic matter during photosynthesis is often referred to as gross primary productivity (GPP) of an ecosystem, not net primary productivity (NPP). NPP is the available biomass for the consumption to heterotrophs.

11. (d) NCERT XI, Ch-Breathing and Exchange of Gases, Body Fluids and Circulation, Excretory Products and their Elimination, Locomotion and Movement, Page-190, 203, 214, 227

(A-II) Emphysema: It is a chronic respiratory disorder involving damaged alveolar walls and decreased respiratory surface.

(B-III) Angina Pectoris: This condition involves acute chest pain when not enough oxygen is reaching the heart muscle.

(C-IV) Glomerulonephritis: This condition is the inflammation of glomeruli of the kidney.

(D-I) Tetany: This condition is characterized by rapid spasms (wild contractions) in muscle due to low Ca^{2+} in body fluid.

12. (b) NCERT XII, Ch-Sexual Reproduction in Flowering Plants, Page-13

Assertion (A) is true: Both wind and water pollinated flowers are not very colourful and do not produce nectar.

Reason (R) is also true: Both wind and water pollinated flowers produce large quantities of pollen to increase the chances of successful pollination.

However, reason does not explain the assertion. Wind and water pollinated flowers are not very colourful and do not produce nectar because these flowers do not need to attract pollinators.

13. (c) NCERT XII, Ch-Microbes in Human Welfare, Page-152

Beer is a non-distilled alcoholic beverage produced by fermentation with the help of yeast *Saccharomyces cerevisiae*.

Whisky, Brandy, and Rum are distilled alcoholic beverages. After fermentation, these drinks undergo a distillation process to increase alcohol content.

Introduction

- Five kingdom system of classification suggested by R.H. Whittaker is not based on [MR*] (2014)
 - Complexity of body organisation
 - Presence or absence of a well defined nucleus
 - Mode of reproduction
 - Mode of nutrition
- In the five-kingdom classification, *Chlamydomonas* and *Chlorella* have been included in: (2012 Mains)
 - Protista
 - Algae
 - Plantae
 - Monera
- In which kingdom would you classify the archaea and nitrogen-fixing organisms, if the five-kingdom system of classification is used? (2003)
 - Plantae
 - Fungi
 - Protista
 - Monera
- In five kingdom system, the main basis of classification: (2002)
 - Structure of nucleus
 - Mode of nutrition
 - Structure of cell wall
 - Asexual reproduction
- According to five kingdom system, blue green algae belongs to: (1998)
 - Metaphyta
 - Monera
 - Protista
 - Algae
- An important criterion of modern day classification is: (1991)
 - Resemblances in morphology
 - Anatomical and physiological traits
 - Breeding habits
 - Presence or absence of notochord

Kingdom Monera

- Which of the following is a correct statement? [MR*] (2022)
 - Mycoplasma have DNA, Ribosome and cell wall
 - Cyanobacteria are a group of autotrophic organisms classified under Kingdom Monera
 - Bacteria are exclusively heterotrophic organisms
 - Slime moulds are saprophytic organisms classified under Kingdom Monera.

- Which of the following is incorrect about Cyanobacteria? [MR*] (2020-Covid)
 - They lack heterocysts
 - They often form blooms in polluted water bodies
 - They have chlorophyll 'a' similar to green plants
 - They are photoautotrophs
- Oxygen is **not** produced during photosynthesis by (2018)
 - Nostoc*
 - Green sulphur bacteria
 - Cycas*
 - Chara*
- Which of the following are found in extreme saline conditions? (2017-Delhi)
 - Archaeobacteria
 - Eubacteria
 - Cyanobacteria
 - Mycobacteria
- Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen? (2017-Delhi)
 - Bacillus*
 - Pseudomonas*
 - Mycoplasma
 - Nostoc*
- Methanogens belong to: (2016 - II)
 - Dinoflagellates
 - Slime moulds
 - Eubacteria
 - Archaeobacteria
- Which one of the following statements is wrong? [MR*] (2016 - I)
 - Cyanobacteria* are also called blue-green algae
 - Golden algae are also called desmids
 - Eubacteria are also called false bacteria
 - Phycomycetes are also called algal fungi
- The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the: (2016 - I)
 - Halophiles
 - Thermoacidophiles
 - Methanogens
 - Eubacteria
- True nucleus is absent in: (2015)
 - Vaucheria*
 - Volvox*
 - Anabaena*
 - Mucor*
- The gut of cow and buffalo possess: (2015)
 - Methanogens
 - Cyanobacteria*
 - Fucus*
 - Chlorella*

