1. Consider the following statements about Vechur cattle breed
   1. Vechur is the world's largest cow.
   2. It is indigenous breed found in Kerala.
   3. Its milk protein has medicinal value.
   4. Commonly used in farming as draught animal.

   Which of the statements given above are correct?
   (a) 1, 2, 3 and 4 (b) 1, 2 and 3
   (c) 2, 3 and 4 (d) 3 and 4
2. Consider the following statements:
   1. Warm-blooded animals can remain active in cold environment in which cold-blooded animals can hardly move.
   2. Cold-blooded animals require much less energy to survive than warm-blooded animals.

   Which of the statements given above is/are correct?
   (a) 1 only (b) 2 only
   (c) Both 1 and 2 (d) Neither 1 nor 2
3. Consider the following statements:
   1. Human beings have 23 pairs of chromosomes.
   2. Sex chromosome in human male is named XX.
   3. Chromosomes are best seen in metaphase.

   Which of the statements given above are false about chromosomes?
   (a) 1 and 2 (b) 2 only
   (c) 1, 2 and 3 (d) None of these
4. Match List-I (animals) with List-II (class/phylum) and select the correct answer from the codes given below:

List-I	**List-II**
A. Octopus	1. Pisces
B. Jellyfish	2. Arthropoda
C. Silver fish	3. Mollusca
D. Bombay duck	4. Coelenterata

Codes:

	A	B	C	D
(a)	3	4	2	1
(b)	3	2	4	1
(c)	2	3	1	4
(d)	2	1	3	4

5. Which of the following professionals are more likely to run the risk of a permanent change in their cell's DNA?
   1. Researchers from carbon-14 isotope
   2. X-ray technician
   3. Coal miner
   4. Dyer and painter

   Select the correct answer from the codes given below:
   (a) 2 only (b) 1, 2 and 3
   (c) 1, 2 and 4 (d) 1, 3 and 4
6. Consider the following statements about gene
   1. Word 'Gene' was given by Johanssen.
   2. Genes are situated on chromosomes.
   3. Genes located at different locus and having different expression are multiple alleles.

   Which of the statements given above are true?
   (a) 1 and 2 (b) 2 and 3
   (c) 1 and 3 (d) 1, 2 and 3
7. Consider the following statements:
   1. Frogs can breathe by lungs as well as skin.
   2. Gills are not present in any stage of lifespan of frogs.

   Which of the statements given above is/are correct?
   (a) 1 only (b) 2 only
   (c) 1 and 2 only (d) Neither 1 nor 2

8. Consider the following statements:
Assertion (A): In humans, female sex is determined by XX-chromosomes.
Reason (R): Male sex is determined by YY-chromosomes.
Codes:
(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.

9. With reference to the work of human kidney, consider the following statements:
1. After the waste is removed in the kidney, the cleaner blood is sent back through renal artery.
2. From Bowman's capsule, the filtered liquid passes through tiny tubes where much of the glucose is reabsorbed and sent back to the blood in the renal vein.
Which of the statements is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

10. Consider the following statements:
Assertion (A): Drinking of whisky increases the frequency of urination.
Reason (R): Alcohol intake speeds up the secretion of vasopressin in the body.
Codes:
(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.

11. With reference to the human body, consider the following statements:
1. The production of somatropin goes up when a person exercises.
2. Men's testes produce progesterone.
3. Women's adrenal glands secret testosterone.
4. Stress causes the adrenal to release very less amount of cortisol than usual.
Which of these statements are correct?
(a) 1, 2, 3 and 4
(b) 1, 2 and 3
(c) 2, 3 and 4
(d) 1 and 4

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

	List-I		**List-II**
A.	Arber and Smith	1.	Developed transgenic plants with Agrobacterium T-DNA
B.	Feldman	2.	Discovered endonucleases
C.	Mullis	3.	Discovered reverse transcriptase
D.	Temin and Baltimore	4.	Discovered polymerase chain reaction

Codes:

	A	B	C	D
(a)	2	1	4	3
(b)	1	2	4	3
(c)	2	1	3	4
(d)	1	2	3	4

13. Consider the following statements:
Assertion (A): Human diet should compulsorily contain glycine, serine and tyrosin.
Reason (R): Essential amino acids can't be synthesized in the human body.
Codes:
(a) A and R are true and R is the correct explanation of A.
(b) 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.

14. Oxygen transportation in a human body takes place through
1. Blood
2. Lungs
3. Tissue
The correct sequence of transportation is
(a) 1, 2 and 3 (b) 3, 1 and 2
(c) 2, 1 and 3 (d) 1, 3 and 2

15. Consider the following statements:
Assertion (A): Scientists can cut apart and paste together DNA molecules at will, regardless of the source of the molecules.
Reason (R): DNA fragments can be manipulated from restriction endonucleases and DNA ligases.
Codes:
(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.

16. Consider the following statements:
Assertion (A): 'DNA fingerprinting' has become a powerful tool to establish paternity and identity of criminals in rape and assault cases.
Reason (R): Trace evidences, such as hairs, saliva and dried semen, are adequate for DNA analysis.
Codes:
(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.

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

	List-I		**List-II**
A.	Discovery of transduction and conjugation in bacteria	1.	Khorana
B.	Establishing the sex-linked inheritance	2.	Kornberg
C.	Isolation of DNA polymerase from *E. coli*	3.	Lederberg
D.	Establishing the complete genetic code	4.	Morgan
		5.	Ochoa

Codes:

	A	B	C	D
(a)	4	3	2	1
(b)	3	4	1	5
(c)	4	3	1	5
(d)	3	4	2	1

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

	List-I (Bone)		**List-II (Name)**
A.	Breast bone	1.	Clavicle
B.	Collar bone	2.	Patella
C.	Knee cap	3.	Scapula
D.	Shoulder blade	4.	Sternum

Codes:

	A	B	C	D
(a)	4	1	3	2
(b)	1	4	3	2
(c)	1	4	2	3
(d)	4	1	2	3

19. Match the hormones in List-I with items in List-II and select the correct answer from the codes given below:

	List-I		**List-II**
A.	Adrenaline	1.	Anger, fear, danger
B.	Oestrogen	2.	Attracting partners of smell through sense
C.	Insulin	3.	Females
D.	Pheromones	4.	Glucose

Codes:

	A	B	C	D
(a)	3	1	4	2
(b)	1	3	2	4
(c)	1	3	4	2
(d)	3	1	2	4

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

	List-I		**List-II**
A.	Ptyalin	1.	Converts angiotensinogen in blood into angiotensin
B.	Pepsin	2.	Digests starch
C.	Renin	3.	Digests proteins
D.	Oxytocin	4.	Hydrolyses fats
		5.	Induces contraction of smooth muscles

Codes:

	A	B	C	D
(a)	2	3	1	5
(b)	3	4	2	5
(c)	2	3	5	1
(d)	3	1	2	4

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

	List-I		List-II
A.	EEG	1.	Muscle
B.	ECG	2.	Eye
C.	EOG	3.	Brain
D.	EMG	4.	Heart

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	3	4	2	1
(c)	2	3	4	1
(d)	4	3	1	2

22. Which of the following diseases are infectious in milch animals?
1. Hand diseases
2. Anthrax
3. Black quarter
4. Cowpox

Select the correct answer from the codes given below:
(a) 1, 2 and 3 (b) 2, 3 and 4
(c) 1 and 4 (d) 1, 2, 3 and 4

23. Consider the following statements:
1. Meningococcal meningitis is transmitted from person to person by mosquito bites.
2. Vomiting and neck pain are two of the symptoms of meningococcal meningitis.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

24. Consider the following statements and select the correct answer from the codes given below:
Assertion (A): If somebody stops taking green vegetables, he will suffer from night blindness.
Reason (R): He will suffer from vitamin A deficiency.

Codes:
(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.

25. Consider the following statements:
1. Dengue is a protozoan disease transmitted by mosquitos.
2. Retro-orbital pain is not a symptom of dengue.
3. Skin rash and bleeding from nose and gums are some of the symptoms of the dengue.

Which of the statements given above is/are correct?
(a) 1 and 2 only (b) 2 only
(c) 3 only (d) 1 and 3 only

26. Consider the following statement about lymph
1. Lymph is another medium of circulation in the human body.
2. Lymph flows in only one direction - from the heart to body tissues.
3. Lymph protects the body by killing the germs drained out of the body tissues with the help of Lymphocytes.

(a) 1 and 3 are correct
(b) 1 and 2 are correct
(c) 2 and 3 are correct
(d) 1, 2 and 3 are correct

27. Consider the following statements:
1. ELISA test is employed as the first and most basic test for an individual to detect cancer.
2. Almost 50% human being have Rh+ blood while the remaining have Rh– blood.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

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

	List-I		List-II
A.	Plague	1.	Protozoa
B.	AIDS	2.	Fungus
C.	Baldness	3.	Virus
D.	Malaria	4.	Bacteria

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	3	4	1
(c)	3	4	1	2
(d)	4	3	2	1

29. Consider the following statements
Assertion (A): An enzyme is basically a protein which acts like a catalyst in the metabolic reactions of an organism.
Reason (R): The pancreatic juice is basically composed from three enzymes trypsin, amylase and lipase.
Codes:
(a) A and R are correct 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.

30. Match the following columns:

	Types of blood cells		**Function**
A.	Neutrophils	1.	Heparin and histamine secretion
B.	Basophils	2.	Antibodies formation
C.	Acidophils	3.	Scavenger
D.	Monocytes	4.	Phagocytes
E.	Lymphocytes	5.	Antiallergic and healing of wounds

Codes:

	A	B	C	D	E
(a)	3	1	5	4	2
(b)	1	4	5	3	2
(c)	3	2	1	4	5
(d)	2	3	1	4	5

31. Consider the following statements and choose the correct ones.
1. Once the HIV gains a foothold, it can never be eradicated from the body.
2. Many HIV patients, however, can manage the infection with a cocktail of drugs.
3. It is very mutable and infects the respiratory system itself.
(a) 1 and 2 only
(b) 2 and 3 only
(c) None
(d) All are correct

32. Consider the following statements and choose the correct code.
Assertion (A): A true nucleus is absent in *E. coli* and other prokaryotes.
Reason (R): An undifferentiated, unorganised fibrillar chromosome exists inside the prokaryotic cells.
Codes:
(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 false, but R is true.
(d) Both A and R are false.

33. Consider the following statements and choose the correct code.
Assertion (A): Regeneration in animals is one of the strategies to escape predation.
Reason (R): These strategies include the rearrangement of pre-existing tissue.
Codes:
(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 false, but R is true.
(d) Both A and R are false.

34. Which one of the following animals is correctly matched with its one characteristic and taxon?

	Animal	**Characteristic**	**Taxon**
(a)	Sea anemone	Ventral nerve cord	Arachnide
(b)	Millipede	Triploblastic	Cnidaria
(c)	Duckbilled platypus	Oviparous	Mammaliar
(d)	Silver fish	Pectoral fins	Cnordate

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

	List-I		**List-II**
A.	Gonads	1.	Insulin
B.	Pituitary	2.	Progesterone
C.	Pancreas	3.	Growth hormone
D.	Adrenal	4.	Cortisol

Codes:

	A	B	C	D
(a)	2	3	4	1
(b)	2	3	1	4
(c)	3	2	4	1
(d)	3	2	1	4

36. Match the List-I and LIst-II:

List-I (Organs of the Body)	List-II (Process of Treatment)
A. Heart	1. Cataract Operation
B. Kideny	2. Angioplasty
C. Eye	3. Hysterectomy
D. Uterus	4. Dialysis

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	4	1	3
(c)	4	2	1	3
(d)	1	2	4	3

37. Consider the following statements and choose the correct code.

Assertion (A): Osteoporosis is a reduction in bone mass causing weakness of skeletal bones.

Reason (R): It is caused by excessive resorption of calcium and phosphorus from the bone.

Codes:

(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) Both A and R are false.

38. Match the List-I with List-II

List-I Carcinogens	List-II Organs affected
A. Cigarette smoke	1. Lungs and arteries
B. Mustard gas	2. Lungs
C. Asbestos	3. Lungs and pleural membrane
D. Vinylchloride	4. Liver

Codes:

	A	B	C	D
(a)	4	3	2	1
(b)	1	2	3	4
(c)	4	2	1	3
(d)	3	1	2	4

39. Consider the following statements and the correct ones.

(1) Fish that eradicates the mosquito larva is *Gambusia*.

(2) The instrument used to measure blood pressure is Autoanalyser.

(3) CT scanning was developed by Godfrey Hounsfield.

(a) Only 1 (b) Only 2

(c) Only 1 and 3 (d) All are correct

40. Match the List-I with List-II

List - I	List - II
A. Phobia	1. Maladaptive habit
B. Neurosis	2. Undue concern about health
C. Hypochondria	3. Lack of sleep
D. Insomnia	4. Intense fear

Codes:

	A	B	C	D
(a)	1	3	4	2
(b)	2	4	3	1
(c)	4	1	2	3
(d)	3	2	1	4

41. Match the List-I with List-II

List-I (Disease)	List-II (Meanings)
A. Jaundice	1. Allergic inflammation of nose
B. Stenosis	2. Loss of motor functions
C. Rhinitis	3. Defect of heart values
D. Paralysis	4. Increase in bile pigments in the blood

Codes:

	A	B	C	D
(a)	1	4	2	3
(b)	3	2	4	1
(c)	4	3	1	2
(d)	2	1	3	4

42. The main reason why antibiotics could not solve all the problems of bacterial diseases is

(a) Insensitivity of the individual following prolonged exposure to antibiotics

(b) Inactivation of antibiotics by bacterial enzymes

(c) Decreased efficiency of the immune system

(d) The development of mutant strains resistant to antibiotics

43. Consider the following statements:

1. Annual rings are distinct in plants which grow in temperate region.
2. One growing ring of plant consists of only spring wood.

