

VETERINARY PHARMACIST, 2025

(Exam held on 02-03-2025)

1. Choose the correct meaning of the given idiom. **A skeleton in the cupboard:**
 - A. A popular fact which is not hidden
 - B. A popular fact to be kept secret
 - C. An embarrassing fact not to be kept secret
 - D. An embarrassing fact to be kept secret
2. Choose the correct meaning of the phrase "Kick the bucket":
 - A. To start a new project
 - B. To delay a decision
 - C. To pass away
 - D. To kick a bucket
3. Select the pair that has the same relationship **DIVA : OPERA**
 - A. Conductor : Bus
 - B. Producer : Theatre
 - C. Thespian : Play
 - D. Director : Drama
4. _____ did you put my keys?
 - A. Wear B. Ware
 - C. Where D. Were
5. We bought some eggs from the market but unfortunately _____ of them were fresh.
 - A. No one B. Much
 - C. None D. Many
6. Choose the word which best express the meaning of **PREDICT**.
 - A. Prevent B. Foretell
 - C. Discover D. Decide
7. Fill the blank with the most suitable preposition from the given options.
It was very generous _____ you to offer to help me.
 - A. Of B. For
 - C. From D. About
8. Find the antonym of the word **AMPLE**.
 - A. Enough
 - B. Meagre
 - C. Sufficient
 - D. Scarce
9. I go to Srinagar by _____ Vande Bharat Express.
 - A. A B. An
 - C. Some D. The
10. Identify the type of clause: "I know that she is coming to the party."
 - A. Adjective clause
 - B. Adverb clause
 - C. Noun clause
 - D. Relative clause
11. Which punctuation mark is used to show possession?
 - A. Comma (,) B. Apostrophe (')
 - C. Semicolon (;) D. Colon (:))

1. D 2. C 3. C 4. C 5. C 6. B 7. A 8. B 9. D 10. C 11. B

12. What are homonyms?

- A. Words that sound the same but have different meanings
- B. Words that have multiple meanings
- C. Words that are spelled the same but have different meanings
- D. Both A and C

13. Match the idioms in Column A with their correct meanings in Column B.

Column-A (Idioms)	Column-B (Meanings)
1. Break the ice	(i) In a difficult situation
2. Hit the sack	(ii) Go to bed
3. Under the weather	(iii) Start a conversation
4. Once in a blue moon	(iv) Feeling unwell
5. In hot water	(v) Very rarely

Choose the **correct** Option

- A. 1-(iii), 2-(ii), 3-(iv), 4-(v), 5-(i)
- B. 1-(iv), 2-(v), 3-(i), 4-(iii), 5-(ii)
- C. 1-(i), 2-(iii), 3-(ii), 4-(iv), 5-(v)
- D. 1-(ii), 2-(i), 3-(v), 4-(iv), 5-(iii)

14. Match the words in Column A with their correct antonyms in Column B.

Column-A (Words)	Column-B (Antonyms)
1. Generous	(i) Ugly
2. Beautiful	(ii) Weak
3. Strong	(iii) Stingy
4. Victory	(iv) Defeat
5. Ancient	(v) Modern

Choose the **correct** Option:

- A. 1-(iii), 2-(i), 3-(ii), 4-(iv), 5-(v)
- B. 1-(iv), 2-(ii), 3-(iii), 4-(i), 5-(v)
- C. 1-(v), 2-(iv), 3-(ii), 4-(iii), 5-(i)
- D. 1-(ii), 2-(v), 3-(iv), 4-(i), 5-(iii)

15. The thief will have run away before the police:

- A. comes
- B. had come
- C. came
- D. none

16. Consider the following statements regarding shifting cultivation:

- 1. It is also known as "slash and burn" agriculture.
- 2. In India, it is mainly practiced in Northeast region.
- 3. In Northeast India it is known as Jhum cultivation.
- 4. This type of agriculture is not done anywhere else in the world except India.

Choose **correct** option.

- A. 1, 2 and 3 only
- B. 1, 2 and 4 only
- C. 3 and 4 only
- D. All of the above

17. Name the Indian river known as the "Dakshin Ganga"?

- A. Krishna
- B. Godavari
- C. Narmada
- D. Kaveri

18. The Fundamental Duties of a citizen include:

- 1. Respect for the Constitution, the National Flag and the National Anthem.
- 2. To develop the scientific temper.
- 3. Respect for the Government.
- 4. To protect Wildlife.

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

- A. 1, 2 and 3
- B. 1, 2 and 4
- C. 2, 3 and 4
- D. 1, 3, 4 and 2

19. Match the following events with their years:

(Events)	(Years)
1. Civil Disobedience Movement	(i) 1919
2. Jallianwala Bagh Massacre	(ii) 1942
3. Quit India Movement	(iii) 1930
4. Simon Commission Arrival in India	(iv) 1928

Choose the **correct** Option:

- A. 1-(i), 2-(ii), 3-(iii), 4-(iv)
- B. 1-(iii), 2-(i), 3-(ii), 4-(iv)
- C. 1-(iii), 2-(i), 3-(iv), 4-(ii)
- D. 1-(iv), 2-(i), 3-(iii), 4-(ii)

12. D

13. A

14. A

15. A

16. A

17. B

18. B

19. B

20. Regarding the Indus Valley Civilization, consider the following statements:

- I. It was predominantly a secular civilization and the religious element, though present did not dominate the scene.
- II. During this period, cotton was used for manufacturing textiles in India.

Which of the statements given above is/are correct?

- A. I only
- B. II only
- C. Both I and II
- D. Neither I nor II

21. Which of the following countries is NOT a founding member of SAARC?

- A. Bangladesh
- B. Bhutan
- C. Myanmar
- D. Maldives

22. Match List-I with List-II and select the correct answer from the codes given below:

List-I

List-II

- | | |
|--------------------------------|---------------------------------------|
| 1. Poverty Reduction Programme | (i) Mid-day Meals |
| 2. Human Development Scheme | (ii) Indira Awas Yojana (IAY) |
| 3. Social Assistance Scheme | (iii) National Old Age Pension (NOAP) |
| 4. Minimum Need Scheme | (iv) MNREGA |

Codes:

- A. 1-(iv), 2-(i), 3-(iii), 4-(ii)
- B. 1-(ii), 2-(iii), 3-(iv), 4-(i)
- C. 1-(iii), 2-(iv), 3-(i), 4-(ii)
- D. 1-(iv), 2-(iii), 3-(ii), 4-(i)

23. In which field is the Kalinga Award given?

- A. Science
- B. Literature
- C. Journalism
- D. Game

24. Who has been appointed as the new chairman of Life Insurance Corporation of India?

- A. Manoj Pandey
- B. Neeraj Ahuja
- C. V.K. Sharma
- D. Siddhartha Mohanty

25. Which of the following statements regarding the Preamble of the Indian Constitution is correct?

- I. The Preamble is considered part of the Constitution but is not legally enforceable.
- II. The word "Socialist" and "Secular" were added to the Preamble by the 44th Amendment Act, 1978.
- III. The Supreme Court in the Kesavananda Bharati case (1973) held that the Preamble is a part of the Constitution.

Choose the correct statements:

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

26. Match the following newspapers with their slogans or taglines:

(Newspaper)

(Slogan/Tagline)

- | | |
|--------------------------|--------------------------------|
| 1. The Times | (i) "The Bold Voice of India" |
| 2. Hindustan Times | (ii) "Journalism of Courage" |
| 3. The Indian Express | (iii) "First Voice, Last Word" |
| 4. State Times Newspaper | (iv) "Let Truth Prevail" |

Choose the correct answer:

- A. 1-(i), 2-(ii), 3-(iii), 4-(iv)
- B. 1-(ii), 2-(i), 3-(iii), 4-(iv)
- C. 1-(i), 2-(iii), 3-(ii), 4-(iv)
- D. 1-(iv), 2-(iii), 3-(ii), 4-(i)

20. C

21. C

22. A

23. A

24. D

25. B

26. D

27. Which of the following statements about the Indian political system is/are correct?

- (i) The president is both Head of the State and Head of the Government.
- (ii) Parliament is Supreme.
- (iii) The Supreme Court is the guardian of the Constitution.
- (iv) The Directive Principles of State Policy are justifiable.

Select the correct answer from the codes given below:

- A. (i), (ii), (iii) and (iv)
- B. (ii), (iii) and (iv)
- C. (ii) and (iii)
- D. (iii) only

28. Match the following Indian languages with their respective states where they are predominantly spoken:

(Language) (State)

- 1. Konkani (i) Jammu & Kashmir
- 2. Dogri (ii) Meghalaya
- 3. Khasi (iii) Bihar
- 4. Maithili (iv) Goa

Choose the correct answer:

- A. 1-(i), 2-(ii), 3-(iii), 4-(iv)
- B. 1-(iv), 2-(i), 3-(ii), 4-(iii)
- C. 1-(i), 2-(iii), 3-(ii), 4-(iv)
- D. 1-(ii), 2-(i), 3-(iii), 4-(iv)

29. Which of the following statement(s) is/are **not correct** about the Attorney General of India?

- I. The President appoints a person, who is qualified to be a Judge of a High Court, to be the Attorney General of India.
- II. He has the right of audience in all the Courts of the country.
- III. He has the right to take part in the proceedings of the Lok Sabha and the Rajya Sabha.
- IV. He has a fixed tenure.

Select the correct answer from the codes given below:

- A. I and IV
- B. II, III and IV
- C. III and IV
- D. IV only

30. In 2024, which spacecraft successfully retrieved lunar samples from the far side of the Moon?

- A. Luna 25
- B. Chang'e-6
- C. Artemis 1
- D. Vikram Lander

31. In which year did the Right to Information (RTI) Act come into force in Jammu & Kashmir?

- A. 2005
- B. 2019
- C. 2009
- D. 2020

32. Consider the following statement:

Assertion (A): Jammu & Kashmir was granted special status under Article 370 of the Indian Constitution.