39. BGA (blue green algae) are included in which of the following groups? (1996)
 a. Bryophytes b. Prokaryotes
 c. Protista d. Fungi
40. *Azotobacter* and *Bacillus polymyxa* are the examples of: (1996)
 a. Pathogenic bacteria b. Decomposers
 c. Symbiotic N_2 fixer d. Non-symbiotic N_2 fixer
41. Which are the sex organs provided in some bacteria? (1996)
 a. Sex pili b. Plasmid
 c. Circular DNA d. Gametes
42. Which type of DNA is found in bacteria? (1996)
 a. Circular free DNA b. Membrane bound DNA
 c. Straight DNA d. Helical DNA
43. The tailed bacteriophages are: [OS] (1995)
 a. Motile on surface of bacteria
 b. Non-motile
 c. Motile on surface of plant leaves
 d. Actively motile in water
44. A large number of organic compounds can be decomposed by: [OS] (1995)
 a. *Azotobacter* b. Chemolithotrophs
 c. *Mycoplasma* d. *Pseudomonas*
45. Organisms, which fix atmospheric nitrogen in the soil, fall under the category of: (1994)
 a. Bacteria b. Green algae
 c. Soil fungi d. Mosses
46. Transduction in bacteria is mediated by: [OS] (1994)
 a. Plasmid vectors b. Phage vectors
 c. Cosmids d. F-factors
47. Genophore/bacterial genome or nucleoid is made of: (1993)
 a. Histones and non-histones
 b. RNA and histones
 c. A single double stranded DNA
 d. A single stranded DNA
48. *Escherichia coli* is used extensively in biological research as it is: (1993)
 a. Easily cultured b. Easily available
 c. Easy to handle d. Easily multiplied in host
49. Bacteria lack alternation of generation because there is: [OS] (1992, 1991)
 a. Neither syngamy nor reduction division
 b. Distinct chromosomes are absent
 c. No conjugation
 d. No exchange of genetic material
50. Name the organisms which do not derive energy directly or indirectly from sun: (1991)
 a. Chemosynthetic bacteria b. Pathogenic bacteria
 c. Symbiotic bacteria d. Mould

51. Which one belongs to Monera? (1990)
 a. *Amoeba* b. *Escherichia*
 c. *Gelidium* d. *Spirogyra*
52. Many blue-green algae occur in thermal springs (hot water springs). The temperature tolerance of these algae have been attributed to their: (1994)
 a. Mitochondrial structure
 b. Importance of homopolar bonds in their proteins
 c. Cell wall structure
 d. Modern cell organisation

Kingdom Protista

53. Match List-I with List-II: (2024 Re)

List-I Organisms		List-II Mode of nutrition	
(A)	Euglenoid	(I)	Parasitic
(B)	Dinoflagellate	(II)	Saprophytic
(C)	Slime mould	(III)	Photosynthetic
(D)	<i>Plasmodium</i>	(IV)	Switching between photosynthetic and heterotrophic mode