Which of the statements given above is/are correct about annual ring?
(a) 1 only
(b) 2 only
(c) 1 and 2
(d) Neither 1 nor 2

44. Consider the following statements:
1. Carolus Linnaeus is the father of binomial nomenclature of organisms.
2. The word taxonomy was coined by Augustin de Candolle.
Which of the above statements is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

45. Match List-I with List-II and select the correct answer by using the codes given below:

	List-I	List-II
A.	Ribosome	1. Suicidal bag of cells
B.	Lysosome	2. Protein factory of cells
C.	Mitochondria	3. Controller of cell
D.	Nucleus	4. Power house of cell

Codes:

	A	B	C	D
(a)	2	1	4	3
(b)	4	3	2	1
(c)	1	4	3	2
(d)	3	2	1	4

46. Which of the following is the correct sequence of the different phases of cell division?
1. Anaphase
2. Telophase
3. Prophase
4. Metaphase
Codes:
(a) 1, 2, 3, 4 (b) 1, 3, 2, 4
(c) 3, 1, 4, 2 (d) 3, 4, 1, 2

47. Consider the following statements:
1. The cell was discovered by Robert Hooke.
2. Nucleus was described by Robert Brown.
3. Plant cells generally have lysosomes.
Which of the above statements is/are correct?
(a) 1 only (b) 1 and 2 only
(c) 2 and 3 only (d) 1, 2 and 3

48. Match List-I with List-II and select the correct answer by using the codes given below:

	List-I (Institutes)	List-II (Places)
A.	National Botanical Research Institute (NBRI)	1. Shimla
B.	Central Potato Research Institute (CPRI)	2. Lucknow
C.	Central Rice Research Institute (CPRI)	3. Cuttack
D.	Central Forest Research Institute (CFRI)	4. Dehradun

Codes:

	A	B	C	D
(a)	2	1	3	4
(b)	1	3	4	2
(c)	3	4	2	1
(d)	4	2	1	3

49. Match List-I with List-II and select the correct answer by using the codes given below:

	List-I	List-II
A.	Sundew	1. Drosera
B.	Venus flytrap	2. Dionaea
C.	Bladderwort	3. Utricularia
D.	Pitcher plant	4. Nepenthes

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	3	4	1
(c)	3	4	1	2
(d)	4	1	2	3

50. Match List-I with List-II and select the correct answer by using the codes given below:

	List-I	List-II
A.	Dark reaction	1. Grana of chloroplast
B.	Light reaction	2. Stroma of chloroplast
C.	Glycolysis	3. Cytoplasm
D.	Kreb's cycle	4. Mitochondrial matrix

Codes:

	A	B	C	D
(a)	2	1	3	4
(b)	3	4	2	1
(c)	1	3	4	2
(d)	4	2	1	3

51. Match List-I with List-II and select the correct answer by using the codes given below:

	List-I		**List-II**
A.	*Cycas*	1.	Living fossil
B.	*Zamia pygmaea*	2.	Smallest gymnosperm
C.	*Sequoia gigantea*	3.	Tallest gymnosperm
D.	*Abies balsamea*	4.	Canada balsam

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	3	4	1
(c)	4	1	2	3
(d)	3	4	1	2

52. Consider the following statements:
1. *Sphagnum* is used as a packing material for transporting living plants.
2. Drug ephedrine is obtained from stem of *Sphagnum*.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

53. Match List-I with List-II and select the correct answer by using the codes given below:

	List-I		**List-II**
A.	Sanjeevani	1.	*Adiantum sp.*
B.	Maiden hair fern	2.	*Dryopteris sp.*
C.	Horse tail	3.	*Equisetum sp.*
D.	Male shield fern	4.	*Selaginella sp.*

Codes:

	A	B	C	D
(a)	1	2	4	3
(b)	4	3	1	2
(c)	4	1	3	2
(d)	3	1	2	4

54. Consider the following statements:
1. Bryophytes are the amphibians of plant kingdom.
2. Bryophytes do not have vascular tissue.
3. *Selaginella* is an example of Bryophytes.

Which of the statements given above is/are correct?
(a) 1 only
(b) 1 and 2 only
(c) 1, 2 and 3
(d) Neither 1 nor 2 only 3

55. Consider the following statements:
1. Food prepared by plant is transported to different parts of plant through phloem.
2. Water and minerals in plant is transported through phloem.
3. The cell wall of phloem cells is rich in lignin.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 and 3
(c) 1 and 3 (d) 1, 2 and 3

56. Consider the following statements:
1. Lichens show symbiotic association between algae and bryophytes.
2. Lichens are sensitive to SO_2 and indicators of pollution.

Which of the statements given above is/are correct about lichens?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

57. Consider the following statements:
1. *Chlorella* is present in sewage.
2. *Chlorella* produces food rich in vitamins, proteins, etc.
3. *Chlorella* is used in prolonged space flight for O_2.
4. *Chlorella* yields an antibiotic, penicillin.

Which of the statements given above is/are correct?
(a) 1 and 2 only (b) 2 and 3 only
(c) 1, 2 and 3 only (d) 1, 2, 3 and 4

58. Diabetes mellitus takes place only when
(a) α-cells of pancreas are in excess
(b) β-cells of pancreas are in excess
(c) α-cells of pancreas are in hypo
(d) β-cells of pancreas are in hypo

59. Consider the following statements and select the correct answer from the codes given below:
Assertion (A): In filariasis, the lower legs and scrotum are swelled to unproportionate level
Reason (R): The filarial worms block the lymph vessels and lymph node.
Codes:
(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.

60. Consider the following statements:
1. Progeria is the genetic disease associated with fast ageing.
2. Progeric patients never live beyond early years of 5 or 6.
Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

61. Match the List-I with List-II

List-I	**List-II**
Disease	**Causative agent**
A. Amoebiasis	1. *Trypanosoma gambiense*
B. Sleeping sickness	2. *Treponema pallidum*
C. Syphilis	3. *Entamoeba histolytica*
D. Bubonic plague	4. *Pasteurella pestis*

Codes:

	A	B	C	D
(a)	1	3	4	2
(b)	3	1	2	4
(c)	4	2	3	1
(d)	2	4	1	2

62. Which of the following statements are correct?
1. Stewart's disease of corn is caused by *Erwinia stewartii*.
2. The primary vector of *Erwinia stewartii* is corn flea beetle *Chaetocnema pulicaria.*
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

63. Consider the following statements:
1. Hashimoto disease results in thymosin deficiency.
2. Cretinism in children occurs due to thyroxine deficiency.
Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

64. Consider the following statements:
1. ECG is a test that measures the electrical activity of the heart.
2. ECG is not used to measure the rate and regularity of heart beats.
Which of the statement/s given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) None of these

65. Match the List-I with List-II

List-I	**List-II**
A. Neoplasm	1. Haematopoietic cell tumours
B. Benign tumour	2. Bone, cartilage tissue cancers
C. Carcinomas	3. Malignant tumour
D. Sarcomas	4. Cancer of epithelial tissues
E. Lymphomas	5. Non-cancerous tumour
	6. Initiation of new tumours

Codes:

	A	B	C	D	E
(a)	3	5	4	2	1
(b)	2	5	4	3	6
(c)	6	4	3	2	1
(d)	2	3	5	6	4

66. Consider the following statements:
1. A colour blind person cannot distinguish red and green.
2. Colour blindness is related with a defect in nerve cells.
Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

67. Match List-I with List-II and select the correct answer by using the codes given below:

List-I	**List-II**
A. Agroforestry	1. Growing plant without soil in water containing nutrients
B. Hydroponics	2. Growing of tree with cultivation of crop in the same field

C. Pomology 3. Study of fruits
D. Palynology 4. Study of pollen grains

Codes:

	A	B	C	D
(a)	2	1	3	4
(b)	3	4	2	1
(c)	1	3	4	2
(d)	4	2	1	3

68. Match List-I with List-II and select the correct answer by using the codes given below:

List-I (Physiological processes)	**List-II (Cell organelles)**
A. Photosynthesis	1. Plasma membrane
B. Mineral uptake	2. Chloroplast
C. Respiration	3. Mitochondria
D. Protein synthesis	4. Ribosomes

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	1	2	4	3
(c)	2	1	3	4
(d)	2	1	4	3

69. Consider the following plants:
1. Bougainvillea 2. Carnations
3. Cocoa 4. Grapes

Which of these plants are propagated by stem cutting?

(a) 1 and 2 (b) 2, 3 and 4
(c) 1, 3 and 4 (d) 1, 2, 3 and 4

70. Match List-I with List-II and select the correct answer by using the codes given below:

List-I	**List-II**
A. Theory of mutation	1. Beadle and Tatum
B. Theory of evolution	2. Jacob and Monod
C. One gene one enzyme hypothesis	3. Darwin
D. Concept of operon	4. de Vries

Codes:

	A	B	C	D
(a)	3	4	1	2
(b)	3	4	2	1
(c)	4	3	1	2
(d)	4	3	2	1

71. Match the following:

List-I	**List-II**
A. Chili pepper	1. Capsaicin
B. Coriander	2. Allicin
C. Garlic	3. Lycopene
D. Tomato	4. Geraniol

Codes:

	A	B	C	D
(a)	1	4	2	3
(b)	3	1	2	4
(c)	4	3	1	2
(d)	2	1	3	4

72. Match List-I with List-II and select the correct answer by using the codes given below:

List-I	**List-II**
A. Fruit	1. Ovule
B. Seed	2. Leaf
C. Wood	3. Stem
D. Starch	4. Ovary

Codes:

	A	B	C	D
(a)	2	1	3	4
(b)	2	3	1	4
(c)	4	1	3	2
(d)	4	3	1	2

73. Consider the following statements:
1. Swine flu is also called swine influenza.
2. It is an infection caused by swine influenza viruses.
3. Swine flu is transmitted from person to person by inhalation or ingestion of droplets containing virus from people sneezing or coughing.
4. It is also spread by eating cooked pork.

Which of the statements given above are correct?

(a) 1 and 2 only (b) 1, 2 and 3 only
(c) 2, 3 and 4 only (d) 1, 2, 3 and 4

74. AIDS is transmitted by
1. Sexual intercourse
2. Blood transfusion
3. Mosquitoes and other blood sucking insects
4. Across the placenta

Select the correct answer from the codes given below:

(a) 1, 2 and 3 (b) 1 and 2
(c) 1, 2 and 4 (d) 1, 3 and 4

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

	List-I (Diseases)		List-II (Organs)
A.	Myxedema	1.	Reproductive system
B.	Nephrosis	2.	Nervous disorder
C.	Paralysis	3.	Endocrine gland
D.	Syphilis	4.	Excretory system

Codes:

	A	B	C	D
(a)	3	4	1	2
(b)	3	4	2	1
(c)	1	2	4	3
(d)	2	1	3	4

76. Consider the following statements:
1. Hepatitis-B is several times more infectious than HIV/AIDS.
2. Hepatitis-B can cause liver cancer.

Which of the statements given above is/are correct?

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

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

	List-I (Disease)		List-II (Cause)
A.	Khaira	1.	Vitamin C deficiency
B.	Anaemia	2.	Iodine deficiency
C.	Goitre	3.	Iron deficiency
D.	Scurvy	4.	Zinc deficiency

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	1	4	3
(c)	3	4	1	2
(d)	4	3	2	1

78. Which of the following are characteristics of diabetes mellitus, a common disease of human beings?
1. Increase of sugar in blood
2. Appearance of sugar in urine
3. Loss of hunger
4. Lack of energy

Which of the statements given above are correct?

(a) 1 and 2 only (b) 1, 2 and 3 only
(c) 1, 2 and 4 only (d) 1, 2, 3 and 4

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

	List-I (Disease)		List-II (Prophylaxis)
A.	Tuberculosis	1.	Chloramphenicol
B.	Diphtheria	2.	ATS and DPT vaccines
C.	Tetanus	3.	BCG vaccine
D.	Typhoid	4.	DPT vaccine
		5.	TAB vaccine

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	3	4	2	5
(c)	5	3	2	4
(d)	3	4	5	1

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

	List-I		List-II
A.	Leprosy	1.	Fungi
B.	Measles	2.	Protozoa
C.	Kala-azar	3.	Bacteria
D.	Athlete's foot	4.	Virus

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	1	3	4
(c)	4	3	1	2
(d)	3	4	2	1

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

	List-I		List-II
A.	Cardiologist	1.	Eye
B.	Nephrologist	2.	Urinary tract
C.	Urologist	3.	Heart
D.	Oculist	4.	Kidney

Codes:

	A	B	C	D
(a)	3	4	2	1
(b)	4	3	1	2
(c)	1	2	4	3
(d)	2	1	3	4

82. Which one of the following is not correctly matched?

(a) Antipyretic — Paracetamol
(b) Antifoaming agent — Polyamides silicones

(c) Antiseptic — Aspirin
(d) Antirachitic — Calciferol

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

	List-I (Disease)	List-II (Cause)
A.	Night blindness	1. Vitamin D
B.	Rickets	2. Vitamin C
C.	Scurvy	3. Vitamin B
D.	Beri-beri	4. Vitamin A

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	3	4	1	2
(c)	4	1	2	3
(d)	2	3	4	1

84. Match the following columns

	Column I	Column II
A.	Ligament	1. Stores fat
B.	Tendon	2. Connects bone to bone
C.	Areolar tissue	3. Connects muscle to bone
D.	Adipose tissue	4. Forms blood cells
		5. Filling tissue

Codes:

	A	B	C	D
(a)	2	3	5	4
(b)	2	3	5	1
(c)	2	3	1	4
(d)	2	4	5	1

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

	List-I (Disease)	List-II (Cause)
A.	Marasmus	1. Prolonged starvation
B.	Kwashiorkor	2. Protein deficiency
C.	T.B.	3. Bacterial infection
D.	Hepatitis B	4. Viral infection

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	1	3	4
(c)	4	2	3	1
(d)	2	4	1	3

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

	List-I	List-II
A.	Anthrax	1. A disease due to a defective gene
B.	Thalassaemia	2. Womb-renting
C.	Surrogecy	3. Science of altering genes
D.	Transgenics	4. A toxin used by biowarfare

Codes:

	A	B	C	D
(a)	4	1	2	3
(b)	2	3	4	1
(c)	3	2	1	4
(d)	1	2	3	4

87. Which of the following statements is/are correct?
1. Cholera is a disease caused by bacteria.
2. Athlete's foot is a disease caused by virus.