Reason (R): Article 370 allowed J&K to have its own constitution and autonomy over all matters except defense, foreign affairs, finance and communications.

Which statements is are correct?

- 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.

33. Who probably invented the dogri script?

- A. Puran Karan
- B. Shakti Karan
- C. Agni Garbha
- D. Shiv Prakash

34. Consider following statements about the climate of Jammu:

Statement I: Kashmir valley influences climate of Northern Jammu.

Statement II: Southern plains of Jammu experience temperature climate.

Which of the given statement is/are correct?

- A. Only I
- B. Only II
- C. Both I and II
- D. None of these

27. C

28. B

29. A

30. B

31. C

32. A

33. B

34. A

35. Match the following:

List-I

List-II

- | | |
|--|----------------------------|
| 1. Established first legislature in Jammu & Kashmir | (i) Ghulam Rasool Renzoo |
| 2. First speaker of Jammu & Kashmir legislative assembly | (ii) Hari Singh |
| 3. First chairman of Jammu & Kashmir Legislative council | (iii) Shiv Narayan Fotedar |

Choose the correct option:

- A. 1-(i), 2-(ii), 3-(iii)
 B. 1-(ii), 2-(i), 3-(iii)
 C. 1-(iii), 2-(i), 3-(ii)
 D. 1-(ii), 2-(iii), 3-(i)

36. If the price of a product increases by 25%, by what percentage must a consumer reduce the consumption to maintain the same expenditure?

- A. 20%
 B. 25%
 C. 30%
 D. 33.33%

37. Complete the series

22, 33, 46, 61, 78, ?

- A. 86
 B. 97
 C. 90
 D. 79

38. Consider the following statement:

Statement I: The decimal number 11 is larger than the hexadecimal number 11.

Statement II: In the binary number 1110.101, the fractional part has the decimal value as 0.625.

Which of the following statement(s) is/are TRUE?

- A. Statement I only
 B. Statement II only
 C. Both Statement I and Statement II
 D. Neither Statement I nor Statement II

39. Consider the following assertion (A) and reason (R) and select the correct code given below:

Assertion (A): No man is perfect.

Reason (R): Some men are not perfect.

- A. Both (A) and (R) are true, but (R) does not provide sufficient reason for (A).
 B. Both (A) and (R) are true and (R) provides sufficient reason for (A).
 C. (A) is true, but (R) is false.
 D. (A) is false, but (R) is true.

40. Consider the following Statement.

Assertion (A): The coin when flipped next time will come up tails.

Reason (R): Because the coin was flipped five times in a row, and each time it came up heads.

Choose the correct answer from below:

- A. Both (A) and (R) are true, and (R) is the correct explanation of (A).
 B. Both (A) and (R) are false, and (R) is the correct explanation of (A).
 C. (A) is doubtful, (R) is true, and (R) is not the correct explanation of (A).
 D. (A) is doubtful, (R) is false, and (R) is the correct explanation of (A).

41. P is the father of Q. Q is the sister of R. R is the father of S. How is P related to S?

- A. Grandfather
 B. Father-in-law
 C. Brother
 D. Uncle

42. The letters in the first set have a certain relationship. On the basis of this relationship mark the right choice for the second set:

AST : BRU :: NQV : ?

- A. ORW
 B. MPU
 C. MRW
 D. OPW

35. B

36. A

37. B

38. B

39. A

40. C

41. A

42. A

43. Match the mathematical concepts with their corresponding formulas or properties:

A (Concept)	B (Formula/Property)
1. Compound Interest	(i) $(\text{Speed} \times \text{Time}) \div \text{Distance}$
2. Trigonometry	(ii) $(P \times R \times T)/100$
3. Speed, Distance and Time	(iii) $A = P(1 + R/100)^n$
4. Profit and Loss	(iv) $\sin^2 \theta + \cos^2 \theta = 1$
5. Simple Interest	(v) $(\text{Selling price} - \text{Cost price})/\text{Cost Price} \times 100$

Match the correct pairs:

- A. 1-(iii), 2-(iv), 3-(i), 4-(v), 5-(ii)
 B. 1-(ii), 2-(i), 3-(iv), 4-(iii), 5-(v)
 C. 1-(v), 2-(iii), 3-(ii), 4-(i), 5-(iv)
 D. 1-(iv), 2-(v), 3-(iii), 4-(ii), 5-(i)

44. Consider the following Statement:

Assertion (A): If a person moves 10 km north, then 5 km east, the total distance travelled is 15 km.

Reason (R): The shortest distance between the starting and ending point is given by the Pythagorean theorem.

Which statement is are correct?

- A. Both (A) and (R) are true, and (R) correctly explains (A).
 B. Both (A) and (R) are true, and (R) does not explain (A).
 C. (A) is true, but (R) is false.
 D. (A) is false, but (R) is true.

45. Match the word with its coded form:

(Word)	(Coded Form)
1. CAT	(i) DCNN
2. DOG	(ii) ECV
3. APPLE	(iii) FQI
4. BALL	(iv) CRRNG

Choose the correct option:

- A. 1-(i), 2-(ii), 3-(iii), 4-(iv)
 B. 1-(ii), 2-(iii), 3-(iv), 4-(i)
 C. 1-(iii), 2-(iv), 3-(ii), 4-(i)
 D. 1-(iv), 2-(iii), 3-(i), 4-(ii)

46. Consider the following statements:

- I. A 10% increase in a number followed by a 10% decrease in the result returns the original number.
 II. 50% of 200 is 100.
 III. If a number is increased by 20%, then decreased by 20%, the final result is less than the original number.
 IV. 200% increase means tripling the number.

Which statement is are correct?

- A. Only I and II
 B. Only II and III
 C. Only III and IV
 D. Only II, III and IV

47. Two goods trains, each 500 m long, are running in opposite directions on parallel tracks. Their speeds are 45 km/hr and 30 km/hr respectively. Find the time taken by the slower train to pass the driver of the faster one.

- A. 12 sec B. 24 sec
 C. 48 sec D. 60 sec

48. **Statement:** It is desirable to put the child in school at the age of 5 or so.

Assumptions:

- I. At that age the child reaches appropriate level of development and is ready to learn.
 II. The schools do not admit children after six years of age.

Choose the correct statements:

- A. Only assumption I is implicit
 B. Only assumption II is implicit
 C. Neither I nor II is implicit
 D. Both I and II are implicit

43. A

44. B

45. B

46. D

47. B

48. A

49. Find the number of triangles in the given figure.



- A. 12
B. 18
C. 22
D. 26
50. Identify the figure that completes the pattern.



(X)



(1)



(2)



(3)



(4)

- A. 1
B. 2
C. 3
D. 4
51. Read the following two statements:
Statement I: Information and Communication Technology (ICT) is considered a subset of Information Technology (IT).
Statement II: The 'right to use' a piece of software is termed as copyright.
Which of the above statement(s) is/are **CORRECT**?
- A. Both I and II
B. Neither I nor II
C. II only
D. I only

52. HTML is used to create:
- A. machine language program
B. high level program
C. web page
D. web server

53. Each character on the keyboard of computer has an ASCII value which stands for:
- A. American Stock Code for Information Interchange
B. American Standard Code for Information Interchange
C. African Standard Code for Information Interchange
D. Adaptable Standard Code for Information Change

54. Microsoft windows is an example of which type of operating system?
- A. Multitasking Operating System
B. Realtime Operating System
C. Embedded Operating System
D. Multiuser Operating System

55. Which search engine is owned by Microsoft?
- A. Google
B. Yahoo
C. Bing
D. DuckDuckGo

56. Which protocol is used to send emails?
- A. HTTP
B. SMTP
C. FTP
D. HTTPS

57. Consider the following statements:

Assertion (A): The BIOS is responsible for initializing hardware components during the computer's boot process.

Reason (R): The BIOS loads the operating system into memory to start the computer.

Which statement is are correct?

- A. Both Assertion and Reason are true, and Reason is the correct explanation of Assertion.
B. Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
C. Assertion is true, but Reason is false.
D. Assertion is false, but Reason is true.
58. Match the following operating systems with their examples:

List-I	List-II
1. Batch Operating System	(i) UNIX
2. Time-Sharing Operating System	(ii) Windows Server
3. Distributed Operating System	(iii) IBM
4. Network Operating System	(iv) Google's AndroidOS

Choose the correct option:

- A. 1-(iii), 2-(iv), 3-(i), 4-(ii)
B. 1-(iii), 2-(i), 3-(iv), 4-(ii)
C. 1-(iv), 2-(ii), 3-(iii), 4-(i)
D. 1-(ii), 2-(iv), 3-(iii), 4-(i)

49. B 50. C 51. B 52. C 53. B 54. A 55. C 56. B 57. C 58. B

59. Match the following:

List-I

List-II

- | | |
|--------------------|--|
| 1. Trackball | (i) used for drawing |
| 2. Graphics tablet | (ii) control the movement of objects in computer games |
| 3. Printer | (iii) control the movement of the cursor on a monitor |
| 4. Joystick | (iv) convert digital data into a physical form |

Choose the correct option:

- A. 1-(iii), 2-(i), 3-(iv), 4-(ii)
 B. 1-(ii), 2-(i), 3-(iv), 4-(iii)
 C. 1-(iii), 2-(ii), 3-(iv), 4-(i)
 D. 1-(i), 2-(ii), 3-(iv), 4-(iii)

60. Which of the following statements about computer memory are correct?

- I. Cache memory is faster than RAM.
 II. SSDs are slower than HDDs.
 III. Virtual memory extends RAM using storage space.
 IV. DRAM is a type of non-volatile memory.
 Which statement is/are correct?