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

- a. A-III, B-IV, C-II, D-I b. A-IV, B-II, C-I, D-III
 c. A-IV, B-III, C-II, D-I d. A-IV, B-II, C-III, D-I
54. Select the **wrong** statement [MR*] (2018)
 a. Cell wall is present in members of Fungi and Plantae
 b. Mushrooms belong to Basidiomycetes
 c. Pseudopodia are locomotory and feeding structures in Sporozoans
 d. Mitochondria are the powerhouse of the cell in all kingdoms except Monera
55. Which of the following organisms are known as chief producers in the oceans? [MR*] (2018)
 a. Dinoflagellates b. Diatoms
 c. Cyanobacteria d. Euglenoids
56. Ciliates differ from all other protozoans in (2018)
 a. Using flagella for locomotion
 b. Having a contractile vacuole for removing excess water
 c. Using pseudopodia for capturing prey
 d. Having two types of nuclei
57. Select the wrong statement: (2016 - II)
 a. Diatoms are chief producers in the oceans
 b. Diatoms are microscopic and float passively in water
 c. The walls of diatoms are easily destructible
 d. 'Diatomaceous earth' is formed by the cell wall of diatoms.
58. Chrysophytes, Euglenoids, Dinoflagellates and Slime moulds are included in the kingdom: (2016 - I)
 a. Animalia b. Monera
 c. Protista d. Fungi

115. Which one of the following statements about viruses is correct? (2003)

 - Viruses possess their own metabolic system
 - All viruses contain both RNA and DNA
 - Viruses are obligate parasites
 - Nucleic acid of viruses is known as capsid

116. Cauliflower mosaic virus contains: [OS] (2001)

 - ss RNA
 - ds RNA
 - ds DNA
 - ss DNA

117. Viruses are living because: (2000)

 - They multiply in host cells
 - Carry anaerobic respiration
 - Carry metabolic activity
 - Cause infection

118. Which disease of man is similar with cattle's, bovine spongiform encephalopathy? [OS] (2000)

 - Encephalitis
 - Jacob-Creutzfeldt disease
 - Spongiosis of cerebrum
 - Spondylitis

119. Lichens can be used as: (1999)

 - Bio-indicator for water and air pollution
 - Initial vegetation for waste lands
 - Source of wood
 - To check the air pollution

120. Indicator of water pollution: [OS] (1998)

 - E. coli*
 - Chlorella*
 - Beggiatoa*
 - Ulothrix*

121. Viruses possess: (1997)

 - Ribosomes to synthesize protein
 - Organelle for its vital mechanism
 - Either DNA or RNA
 - None of these

122. Most of the lichens consist of: (1997)

 - Green algae and Ascomycetes
 - Brown algae and higher plant
 - Blue green algae and Basidiomycetes
 - Red algae and Ascomycetes

123. What is the genetic material in *Influenza virus*? [OS] (1996)

 - Double helical DNA
 - RNA
 - Single helix DNA
 - None of these

124. Which one of the following statements about lichens is wrong? (1996)

 - These grow very rapidly (2 cm per day)
 - They show fungal and algal symbiotic relationships
 - Some of its species are eaten by reindeers
 - These are pollution indicators

125. Tobacco mosaic virus (TMV) genes are: (1994)

 - Single stranded RNA
 - Double stranded DNA
 - Proteinaceous
 - Double stranded RNA

126. Organisms which are indicators of SO₂ pollution of air: [MR*] (1992)

 - Mosses
 - Lichens
 - Mushrooms
 - Puffballs

127. Lichens indicate SO₂ pollution because they: (1989)

 - Show association between algae and fungi
 - Grow faster than others
 - Are sensitive to SO₂
 - Flourish in SO₂ rich environment