Select the correct answer from the codes given below:
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

88. Consider the following conditions of a sick human body:
1. Swollen lymph nodes
2. Sweating at night
3. Loss of memory
4. Loss of weight

Which of these are symptoms of AIDS?
(a) 1 and 2 only
(b) 2, 3 and 4 only
(c) 1, 3 and 4 only
(d) 1, 2, 3 and 4

89. Which one of the following sets is correctly matched?
(a) Diphtheria, pneumonia and leprosy : Hereditary
(b) AIDS, syphilis and gonorrhoea : Bacterial
(c) Colour blindness, haemophilia and sickle cell anaemia : Sex linked
(d) Polio, Japanese encephalitis and plague : Nematode

90. Consider the following statements and select the correct answer from the codes given below:
Assertion (A): The person with diabetes insipidus feels thirsty.
Reason (R): A person with diabetes insipidus suffers from low secretion of vasopressin.
Codes:
(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.

91. Which of the following are associated with diabetes mellitus, a common disease in adults?
1. Higher sugar level in blood
2. Lower sugar level in blood
3. Lower insulin level in blood
4. Higher insulin level in blood
Select the correct answer from the codes given below:
Codes:
(a) 2 and 4 (b) 2 and 3
(c) 1 and 3 (d) 1 and 2

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

List-I (Diseases)	**List-II (Types of diseases)**
A. Haemophilia	1. Deficiency disease
B. Diabetes	2. Genetic disease
C. Rickets	3. Hormonal disorder
D. Ringworm	4. Fungal infection

Codes:

	A	B	C	D
(a)	2	3	4	1
(b)	2	3	1	4
(c)	3	2	1	4
(d)	3	2	4	1

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

List-I	**List-II**
A. Malaria	1. Bone marrow
B. Filaria	2. Brain
C. Encephalitis	3. Muscle
D. Leukaemia	4. Lymph node
	5. Blood cells

Codes:

	A	B	C	D
(a)	5	3	2	1
(b)	5	4	2	1
(c)	5	4	1	2
(d)	4	3	5	1

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

List-I (Disease)	**List-II (Organism)**
A. Malaria	1. Fungi
B. Poliomyelitis	2. Bacteria
C. Tuberculosis	3. Virus
D. Ringworm	4. Protozoan

Codes:

	A	B	C	D
(a)	4	3	2	1
(b)	3	4	2	1
(c)	3	4	1	2
(d)	4	3	1	2

95. Match List-I with List-II and select the correct answer by using the codes given below:

List-I	**List-II**
A. Rhizome	1. Colocasia
B. Corm	2. Ginger
C. Tuber	3. Potato
D. Bulb	4. Onion

Codes:

	A	B	C	D
(a)	2	1	3	4
(b)	1	3	4	2
(c)	3	4	2	1
(d)	4	2	1	3

96. Consider the following statements:
1. Carbon dioxide, chlorophyll and sunlight all are essential for photosynthesis.
2. Rate of photosynthesis is minimum in red light and maximum in green light.
3. Increase in O_2 concentration decreases photosynthesis.
Which of the statements given above are correct about photosynthesis?

(a) 1 and 2 (b) 2 and 3
(c) 1 and 3 (d) 1, 2 and 3

97. Consider the following statements:
1. Lateral outgrowth of leaf base is called stipule.
2. Leaves with stipules are called as exstipulate leaves.
3. Leaves without stipules are called as stipulate leaves.

Which of the statements given above is/are correct?
(a) 1, 2 and 3 (b) 1 only
(c) 2 and 3 (d) 1 and 3

98. Consider the following statements and choose the correct ones.
1. Anthesis is a phenomenon of ripening of fruits.
2. Fruits developed without fertilization are parthenocarpic.
3. Plants undergo single fertilization event.
(a) 1 and 2 only (b) 1 only
(c) 2 only (d) All are correct

99. Which of the following is not a true statement about chloroplasts and mitochondria?
(a) Each contains a small amount of DNA
(b) Neither are components of the endomembrane system
(c) Both are membrane less organelles
(d) Mitochondria do not synthesise all their proteins

100. Consider the following statements:
1. During rainy season, wood swells up due to imbibition.
2. Excessive supply of fertilizers often causes death of crop plant due to exosmosis.
3. Water present in soil for the roots of plant is surface water.

Which of the statements given above is/are correct?
(a) 1 and 2 (b) 2 and 3
(c) 3 and 4 (d) 1, 2 and 3

101. Consider the following statements:
1. Gibberellins were discovered in rice plants.
2. Dwarfness can be controlled by treating the plant with gibberellic acid.
3. Vernalization cannot be replaced by gibberellins.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) 3 only (d) 2 and 3 only

102. Match List-I with List-II and select the correct answer by using the codes given below:

	List-I		**List-II**
A.	Mango	1.	Endosperm
B.	Coconut flesh and water	2.	Mesocarp
C.	Litchi	3.	Aril
D.	Apple	4.	Fleshy thalamus

Codes:

	A	B	C	D
(a)	4	3	1	2
(b)	1	4	2	3
(c)	2	1	3	4
(d)	1	3	4	2

103. Consider the following statements:
1. Photolysis of water involves breakdown of oxygen by light.
2. The specific function of light energy in the process of photosynthesis is to activate chlorophyll.
3. Byproduct of photosynthesis is carbon dioxide.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) 3 only (d) 1, 2 and 3

104. Match the List-I with List-II and choose the correct code given below:

	List - I		**List-II**
A.	Sericulture	1.	Bee keeping
B.	Pisciculture	2.	Rearing of silk worm
C.	Apiculture	3.	Micropropagation
D.	Tissue culture	4.	Fish farming

Codes:

	A	B	C	D
(a)	2	4	1	3
(b)	4	2	3	1
(c)	2	4	3	1
(d)	1	2	3	4

105. Match the List-I with List-II and choose the correct code given below:

	List - I		List-II
A.	Largest perennial alga	1.	*Wolffia*
B.	Smallest flowering plant	2.	*Macrocystis*
C.	Living fossil	3.	*Selaginella*
D.	Rhizophore	4.	*Ginkgo*

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	1	4	3
(c)	4	3	2	1
(d)	2	3	1	4

106. Consider the following statements and choose the correct ones.
1. Commensalism can be seen between sea anemone and pagurus.
2. Viceroy butterfly mimics monarch butterfly to avoid predation.

(a) 1 only (b) 2 only
(c) 1 and 2 only (d) Neither 1 nor 2.

107. Read the following statements and choose the correct Codes:
Assertion (A): Angiosperms have dominated the land flora.
Reason (R): Angiosperms are highly adaptable in diverse habits.
Codes:
(a) Both A and R are correct 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.

108. Vaseline was applied to both surfaces of the leaves of a plant. Which of the following process/ processes would be affected?
1. Photosynthesis
2. Respiration
3. Transpiration

Select the correct answer using the codes given below:
(a) 1 and 3 only (b) 2 only
(c) 2 and 3 only (d) 1, 2 and 3

109. Which of the following is a correct statement about nitrogen fixation?
(a) Plants convert atmospheric nitrogen to ammonia.
(b) Ammonia is converted to N_2, which is the form of nitrogen most easily absorbed by plants.
(c) Mutant strains of rhizobium are able to secrete excess protein into the soil.
(d) The enzyme nitrogenase reduces N_2 to form ammonia.

110. Consider the following facts about plants.
1. Carbon dioxide and water vapour in plants are produced as wastes during respiration.
2. Oxygen is produced as a waste during photosynthesis.
3. The gaseous wastes of respiration and photosynthesis in plants are removed through the xylem vessels.

The correct answer is:
(a) 1 and 2 (b) 2and 3
(c) 1 and 3 (d) 1, 2 and 3

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

	List-I		List-II
A.	Barleycorn	1.	Wine
B.	Corn	2.	Beer
C.	Grapes	3.	Whisky
D.	Molasses	4.	Rum

Codes:

	A	B	C	D
(a)	3	1	4	2
(b)	4	2	3	1
(c)	2	3	1	4
(d)	1	4	2	3

112. Match List-I with List-II and select the correct answer by using the codes given below:

	List-I		List-II
A.	Respiratory root	1.	Orchids
B.	Fasiculated root	2.	Piper betle
C.	Climbing root	3.	Dahlia
D.	Epiphytic root	4.	Rhizophora

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	3	1	4	2
(c)	4	1	2	3
(d)	2	3	4	1

113. Consider the following statements and select the correct answer from the codes given below:
Assertion (A): Mendel worked on garden pea.
Reason (R): Garden pea belongs to the family Malvaceae.
Codes:
(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.

114. Match List-I with List-II and select the correct answer by using the codes given below:

List-I (Family)	**List-II (Example)**
A. Solanaceae	1. Radish
B. Malvaceae	2. Onion
C. Liliaceae	3. Cotton
D. Cruciferae	4. Potato

Codes:

	A	B	C	D
(a)	4	3	2	1
(b)	2	1	4	3
(c)	3	2	1	4
(d)	1	4	3	2

115. Consider the following statements:
1. Androecium and gynoecium are reproductive organs of flower.
2. Calyx and corolla are accessory female reproductive organs of a flower.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

116. Consider the following statements:
1. Camphor
2. Chicory
3. Vanilla

Which of the above is/are correct plant product?
(a) 1 and 2 (b) 3 only
(c) 2 and 3 (d) 1, 2 and 3

117. Consider the following statements:
1. Bisexual flowers contain both male and female reproductive organs.
2. Unisexual flowers have only one essential floral whorl either androecium or gynoecium.
3. Flowers having only male reproductive structure are called pistillate flowers.
4. Flowers having only female reproductive part are called staminate flowers.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) 1 and 2 (d) 1, 2, 3 and 4

118. Consider the following statements:
1. Largest family of flowering plants is Malvaceae.
2. Agaricaceae includes mushrooms.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

119. Consider the following statements
1. Pulmonary artery is the only artery in which the impure blood is circulated from heart to lungs.
2. Pulmonary vein is the only artery in which the pure blood is circulated from lungs to heart.
3. Deoxygenated blood is circulated in the arteries.

Which of the above statements is/are correct?
(a) 1 only (b) 3 only
(c) 1 and 2 only (d) 1, 2 and 3

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

	List-I	List-II
A.	Father of circulatory system	1. Stephen Hales
B.	Father of plant physiology	2. William Harvey
C.	Coined the term 'Genera'	3. Karl Landsteiner
D.	Discovered various blood groups	4. John Ray

Codes:

	A	B	C	D
(a)	1	4	3	2
(b)	2	3	1	4
(c)	2	1	4	3
(d)	4	3	1	2

121. Consider the following statements:

Assertion (A): Arteries carry blood from various body organs to heart.

Reason (R): Veins carry blood from heart to various body organs.

Codes:

(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) Both A and R are false.

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

	List-I (Blood group)	List-II (Antibody)
A.	A	1. anti-B
B.	B	2. anti-A
C.	A B	3. None
D.	O	4. Both anti-A and anti-B

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	4	3	2	1
(c)	4	2	3	1
(d)	3	4	2	1

123. Consider the following statements:

1. Femur is the smallest bone in the human body.
2. Stapes is the longest bone in the human body.
3. Enamel is the hardest part of the human body.

Which of the statements given above is/are correct?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 3 only

(d) All of the above

124. Consider the following statements:

1. The virus was discovered by Ivanovski.
2. The bacteria were discovered by Rudolf Virchow.
3. The cell theory was proposed by Schleiden and Schwann.

Which of the statements given above is/are correct?

(a) 1 and 2 (b) 2 and 3

(c) 1 and 3 (d) 1, 2 and 3

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

	List-I (Sugar)	List-II (Source)
A.	Cellulose	1. Honey
B.	Fructose	2. Sugarcane
C.	Maltose	3. Cotton wool
D.	Sucrose	4. Disaccharide

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	3	1	4	2
(c)	2	3	4	1
(d)	4	1	2	3

126. Match the following casual agents and the disease they cause in plants.

	List-I	List-II
A.	*Xanthomonas spp.*	1. Bacterial leaf blight of rice
B.	*Magnoporthe grisea*	2. Citrus canker
C.	*Phytophthora infestans*	3. Blast of rice
D.	*Xanthomonas axonopodis*	4. Blight of potato or late blight

Codes:

	A	B	C	D
(a)	4	3	2	1
(b)	1	3	4	2
(c)	3	1	2	4
(d)	1	4	2	3

127. Consider the following statements and choose the correct ones.
1. *Flavr savr* is a genetically modified tomato that remains fresh and flavourful for longer than normal tomato.
2. This GM tomato has blocked the enzyme polygalacturonase.
3. This enzyme is responsible for cell wall formation.

(a) 1 only (b) 2 only
(c) 1 and 2 (d) 1, 2 and 3

128. Consider the following statements:
1. Cambium is responsible for the secondary growth.
2. Cork is obtained from apical meristem.
3. Vascular cambium and cork cambium are the examples of lateral meristem.

Which of the statements given above is/are correct?

(a) 1 only (b) 2 only
(c) 1 and 3 (d) 1, 2 and 3

129. Consider the following statements and choose the correct ones.
1. Hirudin, an anticoagulant protein, is obtained from *Brassica napus*.
2. Pyrethrin is an insecticide obtained from floral heads of *Vincia rosea*.
3. Tissue culture technique is based on the totipotency.

(a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 3 only (d) All are correct

130. Consider the following statements and choose the correct ones.
1. Loose smut of wheat is caused by *Puccinia graminis*.
2. Father of Indian mycology and plant pathology is E.J. Butler.

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 or 2

131. Match the following plants with the drugs they yield.

List-I (Plants)	**List-II (Drugs)**
A. *Papaver somniferum*	1. Quinine
B. *Cinchona officinalis*	2. Isabgol
C. *Withania somnifera*	3. Ashwagandha
D. *Plantago ovata*	4. Opium

Codes:

	A	B	C	D
(a)	2	4	3	1
(b)	3	2	4	1
(c)	1	2	3	4
(d)	4	3	1	2

132. Which of the following is not a correct statement?
(a) Prophyra, laminaria and sargassum are edible algae.
(b) Agar-agar is obtained from *Gelidium* and *Gracilaria.*
(c) Algin is obtained from red algae, while carrageenin from brown algae.
(d) *Chlorella* and *Spirulina* are unicellular algae rich in protein.