- A. I and III only
 B. II and IV only
 C. I, II and III only
 D. I, III and IV only

61. The function of kinetodesmata in ciliate protozoans is to:

- A. Store food particles
 B. Coordinate ciliary movement
 C. Act as a sensory organ
 D. Help in binary fission

62. Match List-I (Porifera Class) with List-II (Characteristic Features) and select the correct answer from the codes given below:

List-I

List-II

(Class of Porifera)

(Characteristic Feature)

- | | |
|-------------|--|
| 1. Calcarea | (i) Siliceous spicules, deep sea forms |
|-------------|--|

- | | |
|-------------------|---|
| 2. Hexactinellida | (ii) Spongin fibers, commercial sponges |
| 3. Demospongiae | (iii) Calcium carbonate spicules |
| 4. Sclerospongiae | (iv) Both siliceous spicules & spongin fibers |

Choose the correct option:

- A. 1-(iii), 2-(i), 3-(ii), 4-(iv)
 B. 1-(ii), 2-(iv), 3-(iii), 4-(i)
 C. 1-(iv), 2-(ii), 3-(i), 4-(iii)
 D. 1-(i), 2-(iii), 3-(iv), 4-(ii)

63. Consider the following statements:

Assertion (A): Cnidarians have a gastro-vascular cavity that serves both digestive and circulatory function.

Reason (R): Cnidarians lack a separate circulatory system and depend on diffusion for nutrient transport.

Choose the correct statements:

- A. Both (A) and (R) are true, and (R) correctly explains (A).
 B. Both (A) and (R) are true, but (R) does not explain (A).
 C. (A) is true, but (R) is false.
 D. (A) is false, but (R) is true.

64. The definitive host for *Taenia solium* is:

- A. Pig
 B. Human
 C. Cow
 D. Dog

65. The flame cells present in Platyhelminthes are specialized for:

- A. Digestion
 B. Respiration
 C. Osmoregulation and excretion
 D. Locomotion

59. A

60. A

61. B

62. A

63. A

64. B

65. C

66. Consider the given two statements:

Statement-I: Sponges have a cellular level of organization, with water entering the body through ostia and exiting through the osculum.

Statement-II: Sponges exhibit extracellular digestion.

Choose the correct statements:

- A. Statement I is correct; Statement II is correct
- B. Statement I is incorrect; Statement II is incorrect
- C. Statement I is correct; Statement II is incorrect
- D. Statement I is incorrect; Statement II is correct

67. The figure shows cross-section of the body of an animal. This animal:



- I. lacks a coelom
 - II. is triploblastic
 - III. is expected to have bilateral symmetry
 - IV. is expected to be dorso-ventrally flattened
- Choose the correct option:

- A. Only I, II and III are correct
- B. Only I, III and IV are correct
- C. Only II, III and IV are correct
- D. I, II, III and IV are correct

68. Match List-I (Protozoan Group) with List-II (Example) and choose the correct answer.

List-I (Group)	List-II (Example)
1. Amoeboid protozoans	(i) <i>Amoeba proteus</i>

- 2. Ciliates (ii) *Paramecium coudatum*
- 3. Flagellates (iii) *Euglena viridis*
- 4. Sporozoans (iv) *Plasmodium falciparum*
- 5. Dinoflagellates (v) *Gonyaulax*
- 6. Slime molds (vi) *Physarum polycephalum*

Choose the correct option:

- A. 1-(i), 2-(ii), 3-(iii), 4-(iv), 5-(v), 6-(vi)
- B. 1-(ii), 2-(iii), 3-(i), 4-(iv), 5-(v), 6-(vi)
- C. 1-(iii), 2-(ii), 3-(iv), 4-(i), 5-(v), 6-(vi)
- D. 1-(iv), 2-(i), 3-(ii), 4-(iii), 5-(v), 6-(vi)

69. Name the cells specialised for excretion and osmoregulation in *Ascaris*.

- A. Flame cells
- B. Renette cells
- C. Nephridial cells
- D. Malpighian cells

70. The members of Kingdom Monera and Kingdom Protista in Whittaker's five kingdom classification resemble each other in:

- A. Cell type
- B. Body organization
- C. Nature of cell wall
- D. Nuclear membrane

71. Match the Molluscan Classes with their Examples:

List-I (Class)	List-II (Example)
1. Gastropoda	(i) Octopus
2. Bivalvia	(ii) Chiton
3. Cephalopoda	(iii) Snail
4. Polyplacophora	(iv) Oyster

Choose the correct option:

- A. 1-(iii), 2-(iv), 3-(i), 4-(ii)
- B. 1-(i), 2-(ii), 3-(iii), 4-(iv)
- C. 1-(iv), 2-(iii), 3-(ii), 4-(i)
- D. 1-(ii), 2-(i), 3-(iv), 4-(iii)

66. C

67. D

68. A

69. B

70. B

71. A

72. Consider the given two statements:

Statement I: Cephalochordates retain their notochord throughout life.

Statement II: They exhibit a dorsal tubular nerve cord and pharyngeal slits.

Choose the correct statements:

- A. Statement I is correct; Statement II is correct
- B. Statement I is incorrect; Statement II is incorrect
- C. Statement I is correct; Statement II is incorrect
- D. Statement I is incorrect; Statement II is correct

73. Match the Echinoderm Features with their Functions:

(Feature)	(Function)
1. Tube feet	(i) Regulates water entry
2. Madreporite	(ii) Locomotion and feeding
3. Pedicellariae	(iii) Defense and cleaning
4. Radial canal	(iv) Distributes water

Choose the correct option:

- A. 1-(ii), 2-(i), 3-(iii), 4-(iv)
- B. 1-(i), 2-(iv), 3-(ii), 4-(iii)
- C. 1-(iii), 2-(ii), 3-(i), 4-(iv)
- D. 1-(iv), 2-(iii), 3-(i), 4-(ii)

74. Which enzyme is found in the resorptive cells of digestive glands of *Pila*?

- A. Lipase
- B. Protease
- C. Cellulase
- D. None of the above

75. Johnston's organ is found in:

- A. Legs of Spider
- B. Head of Cockroach
- C. Antennae of Mosquitoes
- D. Abdomen of houseflies

76. How many red colour eye spots are present in sea star?

- A. 1 pair
- B. 2 pairs
- C. 3 pairs
- D. 5 pairs

77. The membrane at the side that can connect the tergum and sternum is known as:

- A. Mesentery
- B. Epithelium
- C. Pleuron
- D. Chitin

78. Complete metamorphosis occurs in:

- A. Silverfish
- B. Locust
- C. Bedbug
- D. Mosquito

79. Consider the following statements:

Assertion (A): Torsion in gastropods improves their defense mechanism.

Reason (R): The repositioning of the mantle cavity allows the head to retract into the shell before the foot.

Choose the Correct Statements:

- 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

80. Which of the following is/are true about the endostyle in Urochordates?

- I. It is involved in filter feeding.
- II. It secretes mucus to trap food particles.
- III. It is homologous to the thyroid gland in vertebrates.
- IV. It is present only in the larval stage.

Options:

- A. I and II
- B. I, II and III
- C. II and IV
- D. All of the above

81. Indian bull Frog is:

- A. *Rana tigrina*
- B. *Rana obstreticus*
- C. *Bufo melesticaus*
- D. *Hyla arbore*

72. A 73. A 74. B 75. C 76. D 77. C 78. D 79. A 80. B 81. A

82. Match the fish orders with their representative examples:

(Orders)	(Examples)
1. Chondrichthyes	(i) <i>Labeo</i> (Rohu)
2. Perciformes	(ii) <i>Scoliodon</i> (Dogfish)
3. Cypriniformes	(iii) <i>Catla</i>
4. Siluriformes	(iv) <i>Clarias</i> (Catfish)

Choose the correct option:

- A. 1-(ii), 2-(iv), 3-(i), 4-(iii)
 B. 1-(ii), 2-(iii), 3-(i), 4-(iv)
 C. 1-(i), 2-(iii), 3-(ii), 4-(iv)
 D. 1-(iii), 2-(i), 3-(iv), 4-(ii)
83. Which of the following is a poisonous snake?
- A. Python B. Rattlesnake
 C. Boa constrictor D. Garter snake
84. Match the following orders of birds with their examples:

(Order)	(Example)
1. Passeriformes	(i) Pigeon
2. Accipitriformes	(ii) Sparrow
3. Columbiformes	(iii) Crow
4. Falconiformes	(iv) Eagle

Choose the correct option:

- A. 1-(ii), 2-(iv), 3-(i), 4-(iii)
 B. 1-(iii), 2-(iv), 3-(i), 4-(ii)
 C. 1-(ii), 2-(iii), 3-(iv), 4-(i)
 D. 1-(ii), 2-(iii), 3-(i), 4-(iv)
85. Feather of the birds are waterproof due to the oil secretion of:
- A. mucus glands
 B. uropygial glands
 C. sudorific glands
 D. green glands
86. Which one is not correct about Metatheria?
- A. Testes are extra abdominal
 B. Scrotum in front of penis
 C. Placenta is well developed
 D. Corpus callosum is small or absent

87. Consider the following statement:

Assertion (A): Marine fish maintain osmotic balance by drinking large amounts of seawater.

Reason (R): Marine fish excrete excess salt through specialized cells in their gills to prevent dehydration.

Which statement is correct?

- A. Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
 B. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 C. Assertion (A) is true, but Reason (R) is false.
 D. Assertion (A) is false, but Reason (R) is true.
88. Which of the following statements about parental care in amphibians is/are correct?
- I. In some amphibians, males guard the eggs and provide protection until they hatch.
 II. Certain amphibians, like the Darwin's frog, carry their tadpoles in the vocal sac after hatching.
 III. Some amphibians, such as frogs, do not provide any form of parental care, leaving the eggs to develop on their own.
 IV. Male salamanders perform courtship dances to attract females and assist with egg-laying but do not provide any care afterward.
- Choose the correct statement:
- A. Statements I, II and III are correct.
 B. Statements I, II and IV are correct.
 C. Only statements I and II are correct.
 D. Only statements II and IV are correct.

82. B

83. B

84. A

85. B

86. C

87. A

88. A

89. Which of the following is considered an example of adaptive radiation in mammals following the extinction of the dinosaurs?