128. Rickettsia form a group under: (1994)

 - Viruses
 - Bacteria
 - Fungi
 - A category between viruses and bacteria

Answer Key

- | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. (b) | 2. (a) | 3. (d) | 4. (b) | 5. (b) | 6. (b) | 7. (b) | 8. (a) | 9. (b) | 10. (a) |
| 11. (c) | 12. (d) | 13. (c) | 14. (c) | 15. (c) | 16. (a) | 17. (b) | 18. (b) | 19. (a) | 20. (a) |
| 21. (a) | 22. (d) | 23. (b) | 24. (c) | 25. (c) | 26. (c) | 27. (d) | 28. (c) | 29. (d) | 30. (c) |
| 31. (a) | 32. (b) | 33. (a) | 34. (d) | 35. (b) | 36. (b) | 37. (a) | 38. (b) | 39. (b) | 40. (d) |
| 41. (a) | 42. (a) | 43. (b) | 44. (d) | 45. (a) | 46. (b) | 47. (c) | 48. (a) | 49. (a) | 50. (a) |
| 51. (b) | 52. (b) | 53. (c) | 54. (c) | 55. (b) | 56. (d) | 57. (c) | 58. (c) | 59. (d) | 60. (a) |
| 61. (b) | 62. (c) | 63. (d) | 64. (c) | 65. (a) | 66. (b) | 67. (b) | 68. (a) | 69. (a) | 70. (d) |
| 71. (c) | 72. (b) | 73. (d) | 74. (c) | 75. (a) | 76. (d) | 77. (c) | 78. (d) | 79. (a) | 80. (d) |
| 81. (b) | 82. (d) | 83. (c) | 84. (d) | 85. (c) | 86. (a) | 87. (c) | 88. (b) | 89. (c) | 90. (c) |
| 91. (c) | 92. (c) | 93. (a) | 94. (a) | 95. (c) | 96. (d) | 97. (d) | 98. (d) | 99. (d) | 100. (b) |
| 101. (a) | 102. (c) | 103. (d) | 104. (c) | 105. (a) | 106. (d) | 107. (b) | 108. (a) | 109. (a) | 110. (b) |
| 111. (d) | 112. (c) | 113. (d) | 114. (c) | 115. (c) | 116. (c) | 117. (a) | 118. (b) | 119. (d) | 120. (a) |
| 121. (c) | 122. (a) | 123. (b) | 124. (a) | 125. (a) | 126. (b) | 127. (c) | 128. (b) | | |