133. Which of the following statements are correct about the functions of the blood?
1. Transportation of oxygen.
2. Transportation of hormones.
3. Control of body temperature.
4. Excessive bleeding.

Codes:

(a) 1 and 2 only (b) 3 and 4 only
(c) 1, 2 and 3 (d) 1, 2, 3 and 4

134. Consider the following statements:

Assertion (A): All the proteins in our food are digested in small intestine only.

Reason (R): The protein-digesting enzymes from pancreas are released into small intestine.

Codes:

(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.

135. Consider the following statements and select the correct answer from the codes given below:
1. In DNA, the base adenine, guanine, thymine and cytosine are found.
2. The nucleus contains all the DNAs of a cell.
3. In RNA, thymine is replaced with uracil.
4. RNA is mainly found to be in the cytoplasm.

Codes:

(a) 1, 2 and 3 (b) 2 and 3 only
(c) 1 and 4 only (d) 1, 2, 3 and 4

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

List-I (Organisms)	**List-II (Chromosomes in pairs)**
A. Human	1. 6 (= 12)
B. Housefly	2. 23 (= 46)
C. Mosquito	3. 39 (= 78)
D. Dog	4. 3 (= 6)

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	4	3	2	1
(c)	3	4	1	2
(d)	4	3	1	2

137. With reference to the animal cell, which of the following statements are correct?
1. There is no cell wall in animal cell but the cell is covered by plasma membrane.
2. Chlorophyll is not found in animal cells.
3. Lysosome occurs in plant cells.
4. Almost in all animal cells, centrioles exist.

Codes:

(a) 2 and 3 only (b) 1, 2 and 3 only
(c) 1, 2 and 4 (d) All of the above

138. Consider the following statements with reference to human body:
1. The common bile duct releases its contents into stomach.
2. The pancreatic duct releases its contents into duodenum.

Which of the statements given above is/are correct?

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

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

List-I (Organisms)	**List-II (Scientific name)**
A. Man	1. *Homo sapiens*
B. Cat	2. *Felis domestica*
C. Cow	3. *Bos indicus*
D. Dog	4. *Canis familiaris*

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	1	3	2	4
(c)	4	3	2	1
(d)	3	4	1	2

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

List-I	**List-II**
A. Testosterone	1. Sedative drug
B. Codeine	2. Indian rubber
C. Caoutchouc	3. Aromatic oil of clove
D. Eugenol	4. Hormone

Codes:

	A	B	C	D
(a)	4	1	2	3
(b)	1	2	3	4
(c)	4	3	2	1
(d)	2	3	4	1

141. Match List-I (generic name) with List-II (scientific name) correctly and select the correct answer from the codes given below:

List-I	**List-II**
A. Buffalo	1. Caprine
B. Sheep	2. Ovine
C. Goat	3. Bovine
D. Horse	4. Equine

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	3	2	1	4
(c)	4	2	1	3
(d)	2	1	3	4

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

List-I (Wildlife species)	List-II (Scientific names)
A. Asiatic wild ass	1. *Boselaphus tragocamelus*
B. Barasingha	2. *Rucervus duvaucelii*
C. Chinkara	3. *Equus hemionus khur*
D. Nilgai	4. *Gazella bennettii*

Codes:

	A	B	C	D
(a)	2	3	1	4
(b)	3	2	4	1
(c)	2	3	4	1
(d)	3	2	1	4

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

List-I	List-II
A. Indian buffalo	1. Tallest
B. Tamaraw buffalo	2. Dwarf smallest
C. Anoa buffalo	3. Dwarf
D. Cape buffalo	4. Medium

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	4	3	2	1
(c)	1	3	4	2
(d)	4	1	3	2

144. Consider the following statements:
1. Toothless mammals, such as pangolins, are not found in India.
2. Gibbon is the only ape found in India.

Which of the statements given above is/are correct?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

145. Match List-I (cattle) with List-II (type) which contains related elements and select the correct answer from the codes given below:

List-I	List-II
A. Long-horned cattle	1. Gir type
B. Long ear cattle	2. Mysore type
C. Danny cattle	3. Dwarf type
D. Himalyan cattle	4. Danny type

Codes:

	A	B	C	D
(a)	1	2	3	4
(b)	2	1	4	3
(c)	3	2	1	4
(d)	4	1	1	2

146. Consider the following statements:
1. Beans are richer source of proteins than potatoes.
2. Apples are richer source of carbohydrates than bananas.

Which of the statements given above is/are correct ?
(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

147. Consider the following statements :
1. In algae, the reproductive organs are single-celled.
2. Fern plants lack true vascular system.

Which of the statements given above is/are correct ?
(a) Only 1 (b) Only 2
(c) Both 1 and 2 (d) Neither 1 nor 2

148. Which of the following statements about sexual reproduction in flowering plants are correct ?
1. Stamen is present in the centre of a flower.
2. Stamen produces pollen grains in the ovary.
3. The swollen bottom part of carpel is the ovary.
4. The fusion of germ cells gives rise to zygote.

Select the correct answer using the code given below.
(a) 2, 3 and 4 only (b) 2 and 4 only
(c) 1 and 3 only (d) 1, 2, 3 and 4 only

149. Consider the following statements :
1. Different plant species grow together.
2. Light cannot penetrate into the lower strata full of undergrowth.

Which of the following types of vegetation is characterised by the above ?
(a) Equatorial moist evergreen
(b) Tropical deciduous
(c) Mediterranean
(d) Warm temperate broad leaved deciduous

150. With regard to animal breeding, which one among the following is not correct?
   (a) In-breeding: Mating of more closely related animals within the same breed for 1 – 2 generations
   (b) Out- breeding : Breeding of unrelated animals of the same breed without common ancestors for 4 – 6 generations
   (c) Cross- breeding: Superior males of one breed are mated with superior females of another breed
   (d) Out- crossing: Offspring is called an 'out-cross'

151. Consider the following statements regarding the recent global outbreak of 'Swine flu'
   I. The agent of infection is not well identified
   II. The risk is higher in those who consume pork
   III. It has a propensity to spread from contact with an infected person
   IV. Absence of an effective treatment or vaccine makes it risk for a global pandemic

   Which of the statements given above is/are correct?
   (a) I, II and IV (b) III and IV
   (c) II and III (d) III only

152. Balanced diet should have approximately
   (a) 1/5 protein, 3/5 fat and 1/5 carbohydrate
   (b) 3/5 protein, 1/5 fat and 1/5 carbohydrate
   (c) 1/5 protein, 1/5 fat and 3/5 carbohydrate
   (d) 1/2 protein, 1/4 fat and 1/4 carbohydrate

Directions (Qs. 153-154) : The next four (04) items consist of two statements, statement I and statement II. You are to examine these two statements carefully and select the answers to these items using the code given below.

Code :

(a) Both the statements are individually true and statement II is the correct explanation of statement I

(b) Both the statements are individually true but statement II is not the correct explanation of statement I

(c) Statement I is true but statement II is false

(d) Statement I is false but statement II is true

153. **Statement I :** Oxidation in our body cells releases dangerous free radicals.
Statement II : Our body itself produces antioxidants to neutralise harmful free radicals.

154. **Statement I :** Red blood cells burst when placed in water.
Statement II : Due to the phenomenon of osmosis water enters into red blood cells.

155. Consider the following statements regarding osmosis in animal cells :
   1. If the water potential of the solution surrounding the cell is too high, the cell shrinks.
   2. If the water potential of the solution surrounding the cell is too low, the cell swells and bursts.
   3. It is important to maintain a constant water potential inside the animal body.
   4. In animal cells, water potential far exceeds the solute potential.

   Which of the statements given above is/are correct?
   (a) 1 and 2 (b) 3 only
   (c) 4 only (d) 2 and 3

156. The following question consist of two statements, one labelled as the Assertion (A) and the other as 'Reason (R), You are to examine these two statements carefully and select the answers to these items using the codes given below:
Assertion (A) : Though carbohydrates are covalent compounds, they are soluble in water.
Reason (R) : Compounds which form hydrogen bond with water are generally soluble in water.
   (a) Both A and R are individually true and R is the correct explanation of A
   (b) Both A and R are individually 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

157. Match list-I (Name of the crop) with list-II (Name of the high yielding variety), and select the correct answer using the codes given below the list :

	List-I (Crop)	List-II (High yielding variety)
A.	Maize	1. Arjun
B.	Paddy	2. Jaya
C.	Wheat	3. Ranjit

Codes :

	A	B	C		A	B	C
(a)	1	2	3	(b)	2	3	1
(c)	3	2	1	(d)	3	1	2

158. With reference to human nutrition consider the following statements :
(1) Banana is richer source of carbohydrates than apples
(2) Banana contains some amount of protein also
(3) Spinach has no protein at all
(4) Potatoes are richer sources of protein than peas
Which of the above statements are correct ?
(a) 1 and 2 (b) 2, 3 and 4
(b) 1, 3 and 4 (d) 1, 2, 3 and 4

159. Cow milk is a rich source of :
(a) Vitamin A (b) Vitamin B
(c) Vitamin C (d) Vitamin D

160. The only snake that builds its nest is :
(a) Krait (b) King cobra
(c) Chain viper (d) Saw scaled viper

161. Consider the following statements :
(1) Heart is three chambered in fishes
(2) Heart is four chambered in birds
(3) All animals of class amphibia are characterised by two pairs of limbs
(4) In all reptiles respiration is by lungs only
Which of the above statements are correct ?
(a) 1, 2, 3 and 4 (b) 1 and 3
(c) 2 and 4 (d) 2, 3 and 4

162. Artificial insemination involves the use of :
(a) Natural semen and natural diluent
(b) Natural semen and artificial diluent
(c) Artificial semen and natural diluent
(d) Artificial semen and artificial diluent

163. The following statements are pertaining to green revolution in India :
Green revolution is most successful in the area of:
(1) Controlled and assured source of irrigation
(2) Where chemical fertilizer (NPK) is adequately applied
(3) Where hydel power is adequately available
(4) Where farmers are more receptive to innovation
Select the correct answer using the codes given below :
(a) 1, 2 and 3 (b) 1, 2 and 4
(c) 1, 3 and 4 (d) 1, 2, 3 and 4

164. Consider the following respiratory pigments :
(1) Haemoglobin (2) Haemocyanin
(3) Haemoerythrin (3) Haemocynoglobin
Iron is contained in :
(a) 1, 2, 3 and 4 (b) 1 and 3
(c) 1 and 2 (d) 1, 2 and 4

Directions (Qs. 165 & 166) : The following questions consists of two statements one labelled **Assertion (A)** and the other labelled **Reason (R)**. Select the correct answers to these questions from the codes 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 correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

165. **Assertion (A) :** Bacterial chromosome is highly folded.
Reason (R) : The bacterial chromosome lacks the histone proteins.

166. **Assertion (A) :** Conifers flourish in the cold zones of north.
Reason (R) : Evergreen conifers can carry out photosynthesis even in short days.

167. Which of the following is represented by X in figure ?

DNA ⟶	C	G	A	T	C	G	C	T
	‖	‖	‖	‖	‖	‖	‖	‖
m-RNA ⟶	G	C	X	A	G	C	G	A

(a) Adenine (b) Guanine
(c) Uracil (d) Thimine

168. Match list-I (Name of the plant) with list-II (Seed dispersal mechanism) and select the correct answer using the codes given below the lists :

List-I (Name of the plant)	List-II (Seed dispersal mechanism)
A. Coconut	1. By animals
B. Drumstick	2. Explosive mechanism
C. Coklebur (*Xanthium*)	3. By water
D. Castor	4. By wind

Codes :

	A	B	C	D		A	B	C	D
(a)	2	1	4	3	(b)	2	4	1	3
(c)	3	4	1	2	(d)	3	1	4	2

169. The yellow colour of urine is due to the presence of :
(a) Bile (b) Lymph
(c) Cholesterol (d) Urochrome

170. SA-node of mammalian heart is known as :
(a) Autoregulator (b) Pace-maker
(c) Time controller (d) Beat regulator

171. A drop of blood contains.
(a) about 10,000 cells
(b) about 100,000 cells
(c) several million cells
(d) less than 25,000 cells

172. Acupuncture is a medical system of treatment in which
(a) herbs are used to relieve pain
(b) needles are inserted into particular parts of the body to relieve pain
(c) surgery is done to relieve pain
(d) none of these

173. Human blood contains _____ percentage of plasma.
(a) 35% (b) 40%
(c) 50% (d) 65%

174. Vivipary in plants means
(a) germination of seeds in the crevices of stem where some soil is deposited
(b) development of pea nut fruits after the fertilization
(c) organization of several shoots
(d) germination of seeds inside the fruit while it is still on the plant parent tree

175. Thermoregulation in mammals is a balance of heat gain and heat loss. All of the following can affect both heat gain and heat loss except
(a) activity of the sweat glands
(b) thickness of the fat layer under the skin
(c) air movements near the body surface
(d) blood flow in the skin

176. When a person, after a certain degree of exertion, suffers from pain in the chest or below the collar bones, in the events of inadequate supply of oxygen to the heart muscles, he is said to suffer from
(a) coronary thrombosis
(b) myocardial infarction
(c) angina pectoris
(d) arteriosclerosis

177. Unwanted sound creates noise pollution, and its unit is decibel (db). Prolonged exposure of noise level of how many db may gradually lead to permanent loss of hearing ability ?
(a) 40 db (b) 60 db
(c) 80 db (d) 100 db

178. What happens each day when the leaf of a plant is first exposed to light ?
(a) the epidermal cells on the upper surface of the leaf begin to photosynthesize.
(b) carbon dioxide diffuses out of the leaf.
(c) the cells of the spongy mesophyll begin to take up carbon dioxide, and are the only cells that are able to do so.
(d) the guard cells become more turgid and the stomatal apertures open.