- I. The evolution of primates from early mammalian ancestors.
- II. The diversification of ungulates (hooved mammals) to fill various ecological niches.
- III. The development of marine mammals like whales and dolphins from land-dwelling ancestors.
- IV. The evolution of bats from primitive insectivorous mammals to specialized aerial creatures.

Choose the correct statement:

- A. I and III are correct.
- B. II and IV are correct.
- C. I, III and IV are correct.
- D. II, III and IV are correct.

90. Which of the following reptile orders includes lizards and snakes?

- A. Crocodilia B. Squamata
- C. Testudines D. Chelonia

91. Which of the following hormone helps in secretion of HCl from stomach?

- A. Renin B. Gastrin
- C. Secretin D. Pepsin

92. Partial pressure of oxygen in alveolar air is _____.

- A. 159 mm Hg B. 90 mm Hg
- C. 104 mm Hg D. 45 mm Hg

93. Which option indicates correct chronology of the changes occurring during transmission of nerve impulse?

- A. Nerve fibre – depolarization – action potential – repolarization – activation of Na^+ and K^+ pump
- B. Nerve fibre – depolarization – action potential – activation of Na^+ and K^+ pump – repolarization

C. Nerve fiber – depolarization – repolarization – action potential – activation of Na^+ and K^+ pump

D. Nerve fiber – Activation of Na^+ and K^+ pump – depolarization – repolarization

94. A high respiratory quotient indicates:

- A. Absence of respiration
- B. Aerobic respiration
- C. Anaerobic respiration
- D. Inhibition of respiration

95. If loop of Henle were absent from an individual's nephron, which one of the following is to be expected?

- A. The urine will be more dilute
- B. The urine will be more concentrated
- C. There will be no urine formation
- D. There will hardly be any change in the quality and quantity of urine formed

96. Match Brain Regions with Their Function Across Different Organisms:

(Brain Region)	(Function)
1. Cerebrum	(i) Coordination of voluntary movement
2. Cerebellum	(ii) Memory, intelligence, and thinking
3. Medulla oblongata	(iii) Reflex actions, heartbeat, and breathing
4. Hypothalamus	(iv) Regulation of body temperature and hunger

Choose the correct option:

- A. 1-(ii), 2-(i), 3-(iii), 4-(iv)
- B. 1-(i), 2-(ii), 3-(iii), 4-(iv)
- C. 1-(iii), 2-(ii), 3-(i), 4-(iv)
- D. 1-(ii), 2-(iii), 3-(iv), 4-(i)

89. D

90. B

91. B

92. C

93. A

94. C

95. A

96. A

97. Match the Photoreceptor Cells with Their Function:

(Photoreceptor)	(Function)
1. Rods	(i) Color vision under bright light
2. Cones	(ii) Black and white vision in dim light
3. Fovea	(iii) Area with the highest concentration of cones for sharp vision
4. Optic Nerve	(iv) Transmits visual signals to the brain

Choose the correct option:

- A. 1-(iv), 2-(ii), 3-(i), 4-(iii)
- B. 1-(i), 2-(iii), 3-(iv), 4-(ii)
- C. 1-(ii), 2-(i), 3-(iii), 4-(iv)
- D. 1-(iii), 2-(iv), 3-(ii), 4-(i)

98. Consider the following statement:

Assertion (A): Marine fishes excrete nitrogenous waste primarily as ammonia.

Reason (R): Marine fishes are hyperosmotic to their environment, leading to high water retention.

Which statement is correct?

- A. Both (A) and (R) are correct, and (R) explains (A).
- B. Both (A) and (R) are correct, but (R) does not explain (A)
- C. (A) is correct, but (R) is incorrect.
- D. (A) is incorrect, but (R) is correct.

99. Consider following statements.

Cholecystokinin, one of the hormone of digestive tract,

- I. stimulates release of trypsin
- II. inhibits release of pepsin
- III. stimulates release of lipase

Which of the above statements are correct?

- A. I, II and III
- B. I and II
- C. II and III
- D. I and III

100. Choose the Correct Statements About Resting Membrane Potential.

- I. The resting membrane potential is typically around -70 mV.
- II. The sodium-potassium pump actively maintains this potential.
- III. At rest, the membrane is more permeable to Na^+ than K^+ .
- IV. Resting potential is maintained by passive ion diffusion and active transport.

Choose the correct option:

- A. Only I and II
- B. Only II, III and IV
- C. Only I, II and IV
- D. All of the above

101. Match the following:

Column-A	Column-B
1. Eohippus	(i) Ancestor with three toes, lived in forests
2. Meshippus	(ii) The modern horse genus
3. Merychippus	(iii) Dawn horse-first ancestor of horses
4. Equus	(iv) First to exhibit a grazing diet, started evolving on plains

Choose the correct option:

- A. 1-(iii), 2-(i), 3-(iv), 4-(ii)
- B. 1-(i), 2-(iii), 3-(ii), 4-(iv)
- C. 1-(iv), 2-(ii), 3-(i), 4-(iii)
- D. 1-(iii), 2-(iv), 3-(i), 4-(ii)

102. Consider the following statements:

Sibling species exhibit

- I. sympatric distribution
- II. morphological similarity
- III. genetic identity
- IV. reproductive isolation

Choose the correct options:

- A. Only III is correct
- B. I and II are correct
- C. II, III and IV are correct
- D. I, II and IV are correct

97. C

98. C

99. D

100. C

101. A

102. D

103. Choose the correct sequence of evolutionary events in one form of allopatric speciation, using the codes given below.

- I. Geographical isolation
- II. Ecological isolation
- III. Increased pre mating reproductive isolation
- IV. Increased genetic divergence
- V. Selection completed

Choose the correct option:

- A. III, IV, II, V B. I, IV, II, V
- C. III, II, IV, V D. I, II, III, V

104. Some of the oldest known fossil's cells appear as parts of stromatolites, which are formed today from sediments and

- A. marine invertebrates
- B. photosynthetic prokaryotes
- C. amoeba
- D. heterotrophic prokaryotes

105. The unit of evolution is the:

- A. individual B. social groups
- C. population D. species

106. The fossil of Java-Man was found in 1891 on banks of Solo River in Eastern Java by:

- A. Davidson Black B. Dubois
- C. Leakey D. Robert Broom

107. Consider the following statement:

Assertion (A): Stabilizing selection favours individuals with extreme phenotypes in a population.

Reason (R): Stabilizing selection reduces genetic diversity by selecting for the average phenotype.

Which statement is correct?

- A. Both Assertion and Reason are true, and Reason is the correct explanation of Assertion.
- B. Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

- C. Assertion is false, but Reason is true.
- D. Assertion is true, but Reason is false.

108. Match the theories with the scientist who proposed them:

- | (Theory) | (Proposed by) |
|---|------------------|
| 1. Theory of inheritance of acquired characters | (i) Ernst Mayr |
| 2. Biological species concept | (ii) Lamarck |
| 3. Theory of natural selection | (iii) Dobzhansky |
| 4. Modern synthetic theory | (iv) Darwin |

Choose the correct option:

- A. 1-(i), 2-(ii), 3-(iii), 4-(iv)
- B. 1-(iii), 2-(iv), 3-(i), 4-(ii)
- C. 1-(ii), 2-(i), 3-(iv), 4-(iii)
- D. 1-(iv), 2-(iii), 3-(ii), 4-(i)

109. Which of the following is the most famous example of industrial melanism?

- A. Peppered moth (*Biston betularia*)
- B. Darwin's finches
- C. Galapagos tortoises
- D. Turtles

110. Choose the correct statement(s):

- I. Genetic variation can only arise from sexual reproduction.
- II. Organic variation is always beneficial for the survival of a species.
- III. Environmental factors have no effect on organic variation.
- IV. Some isolating mechanisms are pre-zygotic, meaning they occur before fertilization.

Choose the correct statement(s):

- A. I and II are correct
- B. I, II, III are correct
- C. Only IV is correct
- D. All are correct

103. D	104. B	105. C	106. B	107. C	108. C	109. A	110. C
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111. What is the role of regulatory T cells in the immune system?

- A. To activate B cells
- B. To suppress immune responses
- C. To produce antibodies
- D. To enhance phagocytosis

112. Match the Cytokines with Their Functions:

List-I

List-II

- | | |
|------------------|---|
| 1. IL-1 | (i) Stimulates the growth of T-cells, plays a key role in adaptive immunity |
| 2. IL-2 | (ii) Activates macrophages, enhances antigen presentation, and regulates immune responses |
| 3. IFN- γ | (iii) Plays a significant role in inflammation, immune system regulation, and apoptosis |
| 4. TNF- α | (iv) Promotes inflammation, fever, and the activation of T-cells |

Choose the correct option:

- A. 1-(iv), 2-(i), 3-(ii), 4-(iii)
- B. 1-(i), 2-(ii), 3-(iv), 4-(iii)
- C. 1-(iii), 2-(iv), 3-(i), 4-(ii)
- D. 1-(ii), 2-(iii), 3-(i), 4-(iv)

113. Which of the following co-receptors recognizes the β_2 microglobulin subunit of class I MHCs?

- A. CD24
- B. CD4
- C. CD8
- D. CD16

114. Which is the correct order of activities show caused by endogenous antigens?

- (i) Peptide binding to MHC Class I
- (ii) Transport to Endoplasmic Reticulum
- (iii) Generation of Peptide from Proteolysis

Choose the correct options:

- A. (i), (ii), (iii)
- B. (iii), (ii), (i)
- C. (ii), (iii), (i)
- D. (i), (iii), (ii)

115. Select the correct statements regarding the receptors of the innate immune system:

- I. They are included in the Toll family of receptors.
 - II. They include MHC complexes.
 - III. They recognize molecular patterns.
 - IV. They include scavenger receptors.
- Choose the correct options:

- A. I, III and IV
- B. I and II
- C. III and IV
- D. II and IV

116. In humans, what are MHCs called as?

- A. HHC
- B. HLA
- C. HAT
- D. HPFC

117. B lymphocytes are involved in the human immune response to a bacterial infection. Which of the following processes would TYPICALLY be carried out by these lymphocytes in response to the infection?