Explanations

1. (b) Main criteria for classification used by R.H. Whittaker includes cell structure, body organisation, mode of nutrition, reproduction and phylogenetic relationship.
2. (a) *Chlamydomonas* and *Chlorella* are green-algae that belong to kingdom Plantae, division Algae and class Chlorophyceae. In five-kingdom classification, they were placed in kingdom Protista.
3. (d) According to five-kingdom classification, all prokaryotic cells have been classified under kingdom Monera.
4. (b) Mode of nutrition is one of the main criteria for classification used by R.H. Whittaker. Other criteria include cells structure, body organisation, reproduction and phylogenetic relationships.
5. (b) Cyanobacteria (blue-green algae) being unicellular and prokaryotic belong to kingdom Monera of five-kingdom classification given by R. H. Whittaker.
6. (b) Modern day classification is based on not only the morphological but also physiological, anatomical, reproductive and phylogenetic similarities.
7. (b) Only statement (b) is correct and rest other statements are incorrect. Mycoplasma is a bacterium that lacks cell wall. Mycoplasma have DNA and ribosomes. Cyanobacteria are photosynthetic bacteria classified under kingdom Monera. Bacteria can be photosynthetic autotrophic or chemosynthetic autotrophic. The vast majority of bacteria are heterotrophs, i.e., they depend on other organisms or on dead organic matter for food. Slime moulds are saprophytic organisms classified under Kingdom Protista.
8. (a) Cyanobacteria (also referred to as blue-green algae) have chlorophyll a similar to green plants and are photosynthetic autotrophs. Some of these organisms can fix atmospheric nitrogen in specialised cells called heterocysts, e.g., *Nostoc* and *Anabaena*.
9. (b) Green sulphur bacteria perform anoxygenic photo-synthesis. They mainly use sulfide ions as electron donors.
10. (a) Archaeobacteria are special since they live in some of the most harsh habitats such as extreme salty areas (halophiles), hot springs (thermoacidophiles) and marshy areas (methanogens).
11. (c) Mycoplasmas are organisms without a cell wall. They are the smallest living cells known. They can survive without oxygen. Many are pathogenic in animals and plants.
12. (d) Methanogens belong to Archaeobacteria and are present in the gut of several ruminant animals such as cows and buffaloes and they are responsible for the production of methane (biogas) from the dung of these animals.
13. (c) Eubacteria are also known as true bacteria. They are characterised by the presence of a rigid cell wall, and if motile, a flagellum.
14. (c) Methanogens are present in the gut of several ruminant animals such as cows and buffaloes and they are responsible for the production of methane (biogas) from the dung of these animals.
15. (c) *Vaucheria* and *Volvox* are eukaryotes (Plant kingdom) while *Mucor* is a fungi (phycomycetes) and a eukaryote but *Anabaena* is a prokaryote. Prokaryotes lack nucleus.
16. (a) Some of the methanogens (archaeobacteria) live as symbionts (e.g., *Methanobacterium*) inside rumen of cow, buffaloes and helpful to the ruminants in fermentation of cellulose.
17. (b) Mycoplasma are organisms that completely lack cell wall. They are the smallest living cells known and can survive without oxygen.
18. (b) One of the most distinctive features of the *Archaea* is the nature of their membrane lipids. They differ from both *Bacteria* and *Eukarya* in having branched chain hydrocarbons attached to glycerol by ether links rather than fatty acids connected by ester links. Some archaeal membranes are lipid monolayers instead of bilayers.
19. (a) Nuclear membrane is absent in *Nostoc* (prokaryote) while remaining three are eukaryotes.
20. (a) The Cyanobacteria are also referred to as blue-green algae (BGA). It belongs to Eubacteria.
21. (a) Heterotrophic bacteria are the most abundant in nature. The majority are important decomposers. Many of them have a significant impact on human affairs. They are helpful in making curd from milk, production of antibiotics, fixing nitrogen in legume roots.
22. (d) Monerans have maximum nutritional diversity as some of them are autotrophs, heterotrophs, saprophytes, parasitic, symbiotic (*Anabaena*), commensalism & mutualism.
23. (b) Bacterial membranes are similar to eukaryotic membranes in that many of their amphipathic lipids are phospholipids.
24. (c) Methanogens are archaeobacteria, found in marshy areas. They are present in the gut of several ruminant animals.
25. (c) *Chlorobium* (Green sulphur bacteria), *Rhodospirillum* (purple non-sulphur bacteria), *Chromatium* perform anoxygenic photosynthesis.
26. (c) Protein of Archaeobacteria closely resembles the eukaryotic cell in the mechanism of protein synthesis, structural protein and RNA complements of the ribosomes. *Thermococcus*, *Methanococcus* and *Methanobacterium* are archaeobacteria.
27. (d) It is primitive prokaryote. Its ribosomal ribonucleotides in 16S rRNA are different from other organisms.
28. (c) They are insensitive to Penicillin due to absence of cell wall while their growth is inhibited by the tetracycline.
29. (d) Bacterium *Clostridium botulinum* is obligate anaerobe means they cannot survive in the presence of oxygen.
30. (c) Barophilic prokaryotes are organisms that survives in a high-pressure environment. They can grow and multiply in very deep marine sediments.
31. (a) Transduction is one of the methods of introduction of foreign gene into a cell. In this method, virus is used to transfer genes from one cell/bacterium to another cell/bacterium.
32. (b) Autotrophs are organisms who produces their own food. They can be photoautotrophs or chemoautotrophs. Organisms who synthesise their own food by deriving energy from sunlight are called photoautotroph, whereas organisms that derive energy from inorganic compounds to synthesise food are called chemoautotrophs.
33. (a) Cyanobacteria are capable of fixing atmospheric N_2 in presence of sunlight. Nitrogenase, enzyme complex that is responsible for fixing N_2 in cyanobacteria, is sensitive to oxygen & require a near to anoxic environment. These bacteria can produce oxygen through photosynthesis and thus called oxygenic.
34. (d) Archaeobacteria are oldest bacteria that live in some of the most harsh habitats. They have a different cell wall structure than other bacteria and this feature is responsible for their survival in extreme conditions.
35. (b) Photolithotrophs utilise light energy, with the inorganic compound serving as the ultimate electron donor, e.g, higher plants.
36. (b) Thermophiles live in a habitat where temperature exceeds 100°C and therefore these bacteria can survive in hot springs.
37. (a) Bacteriophage is a virus that infect bacteria. During this infection, these viruses transfer the genetic material from one bacterium to another, a process called transduction.
38. (b) *E. coli* has genetic material in the form of DNA. Two strands of DNA are helically bound to each other and form a complete DNA molecule.
39. (b) Blue-green algae are unicellular organisms classified in kingdom Monera. Individuals belongs to Monera have prokaryotic cells & thus they are called prokaryotes.