179. Which one of the following provides the best estimate of the world's biological diversity?
(a) of about 10 million species probably alive today, some 20 species are lost every day, most of them unknown because no more than half a million have yet been actually identified by scientists
(b) of about 30 million living species, some 50 are lost every day, most of them unknown because no more than one million have been actually identified
(c) of about 45 million living species, some 100 are lost every day, most of them unknown

because no more than 1.5 million have been actually identified

(d) of about 75 million living species, some 500 are lost every day, most of them unknown because no more than 3 million have been actually identified

180. Biologically, marriage should be avoided in between
(a) Rh^+ male and Rh^+ female
(b) Rh^- female and Rh^- male
(c) Rh^+ female and Rh^- male
(d) Rh^+ male and Rh^- female

181. A disorder which is linked to the Y chromosome in humans (holandric) will
(a) only be expressed in males whose mothers were a carrier of the gene
(b) never be passed from father to child
(c) show a pattern of skipping generations in a family
(d) be passed only from father to son

182. A dog can smell a breeding bitch from almost 1 km. This is due to the
(a) release of sex pheromones by the bitch during breeding
(b) season release of some chemicals by both the dog and bitch during breeding season
(c) special type of barking by the bitch during breeding season
(d) none of the above

183. Normal adult human male has
(a) 10 g of haemoglobin/100 g of blood
(b) 14 g of haemoglobin/100 g of blood
(c) 18 g of haemoglobin/100 g of blood
(d) 24 g of haemoglobin/100 g of blood

184. Most fish do not sink in water because of the presence of the
(i) swim bladder
(ii) air bladder
(iii) air sacs
(iv) air in spongy bones
(a) i and ii are correct
(b) ii and iii are correct
(c) iii and iv are correct
(d) i, ii, iii and iv are correct

185. Scarification of seeds is done for removing
(a) dormancy
(b) germination inhibitors
(c) growth
(d) embryo

186. The correct sequence of anaerobic reactions in yeast is

(a) $\text{Glucose} \xrightarrow{\text{cytoplasm}} \text{Pyruvate} \xrightarrow{\text{mitochondria}} \text{Ethanol} + \text{Carbondioxide}$

(b) $\text{Glucose} \xrightarrow{\text{cytoplasm}} \text{Pyruvate} \xrightarrow{\text{cytoplasm}} \text{Lactic acid}$

(c) $\text{Glucose} \xrightarrow{\text{cytoplasm}} \text{Pyruvate} \xrightarrow{\text{mitochondria}} \text{Lactic acid}$

(d) $\text{Glucose} \xrightarrow{\text{cytoplasm}} \text{Pyruvate} \xrightarrow{\text{cytoplasm}} \text{Ethanol} + \text{Carbondioxide}$

187. Which of the following statement(s) is (are) true about respiration?
(i) During inhalation, ribs move inward and diaphragm is raised
(ii) In the alveoli, exchange of gases takes place i.e., oxygen from alveolar air diffuses into blood and carbon dioxide from blood into alveolar air
(iii) Haemoglobin has greater affinity for carbon dioxide than oxygen
(iv) Alveoli increase surface area for exchange of gases
(a) (i) and (iv) (b) (ii) and (iii)
(c) (i) and (iii) (d) (ii) and (iv)

188. Which of the following statement (s) is (are) true about heart?
(i) Left atrium receives oxygenated blood from different parts of body while right atrium receives deoxygenated blood from lungs
(ii) Left ventricle pumps oxygenated blood to different body parts while right ventricle pumps deoxygenated blood to lungs
(iii) Left atrium transfers oxygenated blood to right ventricle which sends it to different body parts
(iv) Right atrium receives deoxygenated blood from different parts of the body while left ventricle pumps oxygenated blood to different parts of the body

(a) (i) (b) (ii)
(c) (ii) and (iv) (d) (i) and (iii)

189. Choose the forms in which most plants absorb nitrogen
(i) Proteins
(ii) Nitrates and Nitrites
(iii) Urea
(iv) Atmospheric nitrogen
(a) (i) and (ii) (b) (ii) and (iii)
(b) (iii) and (iv) (d) (i) and (iv)

190. Which of the following statement(s) is (are) correct ?
(i) Pyruvate can be converted into ethanol and carbon dioxide by yeast
(ii) Fermentation takes place in aerobic bacteria
(iii) Fermentation takes place in mitochondria
(iv) Fermentation is a form of anaerobic respiration
(a) (i) and (iii) (b) (ii) and (iv)
(c) (i) and (iv) (d) (ii) and (iii)

191. Which of the following statements are true ?
(i) Sudden action in response to something in the environment is called reflex action
(ii) Sensory neurons carry signals from spinal cord to muscles
(iii) Motor neurons carry signals from receptors to spinal cord
(iv) The path through which signals are transmitted from a receptor to a muscle or a gland is called reflex arc
(a) (i) and (ii) (b) (i) and (iii)
(c) (i) and (iv) (d) (i), (ii) and (iii)

192. Which of the following statements are true about the brain ?
(i) The main thinking part of brain is hind brain
(ii) Centres of hearing, smell, memory, sight etc are located in fore brain
(iii) Involuntary actions like salivation, vomiting, blood pressure are controlled by the medulla in the hind brain
(iv) Cerebellum does not control posture and balance of the body
(a) (i) and (ii) (b) (i), (ii) and (iii)
(c) (ii) and (iii) (d) (iii) and (iv)

193. Offspring formed by asexual method of reproduction have greater similarity among themselves because
(i) asexual reproduction involves only one parent
(ii) asexual reproduction does not involve gametes
(iii) asexual reproduction occurs before sexual reproduction
(iv) asexual reproduction occurs after sexual reproduction
(a) (i) and (ii) (b) (i) and (iii)
(c) (ii) and (iv) (d) (iii) and (iv)

194. Factors responsible for the rapid spread of bread mould on slices of bread are
(i) large number of spores
(ii) availability of moisture and nutrients in bread
(iii) presence of tubular branched hyphae
(iv) formation of round shaped sporangia
(a) (i) and (iii) (b) (ii) and (iv)
(c) (i) and (ii) (d) (iii) and (iv)

195. Which among the following is not the function of testes at puberty?
(i) formation of germ cells
(ii) secretion of testosterone
(iii) development of placenta
(iv) secretion of estrogen
(a) (i) and (ii) (b) (ii) and (iii)
(c) (iii) and (iv) (d) (i) and (iv)

196. New species may be formed if
(i) DNA undergoes significant changes in germ cells
(ii) chromosome number changes in the gamete
(iii) there is no change in the genetic material
(iv) mating does not take place
(a) (i) and (ii) (b) (i) and (iii)
(c) (ii), (iii) and (iv) (d) (i), (ii) and (iii)

197. Select the incorrect statement
(a) Frequency of certain genes in a population change over several generations resulting in evolution
(b) Reduction in weight of the organism due to starvation is genetically controlled
(c) Low weight parents can have heavy weight progeny

(d) Traits which are not inherited over generations do not cause evolution

198. Select the statements that describe characteristics of genes
(i) genes are specific sequence of bases in a DNA molecule
(ii) a gene does not code for proteins
(iii) in individuals of a given species, a specific gene is located on a particular chromosome
(iv) each chromosome has only one gene
(a) (i) and (ii) (b) (i) and (iii)
(c) (i) and (iv) (d) (ii) and (iv)

199. Excessive exposure of humans to U V-rays results in
(i) damage to immune system
(ii) damage to lungs
(iii) skin cancer
(iv) peptic ulcers
(a) (i) and (ii) (b) (ii) and (iv)
(c) (i) and (iii) (d) (iii) and (iv)

200. The pH of water sample collected from a river was found to be acidic in the range of 3.5 – 4.5, on the banks of the river were several factories that were discharging effluents into the river. The effluents of which one of the following factories is the most likely cause for lowering the pH of river water?
(a) Soap and detergent factory
(b) Lead battery manufacturing factory
(c) Plastic cup manufacturing factory
(d) Alcohol distillery

ANSWER KEY																			
1.	(c)	21.	(b)	41.	(c)	61.	(b)	81.	(a)	101.	(b)	121.	(d)	141.	(b)	161.	(c)	181.	(d)
2.	(b)	22.	(b)	42.	(d)	62.	(c)	82.	(c)	102.	(c)	122.	(a)	142.	(b)	162.	(b)	182.	(a)
3.	(b)	23.	(b)	43.	(a)	63.	(b)	83.	(c)	103.	(b)	123.	(c)	143.	(b)	163.	(b)	183.	(b)
4.	(a)	24.	(a)	44.	(c)	64.	(a)	84.	(b)	104.	(a)	124.	(c)	144.	(b)	164.	(b)	184.	(a)
5.	(b)	25.	(c)	45.	(a)	65.	(a)	85.	(b)	105.	(b)	125.	(b)	145.	(b)	165.	(b)	185.	(a)
6.	(a)	26.	(a)	46.	(d)	66.	(a)	86.	(a)	106.	(c)	126.	(b)	146.	(a)	166.	(a)	186.	(d)
7.	(a)	27.	(d)	47.	(d)	67.	(a)	87.	(a)	107.	(a)	127.	(c)	147.	(a)	167.	(c)	187.	(d)
8.	(c)	28.	(d)	48.	(a)	68.	(c)	88.	(d)	108.	(d)	128.	(c)	148.	(c)	168.	(c)	188.	(c)
9.	(b)	29.	(b)	49.	(a)	69.	(d)	89.	(c)	109.	(d)	129.	(b)	149.	(c)	169.	(d)	189.	(b)
10.	(c)	30.	(a)	50.	(a)	70.	(a)	90.	(a)	110.	(a)	130.	(b)	150.	(d)	170.	(b)	190.	(c)
11.	(d)	31.	(a)	51.	(a)	71.	(a)	91.	(c)	111.	(c)	131.	(a)	151.	(c)	171.	(c)	191.	(c)
12.	(a)	32.	(a)	52.	(a)	72.	(c)	92.	(b)	112.	(b)	132.	(c)	152.	(c)	172.	(b)	192.	(c)
13.	(d)	33.	(d)	53.	(c)	73.	(c)	93.	(b)	113.	(c)	133.	(c)	153.	(b)	173.	(d)	193.	(a)
14.	(c)	34.	(c)	54.	(b)	74.	(c)	94.	(a)	114.	(c)	134.	(d)	154.	(a)	174.	(d)	194.	(c)
15.	(a)	35.	(b)	55.	(a)	75.	(b)	95.	(a)	115.	(a)	135.	(d)	155.	(b)	175.	(a)	195.	(c)
16.	(a)	36.	(b)	56.	(b)	76.	(c)	96.	(c)	116.	(d)	136.	(d)	156.	(c)	176.	(c)	196.	(a)
17.	(d)	37.	(a)	57.	(b)	77.	(d)	97.	(b)	117.	(c)	137.	(d)	157.	(c)	177.	(c)	197.	(b)
18.	(d)	38.	(b)	58.	(d)	78.	(c)	98.	(c)	118.	(b)	138.	(b)	158.	(a)	178.	(d)	198.	(b)
19.	(c)	39.	(c)	59.	(a)	79.	(b)	99.	(c)	119.	(a)	139.	(b)	159.	(a)	179.	(a)	199.	(c)
20.	(a)	40.	(c)	60.	(a)	80.	(d)	100.	(a)	120.	(c)	140.	(a)	160.	(b)	180.	(d)	200.	(b)

Hints & Solutions

1. (c) The Vechur cattle is a rare breed of *Bos indicus*, named after the village Vechoor in Kottayam district of the state of Kerala in India. Its average length is 124 cm and height is 87 cm, according to the Guineas Book of Records, it's the smallest cattle breed in the world. Its milk is considered to have medicinal properties. Unlike other cattle, they can resist drought by being hardy towards it.
2. (b) Cold-blooded animals require much less energy to survive than warm-blooded animals.
3. (b) Humans are diploid organisms by having two members or homologous chromosomes in a pair. Total 23 pairs of chromosomes exist in each somatic cell of the body. Total 46 chromosomes occur. One particular pair individually in male and female determines their respective sex. This one pair is XX in females and XY in males. All the 46 chromosomes in pairs can be seen under microscope at metaphase stage in the cells which are undergoing mitosis.
4. (a) Octopus belongs to Mollusca. Jellyfish belongs to Coelenterata. Silver fish belongs to Arthropoda. Bombay Duck belongs to Pisces.
5. (b) Carbon-14 is radioactive isotope of carbon, which can mutate the DNA by getting incorporated into it. X-rays are high energy and ionizing rays. These can cause mutation at genetic level though they generally damage the bio-molecules by altering their function. Coal miners have the risk to develop certain types of cancers.
6. (a) All the statements are correct. The term gene was coined by Danish biologist Wilhelm Johannsen in 1909. Genes are the discrete DNA segments sitting

in the chromosomes which express to give rise to a particular protein. Alleles are the alternative forms of same gene. In diploid organisms, there are two alleles on the two homologous chromosomes. If there exists multiple number of alleles of same gene, it means all the alleles are multiple or simply multiple alleles.