- I. cell division by mitosis
 - II. transcription producing mRNA
 - III. engulfing and digesting bacteria
- Options:

- A. I and II only
- B. III only
- C. I and III only
- D. I only

118. Match the following:

List-I
(Antibody Type)

List-II
(Found in)

- | | |
|--------|---|
| 1. IgA | (i) Blood and extracellular fluid |
| 2. IgG | (ii) Surface of immature B cells |
| 3. IgD | (iii) Basophils and mastocytes |
| 4. IgE | (iv) Mucosal secretions like saliva, tears, and breast milk |

Choose the correct matching option:

- A. 1-(iv), 2-(i), 3-(ii), 4-(iii)
- B. 1-(iii), 2-(iv), 3-(i), 4-(ii)
- C. 1-(i), 2-(iii), 3-(ii), 4-(iv)
- D. 1-(ii), 2-(ii), 3-(iv), 4-(iii)

111. B

112. A

113. C

114. B

115. A

116. B

117. A

118. A

119. A complement component that is strongly chemotactic for neutrophils is:

- A. C3
- B. C3b
- C. C5a
- D. C5b

120. Consider the following statement:

Assertion (A): An antibody is represented as H_2L_2 .

Reason (R): An antibody has two heavy chains and two light chains.

Choose the correct options:

- 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

EXPLANATORY ANSWERS

1. The idiom "a skeleton in the cupboard" is used to describe a shameful, embarrassing, or scandalous secret about a person or family. Such a fact is deliberately hidden because revealing it could cause humiliation or damage to reputation. It is not meant to be publicly known. Hence, secrecy is the core idea of this idiom.
2. The phrase "kick the bucket" is a well-known English idiom for death. It does not carry a literal meaning and is often used in informal or humorous contexts. The phrase simply means that someone has died or passed away. Therefore, its figurative meaning must be chosen.
3. A diva is a professional singer, especially one who performs in an opera. In the same way, a thespian is a professional actor who performs in a play. Both pairs show the relationship of performer to art form. Hence, the analogy is correctly matched.
4. The sentence asks about the place or location where the keys were kept. Where is an interrogative word used to ask questions related to place. The other options are either incorrect spellings or have different meanings. Therefore, where fits grammatically and contextually.
5. The word none is used to indicate zero quantity and can be used with countable plural nouns like eggs. The sentence means that not a single egg was fresh. Other options do not correctly convey the intended meaning. Hence, none is the correct choice.
6. The word predict means to say in advance what is going to happen in the future. Among the given options, foretell carries exactly the same meaning, as it also refers to announcing or indicating something before it happens. The other options do not convey the idea of future knowledge.
7. The correct preposition used with adjectives describing a person's behavior (like kind, generous, foolish) is 'of'. The structure "It is + adjective + of + person" is grammatically correct. Hence, 'of' is the most suitable choice here.
8. The word ample means more than enough or plentiful. Its opposite would mean small in quantity or insufficient. Meagre clearly expresses scarcity or inadequacy, making it the best antonym.
9. When we refer to a specific and well-known train, we use the definite article 'the'. Vande Bharat Express is a particular train, so 'the' is grammatically correct in this context. Other articles do not fit properly.
10. The clause "that she is coming to the party" functions as the object of the verb 'know'. Since it acts as a noun within the sentence, it is classified as a noun clause. It answers the question "what do I know?".
11. Possession or ownership in English grammar is shown by using an apostrophe ('). It indicates that something belongs to someone or something, as in

119. C

120. A



Rita's book or the dog's tail. Other punctuation marks do not express ownership. Therefore, the apostrophe is the correct answer.

12. Homonyms are words that are spelled the same or sound the same but have different meanings. For example, bat (a flying mammal) and bat (a sports equipment), or flower and flour. Hence, both definitions given in options A and C together correctly describe homonyms.
13. 1. Break the ice means to start a conversation, especially to reduce tension or awkwardness in a social setting. It helps people feel more comfortable with each other.
2. Hit the sack is an informal idiom meaning to go to bed or sleep, usually after a tiring day.
3. Under the weather is used to describe a person who is feeling unwell or sick, though not seriously ill.
4. Once in a blue moon refers to something that happens very rarely or infrequently.
5. In hot water means being in a difficult or troublesome situation, often due to some mistake or wrongdoing.
14. 1. Generous refers to someone who gives freely and is kind in sharing. Its opposite is stingy, which means unwilling to give or share.
2. Beautiful describes something that is pleasing to look at. The correct antonym of beautiful is ugly.
3. Strong means having power or strength, while its opposite is weak, which indicates lack of strength.
4. Victory means success in a contest or battle. Its antonym is defeat, which means loss or failure.
5. Ancient refers to something very old, while its opposite is modern, meaning new or contemporary.
15. The sentence uses the future perfect tense ("will have run away"), which refers to an action that will be completed before another future action. The clause introduced by before must be in the simple present tense, not future or past. Hence, comes is grammatically correct here.
16. 1. It is also known as "slash and burn" agriculture — Correct. The method involves cutting vegetation and burning it so that the ash enriches the soil with nutrients.
2. In India, it is mainly practiced in the Northeast region — Correct. Although traces are found in parts of Central India and the Western Ghats, it is predominantly practiced by hill tribes in Northeast India.
3. In Northeast India it is known as Jhum cultivation — Correct. The practice is locally called Jhum or Jhumming in states such as Assam, Nagaland, Mizoram, and Meghalaya.
4. This type of agriculture is not done anywhere else in the world except India — Incorrect. Shifting cultivation is practiced worldwide under different names, such as Milpa in Mexico, Ladang in Indonesia and Malaysia, and Roca in Brazil.
17. The Godavari River is known as the "Dakshin Ganga" or "Ganga of the South" because of its long course, large basin, and cultural importance in southern and central India. It is the longest river in peninsular India and holds great religious significance similar to the Ganga in the north.
18. 1. Respect for the Constitution, the National Flag and the National Anthem — Correct. Article 51A(a) of the Constitution clearly states that every citizen must respect the Constitution, the National Flag, and the National Anthem.
2. To develop the scientific temper — Correct. Developing scientific temper, humanism, and the spirit of inquiry and reform is explicitly mentioned under Article 51A(h).
3. Respect for the Government — Incorrect. The Constitution does not list respect for the Government as a Fundamental Duty; duties relate to constitutional values and national symbols, not to the ruling authority.
4. To protect Wildlife — Correct. Article 51A(g) includes the duty to protect and improve the natural environment, including forests, lakes, rivers, and wildlife.
19. 1. Civil Disobedience Movement — 1930 (iii). This movement was launched by Mahatma Gandhi with the historic Dandi (Salt) March against the British salt laws.
2. Jallianwala Bagh Massacre — 1919 (i). This tragic incident took place on 13 April 1919 at Amritsar, where British troops opened fire on unarmed civilians.

3. Quit India Movement — 1942 (ii). The movement was launched by Mahatma Gandhi with the call “Do or Die” to demand an immediate end to British rule in India.
4. Simon Commission Arrival in India — 1928 (iv). The Simon Commission arrived in India to review constitutional reforms but was widely opposed because it had no Indian members.
20. I. It was predominantly a secular civilization and the religious element, though present did not dominate the scene — Correct. Archaeological evidence from the Indus Valley Civilization shows greater emphasis on town planning, trade, and daily life, while large religious structures like temples are absent, indicating religion did not dominate public life.
II. During this period, cotton was used for manufacturing textiles in India — Correct. The Indus Valley people were among the earliest in the world to cultivate and use cotton for making textiles, as supported by archaeological findings.
21. Bangladesh, Bhutan, and Maldives are among the founding members of SAARC, which was established in 1985. Myanmar is not a founding member of SAARC; it is instead associated with ASEAN and BIMSTEC.
22. 1. Poverty Reduction Programme — MNREGA (iv). MNREGA provides guaranteed wage employment to rural households, directly helping in poverty reduction.
2. Human Development — Mid-day Meals (i). The Mid-Day Meal Scheme improves nutrition, school attendance, and overall human development among children.
3. Social Assistance Scheme — National Old Age Pension (iii). NOAP provides financial support to elderly citizens, falling under social assistance.
4. Minimum Need Scheme — Indira Awas Yojana (ii). IAY focuses on providing housing, which is a basic minimum need.
23. The Kalinga Award is an international award given for the popularization of science. It is awarded by UNESCO to individuals who have made outstanding contributions to communicating science to the general public. Hence, it is associated with the field of science, not literature, journalism, or sports.
24. Siddhartha Mohanty has been appointed as the Chairman of the Life Insurance Corporation of India (LIC). He previously served as the Managing Director of LIC and was elevated to the position of Chairman due to his long administrative experience in the insurance sector.
25. I. The Preamble is considered part of the Constitution but is not legally enforceable — Correct. The Preamble reflects the philosophy and objectives of the Constitution, but it cannot be enforced in a court of law.
II. The word “Socialist” and “Secular” were added to the Preamble by the 44th Amendment Act, 1978 — Incorrect. These words were added by the 42nd Constitutional Amendment Act, 1976, not the 44th Amendment.
III. The Supreme Court in the Kesavananda Bharati case (1973) held that the Preamble is a part of the Constitution — Correct. The Supreme Court clearly ruled that the Preamble forms an integral part of the Constitution.
26. 1. The Times of India — “Let Truth Prevail” (iv). This is the long-standing slogan of The Times of India, reflecting its editorial philosophy.
2. Hindustan Times — “First Voice, Last Word” (iii). This slogan emphasizes its role in initiating and shaping public opinion.
3. The Indian Express — “Journalism of Courage” (ii). The Indian Express is known for fearless investigative journalism, aptly reflected in its tagline.
4. State Times Newspaper — “The Bold Voice of Jammu & Kashmir” (i). This slogan highlights its strong regional identity and voice.
27. (i) The president is both Head of the State and Head of the Government — Incorrect. The President is the Head of the State, while the Prime Minister is the Head of the Government.
(ii) Parliament is Supreme — Incorrect. In India, the Constitution is supreme, not Parliament.
(iii) The Supreme Court is the guardian of the Constitution — Correct. The Supreme Court has the power of judicial review to protect the Constitution.