New NEET Essentials

Morphology of Flowering Plants (Malvaceae, Cruciferae, Compositae and Gramineae)

1. Which of the following shows the floral characteristic of Cruciferae?

- Six tepals, zygomorphic, six stamens, bilocular ovary, axile placentation.
- Hermaphrodite, actinomorphic, tetradynamous, hypogynous, bicarpellary, bilocular (replum), placentation parietal.
- Bisexual, actinomorphic, six stamens, polyandrous, superior ovary, axile placentation.
- Three tepals, bisexual, zygomorphic, gamophyllous, inferior ovary, marginal placentation.

2. **Assertion:** In the Gramineae family, the two bracts are palea and lemma enclose flower.

Reason: In the Gramineae family, the gynoecium is tricarpeal with inferior ovary.

- Both Assertion and Reason are True, and the Reason is a correct explanation of the Assertion.
- Both Assertion and Reason are True, but Reason is not a correct explanation of the Assertion.
- Assertion is True, but the Reason is False.
- Assertion is False, but the Reason is True.

3. Complete the floral formula of the family Malvaceae.

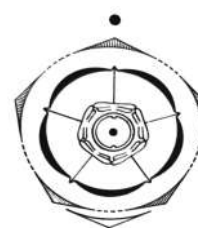
Br \oplus $\overline{\text{Epi}}$ \square K \square C \square A \square G $_{(5-\infty)}$
(i) (ii) (iii) (iv)

- (i) – 3, (ii) – 5, (iii) – 5, (iv) – 3
- (i) – 3 – 7, (ii) – (5), (iii) – 5, (iv) – (∞)
- (i) – 3 – 5, (ii) – 3, (iii) – (5), (iv) – (2 – ∞)
- (i) – 3, (ii) – 5, (iii) – (3), (iv) – 2

4. Which family exhibits actinomorphic, pedicellate, bisexual, complete, pentamerous flowers, typically protected by an epicalyx?

- Malvaceae
- Cruciferae
- Compositae
- Gramineae

5. Identify the correct statement about the diagram.



- The flower of this family consists of a capitulum or head.
- The flower of this family consists of a free anther but fused filaments.
- The flower of this family lacks pappus.
- The flower of this family consists gynoecium of bilocular basal placentation.

6. Identify the plant family from the floral diagram given below.



- Malvaceae
- Cruciferae
- Gramineae
- Leguminosae

7. Mark the following statements as true (T) or false (F) and select the correct option.

- In mustard, filaments of stamens are of similar lengths.
- In Cruciferae, the outer two stamens are short, and the inner four stamens are long.
- The fruit of the china rose is a capsule.
- Marigold, sunflower, and *Chrysanthemum* are members of the family Malvaceae.

	I	II	III	IV
(a)	False	True	True	False
(b)	True	False	True	False
(c)	False	False	False	True
(d)	True	True	False	True

8. Statement-I: In the Asteraceae family within the capitulum, there are ray florets at the center, surrounded by disc florets. **Statement-II:** Disc Florets are present in the centre of the head, bracteate, bisexual, actinomorphic, tubular, pentamerous.