7. (a) Frogs generally breathe by their lungs but they can also breathe with their skin too. Their skin is glandular which can exchange oxygen and carbon dioxide along with some other bodily secretions. The mature frogs have no gills, but before their larval stage have tail as well as internal gills like fishes through which most of the breathing occurs. These two particular features disappear once the tadpoles are ready to metamorphose.
8. (c) Humans are diploid with 23 pairs of chromosomes. Of this, 22 pairs are somatic and the one pair is sex chromosomes. This particular pair exists as XX in human females and XY in males. The presence of two X chromosomes contributes to the female phenotype while presence of only one Y chromosome is responsible for the human to be male. Females produce only X-type haploid gametes and males produce two types (X and Y) of haploid gametes. Fusion of either X or Y of male gamete with the female gamete determines the sex of the offspring.
9. (b) After the removal of wastes from the kidneys, the cleaner blood is sent back through the renal veins. From Bowman's capsule, the filtered liquid passes through tiny tubes where much of the glucose is reabsorbed and sent back to the blood in the renal vein.
10. (c) Alcohol acts as a diuretic. It actually promotes urine production by inhibiting the release of antidiuretic hormone, or vasopressin from the pituitary gland. In turn, reduced levels of antidiuretic hormone prevent the kidneys from reabsorbing water and thereby increase urine production.
11. (d) During exercise, the level of somatotropin goes up. Testes secrete testosterone and females' adrenal glands secrete progesterone. Stress causes the adrenal glands to release very less amount of cortisol (a steroid hormone) than usual.
12. (a) Werner Arber along with American researchers Hamilton Smith and Daniel Nathans, had won the 1978 Nobel Prize in Physiology or Medicine for the discovery of restriction endonucleases. For the first time, Feldmann and Marks had demonstrated the production of transgenic plants without *invitro* step. They just grew the Arabidopsis seeds with the gene containing Agrobacterium tumefaciens.
    Kary Mullis is the inventor of the technique PCR for *in vitro* synthesis of DNA fragments. Reverse transcriptase was discovered by Howard Temin and independently isolated by David Baltimore in 1970.
13. (d) Essential amino acids or indispensable amino acids are those amino acids which cannot be synthesized *de novo* by any particular organism. In humans also, some amino acids are essential and must be supplied in the diet. The amino acids regarded as essential for humans are phenylalanine, valine, threonine, tryptophan, methionine, leucine, isoleucine, lysine, and histidine.
14. (c) Lungs are the organs which actually oxygenate up the blood by exchanging the carbon dioxide to outside and taking up oxygen which comes to them by breathing in by the organism. This oxygen in the blood is then transported to each tissue of the body. Integrated and coordinated works of circulatory and respiratory systems are responsible for this.
15. (a) In genetic engineering, a DNA segment from any foreign source can be inserted into any other genetic material. The enzymes, called *restriction endonucleases*, act like scissors that cut apart a particular or specific part of the DNA. This cut out DNA piece can be inserted into other genetic material which has been cut to make space for containing the foreign DNA. The DNA once inserted can be ligated by enzymes known as ligases.
16. (a) Regarding to the DNA fingerprinting, both the given statements are correct.
17. (d) Transduction and conjugation were discovered by Joshua Lederberg. Morgan investigated about the sex-linked inheritance in Drosophila. In 1956, Arthur Kornberg and colleagues had discovered the enzyme DNA polymerase I, also known as Pol I, in *Escherichia coli*. Hargobind Khorana, Marshall W. Nirenberg and Robert W. Holley were given the Nobel Prize for their work on the discovery of the genetic code in 1968.
18. (d) Sternum is the breast bone. Clavicle is the collar bone. Patella is the knee cap. Scapula is the shoulder blade.

19. (c) Adrenalines are secreted in the situations of exercise, fear or any kind of dangerous situation. Oestrogens are steroid hormones or female primary sex hormones. Insulin is responsible for the metabolism of sugar in the body. Pheromones are the compounds which are secreted generally from insect; go out to affect the other insects. Some of the pheromones include alarm pheromones, food trail pheromones, and sex pheromones.
20. (a) Ptyalin digests the starch in the mouth. Pepsin is a proteolytic enzyme which breaks down the proteins into simple peptides. Renin is responsible for converting angiotensinogen to angiotensin. Oxytocin is a hormone that stimulates the contraction of smooth muscles of the body.
21. (b) Electroencephalography (EEG) is the recording of electrical activity along the scalp. EEG measures voltage fluctuations resulting from ionic current flows in neurons of the brain. Electrocardiography (ECG) is a transthoracic interpretation of the electrical activity of the heart over a period of time detected by electrodes attached to the surface of the skin and recorded external device. Electro-oculography (EOG) is a technique of measuring the corneoretinal standing potential existing between the front and the back of the human eye. Electromyography (EMG) is a technique for evaluating physiologic properties of muscles.
22. (b) Milch animals are those animals which are source of milk, e.g. cow, goat, buffalo. Foot-and-mouth disease, caused by *Aphthae epizooticae* is an infectious disease that affects cloven-hoofed animals. Anthrax is an acute infectious disease caused by the bacterium *Bacillus anthracis*. Blackleg, black quarter is an infectious bacterial disease caused by *Clostridium chauvoei* affecting cattle, sheep and goats. Cowpox is caused by cowpox virus and is infectious.
23. (b) *Meningococcal meningiti*s is transmitted from person to person through air via droplets of respiratory secretions and direct contact with an infected person like oral contact with shared items.
24. (a) Vitamin A has a major role in photo-transduction. Its deficiency causes night blindness in humans. Xerophthalmia, keratomalacia can also occur with its deficiency. Green, yellow-orange-red (dark- coloured) fruits and vegetables, eggs, milk; fortified cereals are rich source of vitamin A. Their avoidance over a long period may cause the vit-A deficiency symptoms.
25. (c) Dengue is a viral disease transmitted through mosquito. Fever, headache, pain in joints, back muscles and eyeballs, skin rash for a few days, bleeding from nose and gums are some of the symptoms of the dengue fever.
26. (a)
27. (d) ELISA (Enzyme-linked immunosorbent assay) is an important test for diagnosing viral diseases like AIDS (caused by HIV). Majority of the human beings are Rh+ while very few are Rh–.
28. (d) Plague is a deadly infectious disease, caused by the *enterobacteria Yersinia pestis*. Until 2007, plague, yellow fever, and cholera were the three epidemic diseases reported to WHO.
    AIDS is caused by human immunodeficiency virus. Baldness can be caused by a fungus *Microsporum audouinii*, a common cause of ringworm and associated hair loss. Malaria is mosquito-borne infectious disease of humans caused by protozoa of genus *Plasmodium*.
29. (b) An enzyme is basically a protein which acts like a catalyst in the metabolic reaction and the juice of the pancreas is basically composed from three enzymes trypsin, amylase and lipase.
30. (a) Leucocytes are white blood cells. These comprise of neutrophils which provide protection to the body through phagocytosis of bacteria and thus act as scavengers. The basophils are the granulocytes which contain histamines and heparin. Heparin thins blood to prevent clotting. Histamines dilate the blood vessels and increase the permeability of capillaries. Monocytes are of two types namely macrophages and dendritic cells. Acidophils take up role in anti-allergic reactions and wound healing. The lymphocytes are B cells, T cells and natural killer cells. These are mainly involved in the immune responses by producing specific antibodies.
31. (a) All the statements are correct. The HIV is highly mutable retrovirus and if remain dormant in the body for long time, it becomes all the more difficult to detect it and remove it from the body once detected. The most severe thing it does to the body is that, it directly attacks the immune system killing many T-cells. And it takes around 10 years to develop AIDS. However, a patient can lead a normal life via taking antiretroviral therapies (ARTs) which can decrease the virus load to undetectable level.

32. (a) In the prokaryotes, all the genetic materials lie inside the cell, no clear or separate nuclear wall is recognized in these cells. In fact no membrane-bound organelles are found in the prokaryotes. While on the other hand, one of the characteristic features of the eukaryotic cells is the presence of membrane bound organelles. Clear and distinguished nuclear membrane bounds the genetic material inside.
33. (d) Both assertion and reason are false. Regeneration is not itself a strategy but rather the shedding off of any organ is a strategy to avoid predation. The strategy to regenerate the body parts from the pre-existing tissue or adult stem cells. This actually involves the de-differentiation of the mature cells to make them a sort of stem cells again which can then differentiate to make the lost part. The later strategy is different than the strategy involved in escaping predation.
34. (c) Duckbilled platypus is that rare mammal which is oviparous. Oviparous animals are those that lie eggs, inside which the young ones develop before hatching.
35. (b) Progesterone is released from the female gonads. It has roles in the female menstrual cycle, pregnancy and embryogenesis. Growth hormone or somatropin or somatropin, is a peptide hormone that stimulates growth, cell reproduction and regeneration in humans and other animals, the pituitary gland secretes this hormone. The pancreas secretes insulin that regulates the sugar metabolism in the body. Cortisol is released from the zona fasciculata of the adrenal cortex in response to stress.
36. (b)
37. (a) Osteoporosis is a disease of bones and cartilage in which there is a reduction in bone tissue mass causing weakness of skeletal bones and fragility. It is caused by excessive resorption of calcium and phosphorous from the bones.
38. (b) Cigarette smoke contains N-nitrosodimethylene and causes accumulation of toxics in lungs and arteries to block the passages.
    Mustard gas, chemically known as Bis (2-chloroethyl) sulphide, blocks lungs and affects respiration as it is a strong mutagen and Carcinogen.
    Asbestos affects lungs and pleural membranes as it is made up of tiny fibers that enter into lungs when breathed in. Vinylchloride is an organochloride, $H_2C = CHCl$ is highly toxic, flammable and carcinogenic and lungs are affected.
39. (c) The instrument used for measuring blood pressure is known as *Sphygmomanometer* or BP apparatus. Blood pressure is usually measured from left brachial artery.
    Autoanalyser is a computer controlled instrument for various biochemical tests on sample of blood, urine or other body fluids.
    CT scanning, developed by Godfrey Hounsfield in 1968, (Nobel Prize in 1979).
    Gambusia is a larvivorous fish, used as a biocontrol agent for mosquitoes.
40. (c) Phobia is a kind of intense fear from something. e.g., hydrophobia, ailurophobia is fear of cats, astraphobia is fear of thunder and lightning, achluophobia is fear of darkness. Neurosis is less severe than mental illness and is normal to overcome worry, fear, anxiety and feeling of insecurity. This can also develop due to maladaptive habits.
    Hypochondria is a condition in which there is undue concern about health by a person about himself.
    Insomnia is lack of sleep over many nights.
41. (c) Jaundice is a result of increased bile pigments in the blood.
    Defects of heart valves leads to stenosis, in which the blood vessels are narrowed abnormally so, there is abnormal blood sounds.
    Highly allergic infection and inflammation of nose is known as Rhinitis.
    Paralysis is the loss of motor functions due to damage to nervous system.
42. (d) Antibiotics act against the growth of micro-organisms. Some antibiotics are broad range and others are specific being active against many micro-organismal species or selective for only some. The 'Resistance genes' in the bacteria develop resistance against a particular antibiotic over a long time due to mutation and thus, that particular antibiotic does not act on this resistant mutant strains.
43. (a) Temperate climatic zones see spring and autumn distinctly in a year. Spring brings plenty of water that the trees can take up to form larger xylem vessels and a broader and soft 'spring wood'. In late summer or in winters, the climate becomes dry severing enough water supply, thus, the vascular cambium cuts off smaller xylem vessels forming a narrow and darker dense 'autumn woods'. Spring and autumn woods together form a growth ring or annual growth ring. Counting each growth ring as the age of the tree.

44. (c) Carolus Linnaeus is credited as the father of modern taxonomy. He had created the binomial nomenclature of the living organism as he introduced it in *Species Plantarum* in 1753. The term taxonomy was originally coined by Augustin Pyramus de Candolle in 1813.
45. (a) Ribosomes are the sites of protein synthesis in the cytoplasm of the cells. The RNA template sits in between the two subunits of the ribosomes and the peptide synthesis take place. Intracellular digestion occurs via lysosomes. The mitochondria are the sites of cellular respiration and power house of the cells generating ATPs. The nucleus contains all the genetic materials which get expressed to produce a phenotype thus, making nucleus the controller of the cells.
46. (d) Somatic cells undergo mitosis during the cell cycle. The phase in which the cells undergo division is called M-phase. The first stage of this phase is prophase, the second is metaphase in which the chromosomes come and lie at the equatorial plate. This stage is followed by anaphase in which the sister chromatids separate out and go to the poles. The telophase is the last stage when the cell's cytoplasm is divided to give rise to two daughter cells.
47. (b) The cell was discovered by Robert Hooke in 1665. The nucleus was the first organelle to be discovered. The oldest description of the nucleus was given by Anton van Leeuwenhoek (1632–1723). But the nucleus was described in more detail for the first time in 1831 by Scottish botanist Robert Brown in a talk at the Linnean Society of London. Lysosomes are found in animal cells but their presence in yeasts and plant cells is disputed.
48. (a) NBRI — Lucknow,
    CPRI — Shimla,
    CRRI — Cuttack,
    CFRI — Dehradun
49. (a) Sundews are one of the largest genera of carnivorous plants. These are the members of the family Droseraceae. So, *Drosera* is a sundew carnivorous plant. *Dionaea* is the member of the family Tachinidae, commonly called as venus flytrap. *Utricularia* is member of the family Lentibulariaceae, which are carnivorous, plants commonly known as bladderworts. *Nepenthes* are genera comprising tropical carnivorous plants and also known as monkey cups. These are generally found in old world tropics.
50. (a) The dark reactions of photosynthesis occur in the stroma of the chloroplast. The light reactions occur in the thylakoid membranes or the grana of the chloroplasts. The glycolytic pathways occur in the cytoplasm of the cells. Kreb's cycle or tricarboxylic acid or citric acid cycle occurs in the mitochondria to produce energy through oxidation.
51. (a) Living fossils are those organisms whose close relatives are not living on the earth. *Cycas* is a living fossil. *Zamia pygmaea* is endemic to Cuba and is the smallest gymnosperm on the earth. *Sequoiadendron giganteum* is the tallest coniferous gymnosperm known as redwoods. Canada balsam is obtained from the *Abies balsamea* (a North American fir) also known as Canada balsam.
52. (a) *Sphagnum* is also called as peat moss. These have leaf-like appendages that have many circular openings which enable them to absorb liquids readily. Thus they are commercially important as soil structure enhancer, packing material for living plants. Ephedrine is a sympathomimetic amine commonly used as a stimulant, appetite suppressant, concentration aid, decongestant. Ephedrine is obtained from the plant *Ephedra sinica* and other members of the *Ephedra* genus.
53. (c) *Selaginella bryopteris*, a lithophytic plant, is used as a medicinal plant in India and commonly known as 'Sanjeevani' or one that infuses life. It is very much drought hardy and can remain alive for many years without water. *Adiantum* is the maiden hair fern. *Equisetum* or horsetail is a living fossil and the only living genus of class Equisetopsida. *Dryopteris* is commonly known as wood fern or male fern.
54. (b) Bryophytes are the phylum of small simple plants with no vascular tissue and root like rhizoids. They are called the amphibians of the plant kingdom as they can survive in both conditions with and without water. *Selaginella* is an example of Pteridophyte.
55. (a) In the leaves, the photosynthates or sugars are converted into starch and via phloem their transport to all the other parts occur. The xylem cells transport only water and some minerals from the roots upto the shoots. The xylem vessels are dead cells with empty lumen but they are hard to carryout the water transport by depositing secondary wall materials, such as lignin.