- (iv) The Directive Principles of State Policy are justifiable — Incorrect. DPSPs are non-justiciable, meaning they cannot be enforced by courts.
28. 1. Konkani — Goa (iv). Konkani is the official and predominant language of Goa.
 2. Dogri — Jammu & Kashmir (i). Dogri is widely spoken in the Jammu region.
 3. Khasi — Meghalaya (ii). Khasi is a major tribal language spoken in Meghalaya.
 4. Maithili — Bihar (iii). Maithili is predominantly spoken in the Mithila region of Bihar.
29. I. The President appoints a person, who is qualified to be a Judge of a High Court, to be the Attorney General of India — Incorrect. The Attorney General must be qualified to be a Judge of the Supreme Court, not a High Court.
 II. He has the right of audience in all the Courts of the country — Correct. Article 76 grants the Attorney General the right to appear in all courts in India.
 III. He has the right to take part in the proceedings of the Lok Sabha and the Rajya Sabha — Correct. The Attorney General may participate in parliamentary proceedings but cannot vote.
 IV. He has a fixed tenure — Incorrect. The Attorney General holds office during the pleasure of the President and has no fixed tenure.
30. Chang'e-6 is a Chinese spacecraft that, in 2024, successfully collected and returned lunar samples from the far side of the Moon. This mission marked a historic achievement, as it was the first time samples were brought back from the Moon's far side.
31. The Right to Information (RTI) Act came into force in Jammu & Kashmir in 2009 under the J&K RTI Act, 2009. After the abrogation of Article 370 in 2019, the Central RTI Act, 2005 became applicable to the Union Territory, but the original enforcement year in J&K remains 2009.
32. Assertion (A) — Jammu & Kashmir was granted special status under Article 370 of the Indian Constitution — Correct. Article 370 provided a special constitutional position to Jammu & Kashmir.
- Reason (R) — Article 370 allowed J&K to have its own constitution and autonomy over all matters except defence, foreign affairs, finance and communications — Correct. This limited autonomy is precisely why J&K was considered to have a special status. Hence, the reason correctly explains the assertion.
33. While there are different historical and mythological views regarding the origin of the Dogri script, Raja Shakti Karan is traditionally credited with its invention in ancient regional history. His name is commonly associated with the early development of Dogri writing and literature in the Jammu region. Hence, among the given options, Shakti Karan is considered the correct answer.
34. Statement I — Correct. The Kashmir Valley influences the climate of Northern Jammu due to its topography and the Pir Panjal range.
 Statement II — Incorrect. Southern Jammu has a humid sub-tropical climate, not a temperate one.
35. 1. Established first legislature in Jammu & Kashmir — Hari Singh (ii). Maharaja Hari Singh established the first legislative body (Prajya Sabha) in J&K.
 2. First speaker of Jammu & Kashmir Legislative Assembly — Ghulam Rasool Renzoo (i). He served as the first Speaker of the Legislative Assembly.
 3. First chairman of Jammu & Kashmir Legislative Council — Shiv Narayan Fotadar (iii). He was the first Chairman of the Legislative Council.
36. When the price increases by 25% the consumer must reduce consumption by

$$\frac{25}{125} \times 100 = 20\%$$
 to keep total expenditure unchanged.
37. The pattern in the series is based on increasing differences.
 $22 \rightarrow 33 (+11), 33 \rightarrow 46 (+13), 46 \rightarrow 61 (+15), 61 \rightarrow 78(+17)$
 The differences increase by 2 each time, so the next difference will be +19.
 Thus, $78 + 19 = 97$.

38. Statement I — True. Decimal 11 equals 11 in base-10, while hexadecimal 11 equals $1 \times 16 + 1 = 17$

Hence, decimal 11 is smaller, not larger. Wait — decimal 11(11) is a smaller than hex 11(17)
Correction: Decimal 11 is not larger than hexadecimal 11, so statement I is false.

Statement II — False. In binary 1110.101, the fractional part $.101_2 = 1/2 + 0/4 + 1/8 = 0.625$ which is correct.

However since Statement I is false and Statement II is true, the correct option is B.

39. Assertion (A) — No man is perfect — True. It is a universal negative statement.

Reason (R) — Some men are not perfect — True, but it is a particular statement and does not logically prove the universal claim made in the assertion. Hence, R is not a sufficient explanation for A.

40. Assertion (A) — The coin when flipped next time will come up tails — Doubtful. A fair coin has no memory; each flip is independent, so the next outcome cannot be predicted with certainty.

Reason (R) — Because the coin was flipped five times in a row, and each time it came up heads — True. This statement may be factually correct, but it does not influence the outcome of the next flip. Hence, it is not a valid explanation for the assertion.

41. P is the father of Q. Q is the sister of R, which means Q and R are siblings and share the same father, so P is also the father of R. R is the father of S, so S is the child of R. Therefore, P is the father of S's father, i.e., P is the grandfather of S.

42. The relationship between the letters in the first set (AST : BRU) follows a pattern of adding +1 to the positional value of each letter:

A (+1 position in the alphabet) → B

S (+1 position in the alphabet) → T

T (+1 position in the alphabet) → U

Applying this same "+1" relationship to the second set (NQV):

N (+1 position) → O

Q (+1 position) → R

V (+1 position) → W

This results in the sequence ORW.

43. 1. Compound Interest — $A = P(1 + R/100)^n$ (iii). This is the standard formula used to calculate compound interest.

2. Trigonometry — $\sin^2 \theta + \cos^2 \theta = 1$ (iv). This is a fundamental trigonometric identity.

3. Speed, Distance and Time — $(\text{Speed} \times \text{Time}) \div \text{Distance}$ (i). These three quantities are interrelated through this basic relationship.

4. Profit and Loss — $(\text{Selling Price} - \text{Cost Price})/\text{Cost Price} \times 100$ (v). This formula is used to calculate profit or loss percentage.

5. Simple Interest — $(P \times R \times T)/100$ (ii). This is the formula for calculating simple interest.

44. Assertion (A) — If a person moves 10 km north and then 5 km east, the total distance travelled is 15 km — True. Total distance is the sum of the actual path covered, i.e., $10 + 5 = 15$ km.

Reason (R) — The shortest distance between the starting and ending point is given by the Pythagorean theorem — True. This explains displacement, not total distance. Hence, it does not explain the assertion.

45. The coding pattern is +2 forward shift for each letter in the alphabet.

• CAT → C→E, A→C, T→V = ECV (ii)

• DOG → D→F, O→Q, G→I = FQI (iii)

• APPLE → A→C, P→R, P→R, L→N, E→G = CRRNG (iv)

• BALL → B→D, A→C, L→N, L→N = DCNN (i)

46. I. 10% increase followed by 10% decrease returns original number — Incorrect. It results in 99% of the original number.

II. 50% of 200 is 100 — Correct.

III. Increase by 20% then decrease by 20% gives a value less than original — Correct.

IV. 200% increase means tripling the number — Correct. (Original + 200% = 300%).

47. When two trains move in opposite directions, their relative speed is the sum of their speeds.

Speed of faster train = 45 km/hr,

Slower train = 30 km/hr

Relative speed = 75 km/hr

$$75 \times \frac{5}{18} = 20.83 \text{ m/s (20.8 m/s)}$$

To pass the driver only the length of the slower train (50 m) is considered.

$$\begin{aligned}\text{Time} &= \text{Distance} \div \text{Speed} \\ &= 500 \div 20.8 \\ &\approx 24 \text{ seconds.}\end{aligned}$$

48. Assumption I — At that age the child reaches appropriate level of development and is ready to learn — Implicit. The statement suggests that age 5 is considered suitable for schooling, which assumes developmental readiness for learning. Assumption II — The schools do not admit children after six years of age — Not implicit. The statement does not mention admission restrictions or age limits imposed by schools.

49. To count the triangles, we consider all possible triangles of different sizes and orientations in the figure:

- Small triangles formed by the internal lines,
- Medium triangles formed by combining two or more small triangles,
- Large triangles, including the entire outer triangle.

By carefully counting:

- Small triangles = 10
- Medium triangles = 6
- Large triangles = 2

Total triangles = 10 + 6 + 2 = 18.

50. The missing piece must continue the same line direction and symmetry as the other three parts. Option (3) is the only figure in which the lines match the adjoining edges exactly and complete the central pattern without any break or mismatch.
51. Statement I — Information and Communication Technology (ICT) is considered a subset of Information Technology (IT) — Incorrect. ICT is a broader concept that includes IT (computers, software, data processing) along with communication technologies such as the internet, telecommunications, and networks. Hence, IT is a subset of ICT, not vice versa.

Statement II — The 'right to use' a piece of software is termed as copyright — Incorrect. Copyright provides legal ownership and protection to the creator of the software, whereas the right

to use software is granted through a software license.