- Both Statement-I and Statement-II are correct.
- Both Statement-I and Statement-II are incorrect.
- Statement-I is correct & Statement-II is incorrect.
- Statement-I is incorrect & Statement-II is correct.

9. Match the characteristics to the correct plants:

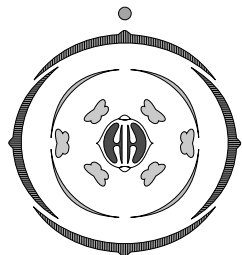
	Characteristics	Plant
P	Zygomorphic, bisexual flowers with basal placentation.	Sunflower
Q	Actinomorphic, pentamerous, bisexual flowers protected by epicalyx.	China rose
		Okra
		Wheat

- P- Okra ; Q- Sunflower
- P- Wheat; Q- China rose
- P- China rose; Q- Okra
- P- Sunflower, Q- China rose

10. What distinct feature allows the immediate identification of the Brassicaceae family?

- Inferior ovary and cruciform corolla
- Tetradynamous stamens and replum
- Tetradynamous stamens and axile placentation
- Cruciform corolla and indehiscent fruit

11. Choose the correct floral formula for the given diagram.



- $\oplus \text{ } \overline{\text{K}}_{2+2} \text{ } \overline{\text{C}}_4 \text{ } \overline{\text{A}}_{2+4} \text{ } \overline{\text{G}}_{(2)}$
- $\% \text{ } \overline{\text{K}}_{(5)} \text{ } \overline{\text{C}}_{1+2+(2)} \text{ } \overline{\text{A}}_{(9)+1} \text{ } \overline{\text{G}}_1$
- $\oplus \text{ } \overline{\text{K}}_{(5)} \text{ } \overline{\text{C}}_{(5)} \text{ } \overline{\text{A}}_{(5)} \text{ } \overline{\text{G}}_{(2)}$
- $\text{Br } \oplus \text{ } \overline{\text{K}}_{(3+3)} \text{ } \overline{\text{A}}_{3+3} \text{ } \overline{\text{G}}_{(3)}$

12. Familiar example of family Compositae is

- Helianthus annuus*, *Artemisia annua*, *Tagetes erecta*
- Pennisetum typhoideum*, *Bambusa*, and *Atropa belladonna*
- Allium cepa*, *Saccharum officinarum*, and *Aloe vera*
- Allium cepa*, *Pennisetum typhoideum* and *Solanum nigrum*

13. Which of the following plants also show similar inflorescence as shown in the given image?



- Indigofera*, *Sesbania*, *Brassica rapa*, Sunhemp
- Ashwagandha*, *Petunia*, *Sesbania*, *Colchicum autumnale*
- Indigofera*, *Ashwagandha*, Sunhemp, *Trifolium*
- Trifolium*, *Petunia*, *Brassica rapa*, *Colchicum autumnale*

14. Which of the following plant is bisexual, syncarpous, superior ovary, actinomorphic, parietal placentation, tap root system, variation in the length of filaments within a flower?

- Mustard
- Sweet pea
- Soyabean
- Moong

15. Which of the following statements is correct about the given image?



- The image shows the fruit of the Leguminosae family.
- The image shows the fruit of the *Hibiscus* or mallow family.
- The image shows the fruit of the sunflower family.
- The image shows the fruit of the mustard family.