56. (b) Lichens are the symbiotic association of algae and fungi. The algal member is generally a green alga or blue-green alga. The fungal partner is usually of Ascomycota. Lichens are sensitive to pH change, thus making them good indicators of pollution or SO_2 as the later makes H_2SO_4 with water.

57. (b) In sewage treatment tanks, different aerobic bacteria are used to degrade organic wastes. '*Chlorella*' is used as a source of providing oxygen to the bacteria. *Chlorella* is an attractive food source as it is high in protein and other essential nutrients. Dried *Chlorella* contains around 45% protein, 20% fat, 20% carbohydrate and pretty good amount of vitamins. *Chlorella* is a potential plant to be used in space flight shuttles for continuous oxygen supply. Chlorellin is an antibiotic obtained from chlorella.

58. (d) Three types of cells are found in pancreas. α-cells, β-cells, δ-cells. α-cells secrete peptide hormone glucagon. β-cells synthesise and secrete the endocrine hormone, insulin, the hyposecretion of which leads to abnormal metabolism of body's sugar and causes Diabetes mellitus. δ-cells produce somatostatin.

59. (a) Lymphatic filariasis is caused by nematodes of genera, *Wuchereria bancrofti, Brugia malayi* and *Brugia timori*, which occupy the lymphatic system, including the lymph nodes. In chronic cases, the worms lead to disease elephantiasis in which legs and sometimes genital organs swell up.

60. (a) Progeria or Hutchinson-Gilford progeria syndrome is a genetic disease with a defect in the gene LMNA, in which the ageing process is manifested at a very early age and the progeric children typically live to their mid-teens to early twenty.

61. (b) *Entamoeba histolytica* causes amoebiasis, the symptoms of which are chronic diarrhoea to fulminant dysentry. *Trypanosoma gambiense* causes sleeping sickness in which there are fevers, joint pains, numbness poor coordination and trouble in sleeping. Syphilis is a STD, caused by *Treponema pallidum*, a spirochete becterium, *Pasteurella pestis* causes Bubonic plague, in which the lymph nodes are swollen especially in armpit and groin.

62. (c) Stewart's wilt or disease is caused by *Erwinia stewartii* in maize. This bacterium is carried in corn flea beetle which acts as a vector for its transmission.

63. (b) Hashimoto's thyroiditis is an autoimmune disease in which the thyroid gland is attacked by a variety of cells and antibody-mediated immune processes. It results in hypothyroidism.
Cretinism is a condition of several stunted physical and mental growth due to untreated congenital deficiency of thyroid hormone or maternal hypothyroidism.

64. (a) ECG is a test that measures the electrical activity of the heart. ECG is used to measure the rate and regularity of heart beats.

65. (a) Benign tumours are those which do not spread from the site of formation and is not cancerous. They can be operated and treated by removal. Malignant tumours are dangerously cancerous as they spread from the place of formation to other tissues. Neoplasm is a malignant tumour.
Cancer of epithelial tissues are called carcinomas. Sarcoma is the cancer developed in bone and cartilage tissues. Lymphomas are the cancers of blood-forming haematopoietic cells.

66. (a) A condition in colour blindness known as 'Protanomaly' where a person is not able to distinguish between red and green. Colour blindness is an X-linked disease condition in which retinal cone cells are not developed properly.

67. (a) Agroforestry involves the practice of growing trees with the cultivated crops on the same field. Hydroponics is a scientific technique of growing plants on soil less artificial liquids or water media that contain the nutrients. The scientific study of fruits and cultivation of fruits comes under the branch of biology known as Pomology. Palynology is the scientific study of pollen grains and spores, live as well as fossilized.

68. (c) The site of photosynthesis is the thylakoid membranes of the chloroplasts. The entire mineral uptake by the cells is done via the plasma membrane which is selectively permeable for some minerals and not permeable for most of the substances. The cellular respiration to derive out the energy occurs in the mitochondria. Ribosomes act as the sites for the peptide synthesis. The RNA template sits on the two subunits of the ribosomes to carry out translation.

69. (d) The process of stem cutting is also known as striking or cloning. It is a vegetative mode of propagation of plants. Stems, roots or both can be used to propagate the plants. Bougainvillea, carnations, cocoa and grapes can all be propagated with stem cuttings.

70. (c) Hugo de Vries introduced the term mutation and developed the mutation theory of evolution. Darwin had given the theory of evolution. One gene one enzyme hypothesis was an idea which said that one gene is responsible for producing one enzyme only. This was proposed by Beadle and Tatum in 1941. The concept of Operon was given by Jacob and Monod in 1961.
71. (a) Pure capsaicin is a white crystalline powder. Capsaicin is a capsaicinoid which belongs to the alkaloid family. It is present in chili peppers. It is beneficial for heart as it has role in controlling cholesterol. Geraniol is a natural antioxidant. Geraniol has been suggested to help prevent cancer. It is found in coriander, lavender, lemon, lime, nutmeg, oranges. Allicin is an antioxidant found in garlic and is effective against cancers. Lycopene is a carotenoid present in tomatoes. It is a very efficient antioxidant, which can neutralize oxygen-derived free radicals.
72. (c) In the flower, the ovules undergo fertilization by fusing the egg with the pollen. These then develop into seeds nestling the small embryo inside. The ovary swells to become the fleshy fruit. The wood in trees is the result of secondary growth of the outer layers of stem by cell divisions. The leaves are the site of photosynthesis and the photosynthates (the sugars are converted into starch) are stored in the form of starch.
73. (c) Swine flu is caused by swine influenza viruses. It is transmitted person to person by sneezing or coughing. It is not spread by eating cooked pork.
74. (c) The HIV is transmitted by exchange of body fluids during sexual intercourse, any kind of infected blood transfusion. It can also be transmitted from mother to the foetus via blood transfusion across placenta.
75. (b) Myxedema is case of either hypothyroidism or hyperthyroidism due to defect in endocrine thyroid gland. Nephrosis is disease of nephrons of kidney, which is a part of excretory system. Paralysis is most often caused by damage in the nervous system or spinal cord. Syphilis is a sexually-transmitted disease of the reproductive system.
76. (c) Hepatitis B is around hundred times more infectious than HIV. Hepatitis B kills more than 1 million people every year. In this disease, liver can also swell up and develop cancer.
77. (d) Khaira is a disease of rice, in which the plants develop chlorotic or yellow patches at leaf base on both sides of the midrib. Anaemia is a decrease in number of red blood cells caused due to iron-deficiency. Deficiency of iodine causes goitre. Scurvy is a gum disease caused due to vitamin-C deficiency.
78. (c) The characteristics of diabetes mellitus are increase of sugar in blood, appearance of sugar in urine and lack of energy.
79. (b) Prophylaxis is a medical or public health procedure whose purpose is to prevent, rather than treat an ailment. For tuberculosis, BCG vaccine is given. DPT vaccine prevents diphtheria, pertussis and tetanus. ATS (antitetanus serum) and DPT vaccines are used to prevent tetanus. TAB vaccine is typhoid-paratyphoid A and B vaccine.
80. (d) Leprosy is caused by bacteria, *Mycobacterium leprae* and *Mycobacterium lepromatosis*. Measles is caused by virus. Kala-ajar is caused by protozoa of genus *Leishmania*. Athlete's foot is caused by fungi *Epidermophyton floccosum, Trichophyton sp*.
81. (a) Cardiologist cures heart diseases. Nephrologist cures kidney. Urologist cures urinary tract ailments. Oculist cures eye.
82. (c) Antipyretics are drugs or herbs that reduce fever. Paracetamol or N-acetyl-p-aminophenol is used as an antipyretic. Antifoaming agent is a chemical that reduces foam formation, is chemically polydimethylsiloxanes or polyamides, silicones. Aspirin is a salicylate drug, used as an analgesic. Saframycin, rifamycin, etc. are antiseptics. Calciferol is antirachitic.
83. (c) Night blindness is caused by deficiency of vitamin-A. Deficiency of vitamin D causes rickets. Deficiency of vitamin C causes scurvy. Deficiency of vitamin B causes beri-beri.
84. (b) Ligaments connect two bones together. Tendon connects muscles. Areolar tissue is filling tissue. Fats are stored in adipose tissue.
85. (b) Marasmus is caused by protein deficiency in under five years children. Kwashiorkor is deficiency of proteins, energy malnutrition caused by prolonged starvation. Tuberculosis is caused by *Mycobacterium* infection. Hepatitis B is a viral diseases.
86. (a) The causative agent of Anthrax is used as a potent bioweapon in warfare. Thalassaemia is a disease caused by defective genes of haemoglobin.

Surrogecy is an intermediate stage in artificial insemination for producing an offspring. The science of altering genes is a branch of biology known as *transgenics*.

87. (a) Cholera is a disease caused by bacterium *Vibrio cholerae*.
Athlete's foot is caused by fungal species such as *Epidermophyton floccosum*, *Tricho-phyton sp*.

88. (d) Acquired Immune Deficiency Syndrome (AIDS) is caused by HIV, a retrovirus in which immune system of the body is seriously affected. The symptoms are swollen-lymph nodes, sweating at night, loss of weight and loss of memory.

89. (c) Diphtheria is a respiratory tract illness caused by *Corynebacterium diphtheriae*. Pneumonia is an inflammatory condition of the lung caused by virus or bacteria. Leprosy or Hansen's disease is caused by *Mycobacterium leprae* and *Mycobacterium lepromatosis*. AIDS, syphilis and gonorrhoea are viral diseases. Polio, Japanease encephalitis and plague are viral diseases. Colourblindness, haemophilia, and sickle cell anaemia are X-linked (sex-linked) disease conditions.

90. (a) *Diabetes Insipidus* (*DI*) is a condition characterized by excessive thirst and excretion of large amounts of severely diluted urine. Diabetes mellitus is a group of metabolic diseases in which a person has high blood sugar, due to two causes either the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced. The most common type in humans is the neurological form which involves a deficiency of arginine vasopressin or antidiuretic hormone.

91. (c) Diabetes mellitus is a metabolic disease in which a person has high blood sugar, either because the pancreas does not produce enough insulin or because cells do not respond to the insulin. Hyposecretion of insulin affects the rate of sugar metabolism.

92. (b) Hemophilia is a group of hereditary genetic disorders that impairs the body's ability to control blood clotting or coagulation. It is an X-chromosome-linked disorder and more likely to occur in males.
Diabetes is a hormonal disorder in which sugar metabolism is affected. Deficiency of vitamin-D causes rickets in which bones of legs bend. Ringworm is fungal lesion like skin infection caused by *Trichophyton rubrum, Trichophyton tonsurans, T. interdigitale, Microsporum canis, T. mentagrophytes*.

93. (b) 'Filariasis' or Philariasis is a parasitic disease transmitted from black flies and mosquitoes to humans. *Wuchereria bancrofti*, *Brugia malayi*, *Brugia timori* cause 'lymphatic Filariasis'. In malaria, red blood cells are infected.
'Encephalitis' is an acute inflammation of the brain. Some of the most common causes of acute viral encephalitis are rabies virus, herpes simplex, poliovirus, measles virus and J.C. virus.
'Leukemia' or Leukaemia is a type of cancer of bone marrow.

94. (a) Malaria is a mosquito-borne infectious disease of humans caused by parasitic protozoans of genus *Plasmodium*. Poliomyelitis is caused by poliovirus. Tuberculosis is caused by *Mycobacterium tuberculosis*. Ringworm is caused by fungi.

95. (a) Ginger is an underground stem modification known as rhizome, which is a horizontal underground stem. Corm is an underground modified stem, in a form of short swollen food-storing stem surrounded by protective scale leaves, *e.g.* colocasia. Tuber, a modified, stem has many nodes and internodes, *e.g.* potato. Onion is a modified stem in the form of a bulb.

96. (c) The raw materials needed by plants to undergo photosynthesis are sunlight, water, soil nutrients, and carbon dioxide. The chlorophyll molecules capture the photons of sunlight to pass it to reaction centre. The range of the spectrum of sunlight absorbed by chlorophylls in photosynthesis is red and blue. They do not absorb the green portion of the spectrum. The concentration of oxygen when increases beyond a limit it causes the rate of photosynthesis to decrease.

97. (b) A small lateral outgrowth present at the leaf base is called stipule. Leaves with stipule are called as stiupulate and leaves without stipule are called exstipulate.

98. (c) Anthesis is the phenomenon of opening of flower buds to become flowers. Fruits which are developed without fertilization are called parthenocarpic fruits. It does not have seeds. The plants undergo double fertilization as the egg fuses with the male gamete and the two polar bodies also get fused with another male gamete. The fertilized egg develops into the diploid embryo while the double fertilized polar bodies become the triploid endosperm.

99. (c) Chloroplasts and mitochondria are considered to be the membrane bound endosymbionts in the eukaryotic cells. Both possess their own genetic

material or genome. But most of their genes have been integrated into the nucleus. So, many proteins are transferred from the cytoplasm into the organelles.

100. (a) The absorption of moisture or water by a solid substance is known as 'imbibition'. Imbibition causes the solid substance to increase a little in volume. In rainy season, wood imbibes moisture to swell up. Excessive fertilizers in soil cause increase of their concentration when dissolved in water. It becomes hypertonic than the solutes present in plant roots thus, exosmosis may occur. The capillary water is the water in the roots causing a negative root pressure.

101. (b) Gibberellins were discovered in the fungus, *Gibberella fujikuroi*. Gibberellic acid causes tallness in plants. Vernalization is stimulus for the plants to flower up. Cold treatment or gibberellic acids also cause flowering and bolting in the plants.

102. (c) The pulpy edible part of mango fruit is a mesocarp which is the middle layer of pericarp (fruit wall). Coconut flesh and water are technically the endosperm. Litchi is an aril which is an outgrowth from the testa of a seed. Apple is also not a true fruit, being a fleshly thalamus. The actual fruit lies inside the apple containing the seeds.

103. (b) The breakdown of water molecules to the constituent atoms by light energy is known as 'photolysis'. The chlorophyll molecules absorb the light energy and funnel it to a specific chlorophyll molecule in the reaction centre which gets excited to a higher energy state. All green plants undergo oxygenic photosynthesis in which the byproduct of carbon dioxide fixation and electron transport chain, is molecular oxygen.