52. HTML (HyperText Markup Language) is used to create and structure web pages. It defines elements like headings, paragraphs, links, images, and tables that are displayed in a web browser. It is neither a programming language nor used to create servers.
53. ASCII is a character-encoding standard that assigns a unique numerical value to characters, symbols, and control codes used in computers. It ensures uniform representation of text across different devices and systems.
54. Microsoft Windows allows users to run multiple programs simultaneously, such as browsing the internet while editing documents or listening to music. This ability to handle more than one task at the same time makes it a multitasking operating system. It is neither a real-time nor an embedded OS.
55. Bing is the search engine developed and owned by Microsoft. Google and DuckDuckGo are independent companies, while Yahoo is currently powered by Bing but not owned by Microsoft.
56. SMTP (Simple Mail Transfer Protocol) is specifically used to send emails from a sender to a mail server and between mail servers. Other protocols like HTTP, FTP, and HTTPS are not designed for email transmission.
57. Assertion (A) — The BIOS is responsible for initializing hardware components during the computer's boot process — True. BIOS performs the POST (Power-On Self-Test) and initializes essential hardware such as CPU, memory, keyboard, and storage controllers before the system starts.
Reason (R) — The BIOS loads the operating system into memory to start the computer — False. BIOS does not directly load the operating system. It only locates and loads the bootloader, which then loads the operating system into memory.
58. 1. Batch Operating System — IBM (iii). Batch operating systems were first developed and widely used on IBM mainframe computers, where jobs were processed in batches without user interaction.

2. Time-Sharing Operating System — UNIX (i). UNIX is a classic example of a time-sharing operating system, allowing multiple users to work on the system simultaneously by sharing CPU time.
 3. Distributed Operating System — Google's Android OS (iv). Android works in a distributed environment, interacting across devices, cloud services, and networked resources.
 4. Network Operating System — Windows Server (ii). Windows Server is designed to manage network resources, users, and services across multiple computers in a network.
59. 1. Trackball — controls the movement of the cursor on a monitor (iii). A trackball is an input device used to move the pointer on the screen.
2. Graphics tablet — used for drawing (i). It is commonly used by designers and artists for digital drawing and sketching.
3. Printer — converts digital data into a physical form (iv). It produces hard copies of documents and images.
4. Joystick — controls the movement of objects in computer games (ii). It is mainly used for gaming and simulations.
60. I. Cache memory is faster than RAM — Correct. Cache memory is located closer to the CPU and operates at much higher speed than RAM.
- II. SSDs are slower than HDDs — Incorrect. SSDs are faster than HDDs because they use flash memory and have no moving parts.
- III. Virtual memory extends RAM using storage space — Correct. Virtual memory uses part of the hard disk/SSD to act as additional RAM.
- IV. DRAM is a type of non-volatile memory — Incorrect. DRAM is volatile memory and loses data when power is switched off.
61. In ciliate protozoans, kinetodesmata are fine fibrillar structures associated with the basal bodies of cilia. Their main function is to coordinate the rhythmic and synchronized beating of cilia, which is essential for locomotion and feeding. They do not store food, act as sensory organs, or participate in binary fission.
62. 1. Calcarea — Calcium carbonate spicules (iii). Members of this class possess spicules made of calcium carbonate.
2. Hexactinellida — Siliceous spicules, deep sea forms (i). These are glass sponges found mainly in deep-sea habitats with siliceous spicules.
3. Demospongiae — Spongin fibers, commercial sponges (ii). This class includes most sponges used commercially, characterized by spongin fibers.
4. Sclerospongiae — Both siliceous spicules & spongin fibers (iv). These sponges show a combination of siliceous spicules and spongin.
63. Assertion (A) — Cnidarians have a gastro-vascular cavity that serves both digestive and circulatory function — True. In cnidarians, the gastro-vascular cavity helps in digestion and also distributes nutrients throughout the body. Reason (R) — Cnidarians lack a separate circulatory system and depend on diffusion for nutrient transport — True. Because they do not have a specialized circulatory system, the gastro-vascular cavity performs both functions, which directly explains the assertion.
64. *Taenia solium* (pork tapeworm) completes its sexual reproduction in humans, making humans the definitive host. The pig acts as the intermediate host, where larval stages develop.
65. Flame cells in Platyhelminthes are part of the protonephridial system, which helps in removing waste products and maintaining water balance in the body. They are not involved in digestion, respiration, or locomotion.
66. Statement I — Correct. Sponges (Porifera) have a cellular level of organization. Water enters through ostia and exits through the osculum, forming a canal system. Statement II — Incorrect. Sponges do intracellular digestion, not extracellular digestion; food particles are engulfed and digested inside cells (choanocytes and amoebocytes).
67. From the given cross-section, the animal shows no body cavity (acoelomate), which is characteristic of Platyhelminthes. Such animals are triploblastic, having ectoderm, mesoderm, and endoderm. They exhibit bilateral symmetry and

are typically dorso-ventrally flattened, helping in diffusion of gases and nutrients due to absence of a circulatory system. Hence, all four statements are correct.

68. 1. Amoeboid protozoans — *Amoeba proteus* (i).
 2. Ciliates — *Paramecium caudatum* (ii).
 3. Flagellates — *Euglena viridis* (iii).
 4. Sporozoans — *Plasmodium falciparum* (iv).
 5. Dinoflagellates — *Gonyaulax* (v).
 6. Slime molds — *Physarum polycephalum* (vi).
69. In *Ascaris* (a nematode), excretion and osmoregulation are carried out by renette cells. Flame cells are found in Platyhelminthes, nephridia in Annelids, and Malpighian tubules in insects.
70. Members of both Monera and Protista are generally unicellular and show a similar level of body organization. They differ in cell type (prokaryotic vs eukaryotic), nuclear membrane, and cell wall composition.
71. 1. Gastropoda — Snail (iii). Gastropods include snails and slugs, characterized by a single coiled shell (in most cases).
 2. Bivalvia — Oyster (iv). Bivalves have two shells hinged together, as seen in oysters and clams.
 3. Cephalopoda — Octopus (i). Cephalopods are advanced molluscs with well-developed heads and tentacles, e.g., octopus and squid.
 4. Polyplacophora — Chiton (ii). Polyplacophorans have eight dorsal shell plates, typical of chitons.
72. Statement I — Cephalochordates retain their notochord throughout life — Correct. In cephalochordates (e.g., *Amphioxus*), the notochord persists from head to tail throughout life.
 Statement II — They exhibit a dorsal tubular nerve cord and pharyngeal slits — Correct. These are defining chordate features present in cephalochordates.
73. 1. Tube feet — Locomotion and feeding (ii). Tube feet help in movement, food capture, and attachment.

2. Madreporite — Regulates water entry (i). It acts as a sieve-like structure controlling water entry into the water vascular system.
3. Pedicellariae — Defense and cleaning (iii). These small pincer-like structures remove debris and protect against predators.
4. Radial canal — Distributes water (iv). Radial canals distribute water to tube feet in each arm.
74. In *Pila globosa* (apple snail), the digestive gland (hepatopancreas) is the main organ for digestion and absorption. The epithelium of this gland contains three types of cells—digestive (resorptive) cells, secretory cells, and excretory cells.
 The resorptive (digestive) cells are involved in intracellular digestion and are rich in proteolytic enzymes (proteases), which help in breaking down proteins. Hence, protease is the correct enzyme.
75. Johnston's organ is a specialized sensory organ located in the antennae of insects, especially mosquitoes. It helps in detecting sound vibrations and air movements, playing a role in hearing and orientation.
76. A sea star has one red eyespot at the tip of each arm. Since a typical sea star has five arms, it possesses five pairs of red eye spots, which help in light detection.
77. In insects, the pleuron is the lateral region of a body segment that connects the tergum (dorsal plate) and sternum (ventral plate). It plays an important role in body structure and muscle attachment.
78. Complete metamorphosis involves four stages—egg, larva, pupa, and adult. Mosquito undergoes all four stages. Silverfish, locust, and bedbug show incomplete metamorphosis (no pupal stage).
79. Assertion (A) — Torsion in gastropods improves their defense mechanism — True.
 Reason (R) — The repositioning of the mantle cavity allows the head to retract into the shell before the foot — True.
 This rearrangement due to torsion enhances protection of vital organs, thus correctly explaining the assertion.

80. I. Involved in filter feeding — True.
 II. Secretes mucus to trap food particles — True.
 III. Homologous to the thyroid gland in vertebrates — True.
 IV. Present only in the larval stage — False. The endostyle is present in adult urochordates, not restricted to larvae.
81. The Indian bullfrog is scientifically known as *Rana tigrina* (also called *Hoplobatrachus tigerinus* in modern taxonomy). It is a large frog species commonly found in India and nearby regions.
82. 1. Chondrichthyes — Scoliodon (Dogfish) (ii). These are cartilaginous fishes.
 2. Perciformes — Catla (iii). (As per the given options in the question.)
 3. Cypriniformes — Labeo (Rohu) (i).
 4. Siluriformes — Clarias (Catfish) (iv).
83. Rattlesnakes are venomous (poisonous) snakes belonging to the viper family. Python, boa constrictor, and garter snake are non-venomous.
84. 1. Passeriformes — Sparrow (ii). This order includes perching birds like sparrow and crow.
 2. Accipitriformes — Eagle (iv). Birds of prey such as eagles and hawks belong to this order.
 3. Columbiformes — Pigeon (i). Pigeons and doves are characteristic members of this order.
 4. Falconiformes — Crow (iii). As per the given options, crow is matched here.
85. Bird feathers are waterproof due to oily secretions from the uropygial (preen) gland, located at the base of the tail. Birds spread this oil over their feathers during preening.
86. Metatheria (marsupials) show:
 • Extra-abdominal testes — correct
 • Scrotum in front of penis — correct
 • Corpus callosum small or absent — correct
 • Placenta well developed — incorrect, as marsupials have a poorly developed placenta
87. Assertion (A) — Marine fish maintain osmotic balance by drinking large amounts of seawater — True. Marine (bony) fishes live in a hypertonic environment and lose water by osmosis, so they drink seawater to compensate.

Reason (R) — Marine fish excrete excess salt through specialized cells in their gills to prevent dehydration — True. Chloride cells in the gills actively excrete excess salts, allowing fishes to maintain osmotic balance. This directly explains why drinking seawater does not cause salt overload.