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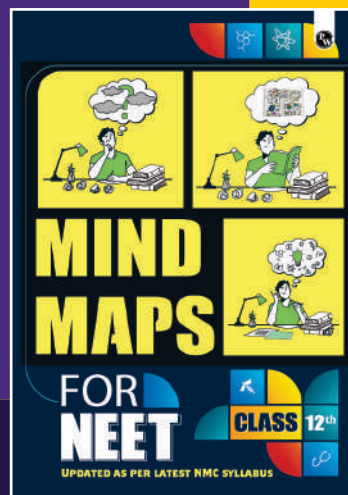
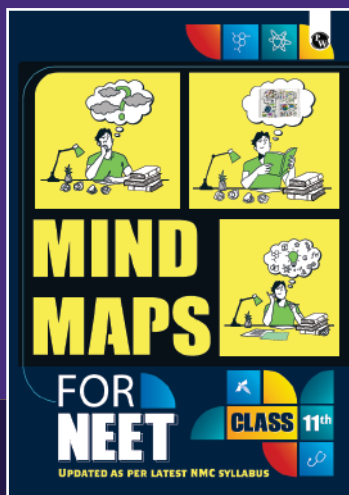
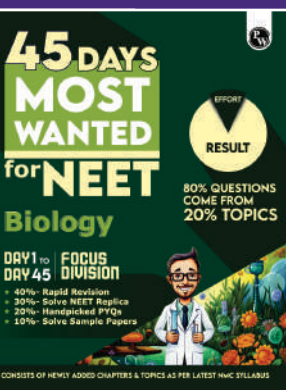
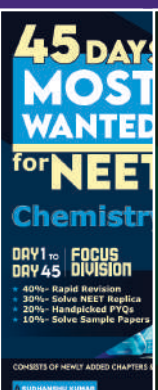
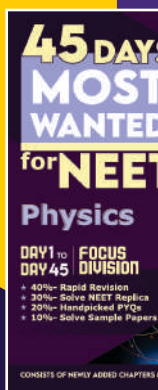
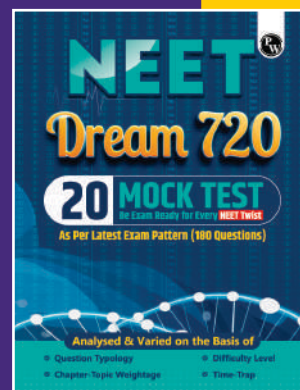
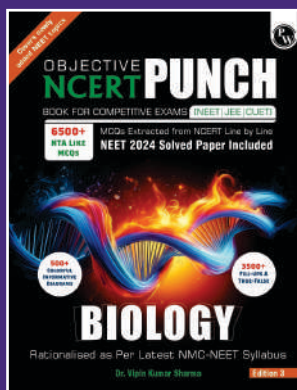
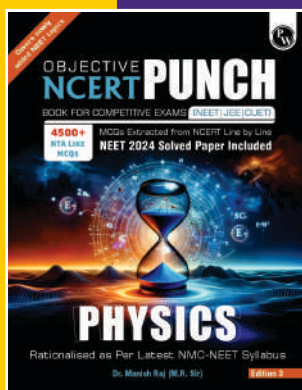
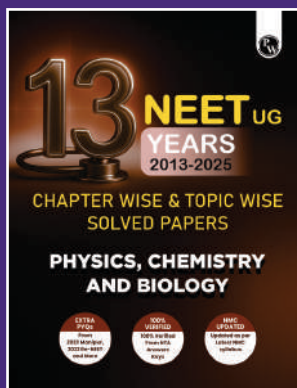
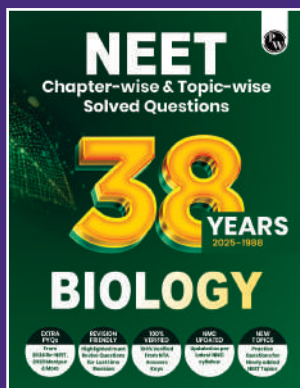
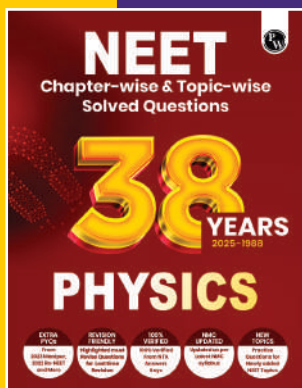
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