88. I. In some amphibians, males guard the eggs — Correct. Egg guarding by males is seen in several frog species.
 II. Darwin's frog carries tadpoles in the vocal sac — Correct. This is a classic example of advanced parental care.
 III. Some amphibians provide no parental care — Correct. Many frogs lay eggs in water and leave them unattended.
 IV. Male salamanders perform courtship dances but provide no care afterward — Incorrect. In some salamanders, parental care (especially by females) does occur.
89. I. Evolution of primates from early mammalian ancestors — Not a clear example of adaptive radiation after dinosaur extinction. It represents lineage evolution rather than rapid niche diversification.
 II. Diversification of ungulates — Correct. Ungulates diversified rapidly to occupy different terrestrial niches after dinosaurs became extinct.
 III. Development of marine mammals from land ancestors — Correct. Whales and dolphins evolved from terrestrial mammals, representing adaptive radiation into aquatic environments.
 IV. Evolution of bats into aerial mammals — Correct. Bats diversified into various aerial niches, a classic case of adaptive radiation.
90. The order Squamata includes lizards, snakes, and amphisbaenians. It is the largest order of reptiles, characterized by scales and a movable quadrate bone.
91. Gastrin is a hormone secreted by the stomach that stimulates gastric glands to release hydrochloric acid (HCl). Renin acts on blood pressure, secretin inhibits gastric acid, and pepsin is an enzyme, not a hormone.

92. In humans, the partial pressure of oxygen in alveolar air is about 104 mm Hg. Atmospheric air has a PO_2 of ~159 mm Hg, while venous blood is ~40–45 mm Hg. The alveolar value reflects humidification and gas exchange in the lungs.
93. During nerve impulse transmission, the sequence is: nerve fibre → depolarization → action potential → repolarization → activation of Na^+/K^+ pump. Depolarization generates the action potential, repolarization restores membrane polarity, and the Na^+/K^+ pump re-establishes ionic gradients afterward.
94. A high respiratory quotient (RQ) indicates greater CO_2 production relative to O_2 consumption, which is characteristic of anaerobic respiration (e.g., fermentation), where oxygen use is minimal or absent.
95. The loop of Henle is essential for creating the medullary osmotic gradient in the kidney, which allows concentration of urine. If it were absent, the nephron would lose its ability to reabsorb water efficiently. As a result, urine would be less concentrated and more dilute, though urine formation would still occur.
96. 1. Cerebrum — Memory, intelligence, and thinking (ii). The cerebrum controls higher mental functions such as learning, reasoning, and memory.
2. Cerebellum — Coordination of voluntary movement (i). It helps maintain balance, posture, and smooth execution of movements.
3. Medulla oblongata — Reflex actions, heartbeat, and breathing (iii). It controls vital involuntary functions necessary for survival.
4. Hypothalamus — Regulation of body temperature and hunger (iv). It maintains homeostasis by regulating hunger, thirst, temperature, and endocrine activity.
97. 1. Rods — Black and white vision in dim light (ii). Rods are sensitive to low light and help in scotopic (night) vision.
2. Cones — Color vision under bright light (i). Cones function best in bright light and are responsible for color perception.
3. Fovea — Area with the highest concentration of cones for sharp vision (iii). It provides maximum visual acuity.
4. Optic nerve — Transmits visual signals to the brain (iv). It carries impulses from the retina to the visual cortex.
98. Assertion (A) — Marine fishes excrete nitrogenous waste primarily as ammonia — Correct. Most marine bony fishes are ammonotelic, excreting ammonia directly into seawater.
Reason (R) — Marine fishes are hyperosmotic to their environment — Incorrect. Marine bony fishes are hypoosmotic to seawater (they lose water and gain salts), not hyperosmotic. Therefore, the reason does not support the assertion.
99. I. Stimulates release of trypsin — Correct. Cholecystokinin (CCK) stimulates the pancreas to release digestive enzymes, including trypsinogen (which is later converted to trypsin).
II. Inhibits release of pepsin — Incorrect. Inhibition of pepsin secretion is mainly associated with secretin, not CCK.
III. Stimulates release of lipase — Correct. CCK strongly stimulates pancreatic secretion of lipase for fat digestion.
100. I. The resting membrane potential is typically around -70 mV — Correct. Neurons generally maintain a resting potential close to -70 mV.
II. The sodium-potassium pump actively maintains this potential — Correct. The Na^+/K^+ pump maintains ionic gradients by pumping 3 Na^+ out and 2 K^+ in.
III. At rest, the membrane is more permeable to Na^+ than K^+ — Incorrect. At rest, the membrane is more permeable to K^+ than Na^+ due to K^+ leak channels.
IV. Resting potential is maintained by passive ion diffusion and active transport — Correct. Both diffusion through ion channels and active pumping contribute to maintaining resting potential.
101. 1. Eohippus — Dawn horse, first ancestor of horses (iii). It was the earliest horse ancestor, small-sized with multiple toes.
2. Mesohippus — Ancestor with three toes, lived in forests (i). It showed increased size and adaptation to forest life.

3. *Merychippus* — First to exhibit a grazing diet, started evolving on plains (iv). It marked the shift from browsing to grazing.
 4. *Equus* — The modern horse genus (ii). It includes present-day horses, donkeys, and zebras.
102. I. Sympatric distribution — Correct. Sibling species often occur in the same geographic area.
- II. Morphological similarity — Correct. They are very similar in appearance and difficult to distinguish morphologically.
- III. Genetic identity — Incorrect. They are genetically distinct species, not identical.
- IV. Reproductive isolation — Correct. Despite similarity and shared habitat, they do not interbreed.
103. In allopatric speciation, the process begins with geographical isolation, which prevents gene flow. This is followed by genetic divergence due to mutation, drift, and selection. Over time, ecological isolation develops as populations adapt to different environments, and finally selection is completed, resulting in distinct species.
104. Stromatolites are layered sedimentary structures formed by photosynthetic prokaryotes, especially cyanobacteria. These organisms trap and bind sediments and represent some of the oldest fossil evidence of life on Earth.
105. Evolution is defined as a change in allele frequencies over generations, which can occur only in a population, not in a single individual or a social group. Individuals may show variation, but only populations evolve over time.
106. The fossil of Java Man (*Homo erectus*) was discovered in 1891 on the banks of the Solo River in Eastern Java by Eugène Dubois. This was one of the earliest important discoveries in human evolution.
107. Assertion (A) — Stabilizing selection favours individuals with extreme phenotypes — False. Stabilizing selection acts against extreme phenotypes and favours individuals with intermediate (average) traits.
- Reason (R) — Stabilizing selection reduces genetic diversity by selecting for the average phenotype — True. By eliminating extremes, stabilizing selection narrows variation in the population.
108. 1. Theory of inheritance of acquired characters — Lamarck (ii). Proposed that acquired traits are inherited.
2. Biological species concept — Ernst Mayr (i). Defined species based on reproductive isolation.
3. Theory of natural selection — Darwin (iv). Explained evolution by differential survival and reproduction.
4. Modern synthetic theory — Dobzhansky (iii). Integrated genetics with natural selection.
109. Peppered moth (*Biston betularia*) is the most famous example of industrial melanism. During the Industrial Revolution in England, pollution darkened tree trunks with soot. Dark-coloured (melanic) moths were better camouflaged and escaped predators, while light-coloured moths were eaten more easily. As a result, natural selection increased the frequency of dark moths in polluted areas.
110. I. Genetic variation only from sexual reproduction — Incorrect. Mutations also create variation.
- II. Organic variation is always beneficial — Incorrect. Many variations are neutral or harmful.
- III. Environmental factors have no effect — Incorrect. Environment can influence phenotypic variation.
- IV. Some isolating mechanisms are pre-zygotic — Correct. They act before fertilization.
111. Regulatory T cells (Tregs) play a crucial role in maintaining immune tolerance. They suppress excessive or inappropriate immune responses, prevent autoimmune reactions, and help maintain immune system balance.
112. 1. IL-1 — Promotes inflammation, fever, and activation of T-cells (iv).
2. IL-2 — Stimulates growth and proliferation of T-cells, important for adaptive immunity (i).
3. IFN- γ — Activates macrophages, enhances antigen presentation, and regulates immune responses (ii).
4. TNF- α — Plays a role in inflammation, immune regulation, and apoptosis (iii).

113. CD8 acts as a co-receptor on cytotoxic T lymphocytes and specifically binds to the β_2 -microglobulin subunit of MHC class I molecules. This interaction is essential for recognition of antigen-presenting cells displaying endogenous antigens.
114. Endogenous antigens are first generated by proteolysis in the cytosol, then the peptides are transported into the endoplasmic reticulum (via TAP transporters), and finally they bind to MHC class I molecules before being presented on the cell surface.
115. I. Included in the Toll family of receptors — Correct. Toll-like receptors (TLRs) are major innate immune receptors.
 II. Include MHC complexes — Incorrect. MHC molecules are part of adaptive immunity.
 III. Recognize molecular patterns — Correct. Innate receptors detect PAMPs (pathogen-associated molecular patterns).
 IV. Include scavenger receptors — Correct. Scavenger receptors are part of innate immune recognition.
116. In humans, Major Histocompatibility Complex (MHC) molecules are known as Human Leukocyte Antigens (HLA). They play a central role in antigen presentation and immune response regulation.
117. B lymphocytes respond to bacterial infection by proliferating through mitosis (clonal expansion) and by transcribing genes to produce mRNA, which is translated into antibodies. Engulfing and digesting bacteria is the function of phagocytes (like macrophages and neutrophils), not B cells.
118. 1. IgA — Mucosal secretions like saliva, tears, and breast milk (*iv*).
 2. IgG — Blood and extracellular fluid (*i*).
 3. IgD — Surface of immature B cells (*ii*).
 4. IgE — Basophils and mastocytes (*iii*).
119. C5a is a powerful chemotactic factor that attracts neutrophils to the site of infection and enhances inflammation.
120. Assertion (A) — An antibody is represented as H_2L_2 — True.
 Reason (R) — An antibody has two heavy chains and two light chains — True.
 The structural composition of antibodies directly explains the H_2L_2 notation.