104. (a)

105. (b) The largest perennial plant is a marine alga, *Macrocystis sp*. The smallest flowering plant is *Wolffia*, which is under 2 mm (0.079 in) long.
Ginkgo is one of the living fossils.
Rhizophores are root-like water and nutrient absorbing organs found in a pleridophyte *Selaginella sp.*

106. (c) Commensalism is a class of relationship between two organisms where one organism benefits without affecting the other, *e.g.* sea anemone hitches a ride on a hermit crab.
Batesian mimicry is demonstrated by Viceroy butterfly to avoid predation. Batesian mimicry is a case of protective or defensive mimicry. Viceroy, a palatable one mimics itself as an unpalatable Monarch butterfly or queen butterfly.

107. (a) Angiosperms could dominate the land flora among other plants, such as gymnosperms, pteridophytes or bryophytes because they inhabited diverse habitats and adapted better to those areas. Moreover, they also had better seed dispersal mechanisms.

108. (d) When vaseline is applied to both surfaces of the leaf of a plant, all the three processes will be affected. Stomata of both surfaces will get closed. As a result there will be no exchange of gases like CO_2, O_2 and water vapour. This will affect all the three processes.

109. (d) The enzyme nitrogenase reduces N_2 to form ammonia. Mutant strains of Rhizobium are not able to secrete excess protein into the soil.

110. (a) Carbon dioxide and water vapour in plants are produced as wastes during respiration. Oxygen is produced as a waste during photosynthesis. All these gaseous wastes of photosynthesis and respiration are removed though stomata.

111. (c) Wine is a fermented drink made from the grapes or sugarcane or other fruits. Beer is an alcoholic beverage produced by the saccharification of starch and fermentation of the resulting sugar. The starch and saccharification enzymes are often derived from malted cereal grains of barley and wheat. Whisky is made from fermented grain mash of barley, malted barley, rye, malted rye, wheat, buckwheat and corn. Rum is made from molasses.

112. (b) Rhizophora constitutes the red mangroves which have respiring roots known as pneumatophores. Fasciculated roots are tuberous roots. Dahlias have fasciculated roots. Climbing roots are developed in Piper betle. Orchids have a characteristic feature of developing epiphytic roots. Epiphytic plants are those plants which develop aerial roots.

113. (c) Mendel worked on garden pea as it was easy for genetic studies and easy to work with as it had short lifespan, self-pollinating crop, and had seven distinguishable contrasted features to compare between. Pea (*Pisum sativum*) is a leguminous crop which belongs to the family Fabaceae.

114. (c) Potato, *Solanum tuberosum*, belongs to the family Solanaceae, other member being tomato

and brinjal. Malvaceae include cotton (*Gossypium sp*), okra (*Abelmoschus esculentus.*), *Hibiscus sp*., *Theobroma cacao*. Liliaceae members are herbaceous, bulbous, flowering monocots, *e.g.* onion (*Allium cepa*). Cruciferae or Brassicaceae members are economical crops to which cabbage (*Brassica oleracea*), radish (*Raphanus sativus*), mustard (*Brassica juncea*) belong.

115. (a) Androecia contain stamens and gynoecia contain carpels. The calyx and corolla are the accessory reproductive organs. Corolla is the whorl of petals around the male and female reproductive organs. Corolla is the outermost whorl of sepals, which persist after fertilization and fruit development.
116. (d) Camphor is a waxy, flammable, white or transparent solid with a strong aromatic odour. *Cinnamomum camphora* is the source of camphor. *Vanilla* is a flavour obtained from the orchid of the genus *Vanilla*, generally from Mexican *Vanilla planifolia*. Chicory is a root extract or roots of *Cichorium intybusis* used commercially as a substitute for coffee.
117. (c) Bisexual flowers are those flowers which have both stamens (male reproductive organ) and carpels (female reproductive organs). Those plants which have only one, either male or female reproductive part are called unisexual flowers. Flowers having only male reproductive part are called staminate and the flowers having only female reproductive part are called pistillate flowers.
118. (b) The largest family containing most number of genera is Asteraceae. Mushrooms are the fruiting bodies of the fungus belonging to the order Agaricales and family Agaricaceae.
119. (a) All the arteries carry oxygenated blood from the heart to various parts of the body except the pulmonary artery which carries the deoxygenated or impure blood from the heart to the lungs to make it oxygenated. All the veins carry deoxygenated blood from various parts of the body towards the heart except the pulmonary vein which brings the oxygenated blood from the lungs to the heart.
120. (c) Willian Harvey discovered the circulatory system of animals. Stephan Hales is considered to be the Father of Plant Physiology. John Ray coined the term 'genera' in around 17th century. Karl Landsteiner discovered the blood groups in humans.
121. (d) Arteries carry blood from heart to various body organs. Veins carry blood from body organs to heart.
122. (a) Blood group A contains antigen A and anti-B antibodies in the blood plasma. Similarly, blood group B contains antigen B and anti-A antibodies in the blood plasma. A particular blood group known as AB contains both A and B antigens but no antibodies. The blood group O contains no antigens but both anti-A and anti-B antibodies in the blood plasma.
123. (c) Femur is the most proximal bone of the leg in the tetrapod vertebrates. It is the single bone in the thigh and longest bone in the human body. The stapes is a bone in the middle year of the humans. It is the smallest in the human body. Enamel is the hardest substance in the human body which is made up of 96% of minerals.
124. (c) In 1892, Dmitri Ivanovsky for the first time had described a non-bacterial pathogen which infected tobacco plants. Then the actual discovery of tobacco mosaic virus was done by Martinus Beijerinck in 1898. Anton van Leeuwenhoek of 17th century is credited with the discovery of bacteria for the first time in a drop of pond water under a glass lens. Theodor Schwann, Matthias Jakob Schleiden, and Rudolf Virchow proposed the cell theory. In 1839, Schwann and Schleiden suggested that cells were the basic unit of life.
125. (b) Cotton wool is all made of fibres of cellulose. Honey gets its sweetness from fructose and glucose. Maltose or malt sugar is a disaccharide. Sugarcane contains sucrose.
126. (b) Bacterial leaf blight of rice is caused by *Xanthomonas spp. Magnoporthe grisea* causes rice blast disease.
Phytophthora spp. causes late blight of potato. It had caused the Great Irish Famine in 1845–1849.
Citrus canker is developed in citric fruits by *Xanthomonas axonopodis.*
127. (c) Flavr Savr, a genetically modified tomato, had been made to retain the freshness and flavour by blocking an enzyme known as polygalacturonase. This enzyme is responsible for ripening of tomato but blocking it by genetic engineering delays ripening and thus prolonging its shelf life.
128. (c) Cambium is the lateral meristematic tissue that gives off secondary xylem cells towards inside and secondary phloem towards outside. Cork cambium is a tissue found in many vascular plants as part of the periderm. It is responsible for developing cork.

Commercial cork is derived from the bark of the cork oak (*Quercus suber*).

129. (b) Hirudin, an anticoagulant protein that does not allow blood to clot or coagulate, has been obtained from GM *Brassica napus*. Tissue culture is a technique that employs the ability of mature cells to dedifferentiate and give rise to whole organism. This particular ability is totipotency.
Pyrethrin is an insecticide obtained from flowers of *Chrysanthemum cinerarifolium* of Asteraceae.

130. (b) Father of Indian mycology (study of fungus) and plant pathology is E.J. Butler.
Loose smut of wheat is a fungal disease of wheat in which the ears of and grains of wheat are replaced by a mass of dark spores. It is caused by *Ustilago tritici*.

131. (a) *Papaver somniferum* or poppy is the source of opium which is used as a narcotic. Quinine is an anti-malarial drug obtained from *Cinchona officinalis*. Ashwangandha, used as a relief agent in common cold, is obtained from *Withania somnifera*. Isabgol, used as a remedial intake during stomach upsetness, is obtained from *Plantago ovata*.

132. (c) Porphyra, *Laminaria* and *Sargassum* are edible. Agar-agar which is used as a growth medium for microbes, is obtained from *Gelidium* and *Gracilaria*. Algin is obtained from brown algae or kelps, *e.g.* the macrocystics while carrageenin is from red algae, *Chondrus crispus*, *Chlorella* and *Spirulina* are unicellular algae which are rich in protein with around 65% of it in the cells.

133. (c) Blood is the medium through which oxygen is transported in every tissue. The hormones secreted by endocrine glands are transported to the site of action via blood. Although, the core body temperature remains at 37 degrees centigrade, the tips of fingers and toes can become cold as blood transfers energy to outside at those places. Platelets, which are the constituent of blood, are responsible to prevent bleeding from the body.

134. (d) The digestion of protein begins in stomach. The enzyme pepsin acts on protein and brings about their breakdown in the stomach. The protein-digesting enzymes from pancrease are released into small intestine.

135. (d) All the DNAs are found to be inside the nucleus of the cell. In DNA, the four nucleotide bases which are present are adenine, cytosine, thymine and guanine. But in RNA, no thymine is present instead only uracil is present which pair up with adenine. All the RNAs which are synthesized inside the nucleus during transcription, come out to the cytoplasm for becoming the template for protein synthesis (translation).

136. (d) Humans have 23 pairs of chromosomes. Houseflies have 6 pairs of chromosomes. Mosquitoes have 3 pairs of chromosomes. Dogs have 39 pairs of chromosomes.

137. (d) Lysosome occurs in animal cells.

138. (b) The common bile duct releases its contents into the small intestine. The pancreatic duct releases its contents into duodenum.

139. (b) Man is called *Homo Sapiens*. Cat is called *Felis domestica*. Cow is called *Bos indicus*. Dog is called *Canis familiaris*.

140. (a) Testosterone is a male sex hormone. Codeine is a sedative drug. Caoutchouc is an Indian rubber. Eugenol is an aromatic oil of clove.

141. (b) Bovines are medium to large-sized ungulates and ruminants, buffalo (*Bubalus bubalis*) is a bovine. Ovines are quadrupedal, ruminant mammals generally kept as livestock. Sheep (*Ovis aries*) is ovine. Goats (*Capra aegagrus hircus*) are caprine. Horse (*Eqqus ferus*) is equine.

142. (b) The Indian or Asian wild ass is *Equus hemionus khur*. It is a subspecies of the onager native to Southern Asia. The barasingha or the swamp deer is *Rucervus duvaucelii syn*. *Cervus duvaucelii*. It is a deer species distributed in the Indian subcontinent. Chinkara is *Gazella bennettii*. Nilgai or *Boselaphus tragocamelus* is the largest Asian antelope.

143. (b) Indian buffalo is medium. Tamaraw buffalo is dwarf. Anoa buffalo is dwarf smallest. Cape buffalo is the tallest. Cape buffalo is also called African buffalo.

144. (b) Pangolins (*Manis crassicaudata*) is found in India, Sri Lanka, Nepal and some parts of Pakistan. Gibbons are the only apes found in India. The Hoollongapar Gibbon Sanctuary is in Assam which is a safe recluse for gibbons.

145. (b) Mysore type cattle is long horned. Gir type cattle is long eared. Danny type cattle is called Danny. Himalaya cattle is called Dwarf type.

146. (a) Beans are highly rich in proteins, potatoes and bananas are carbohydrate rich. Banana provides an amount of sugar, minerals and vitamins and some acids (mainly malic acid).

147. (a) Fern plants are related to Pteridophyta which have true vascular system i.e. xylem and phloem present. Vessels are absent in xylem and companion cells are absent in phloem.
148. (c) Stamen produces pollen grains in the anther which is a bilobed structure and placed terminally. Mammalian germ cells give rise to spermatozoa and ova which fuse during fertilisation to produce a cell called a zygote, which develops into an embryo.
149. (c) Mediterranean vegetation exists.
150. (d) Outcross is used to describe a type of crossbreeding used within a pure breed to increase the genetic diversity within the breed, particularly when there is a need to avoid inbreeding.
151. (c) Swine flue is an infection by Swine influenza Virus, (SIV or S-OIV) is any strain of the influenza family of viruses that is endemic in pigs. As of 2009, the known SIV strains include influenza C and the subtypes of influenza A (H_1N_1,H_1N_2 H_3N_1, H_3N_2 and H_2N_3).
Swine influenza virus is common throughout pig populations worldwide. People with regular exposure to pigs are at increased risk of swine flue infection. In August 2010, the World Health Organization declared the swine flu pandemic officially all over.
152. (c) A balanced diet is a diet which provides sufficient amount of carbohydrates, fats, proteins, vitamins and minerals nutrients to maintain good health and with a small provision for periods of leanness or scarcity.
153. (b) Some antioxidants are produced by our body whereas those the body cannot produce are obtained from the diet.
154. (a) Osmosis is the spontaneous net movement of solvent molecules through a partially permeable membrane into a region of higher solute concentration, in the direction that tends to equalize the solute concentrations on the two sides.
155. (b) Osmosis is defined as the movement of solvent molecules through a semi-permeable membrane to a region that has a higher solute concentration. Osmosis helps animal cell by bringing about a state of balance between important minerals and body solutions.
160. (b) King Cobra is the only snake in the world that builds a nest. The female snake, which is about 13 feet long, builds a nest to lay its eggs.
161. (c) Fishes have 2 chambered heart. Birds have four chambered heart. Frogs, toads, newts and salamenders have four legs. But caecilians, which form the least known group of amphibians, have no limbs and only a very short tail. They resemble snakes, worms or eels.
162. (b) The natural semen, collected from the male should be ideally used with 30-45 minutes of collection. In general, if semen has to be stored beyond one hour after collection, dilution with ideal extender and careful handling is essential. Diluents increase the volume of semen, retains cell integrity and buffering the detrimental effect arising on storage.
164. (b) Haemocyanin contains copper.
167. (c) In RNA, thymine is replaced by uracil. Thus Adenine will bind to uracil of RNA.
169. (d) Urochrome is the chemical which is responsible for the yellow colour of urine.
172. (b) Acupuncture is the stimulation of specific acupuncture points along the skin of the body using thin needles.
174. (d) Viviparous plants produce seeds that germinate before they detach from the parent plant.
175. (a)
176. (c) Angina pectoris is the medical term for chest pain or discomfort due to coronary heart disease. It occurs when the heart muscle doesn't get as much blood as it needs. Angina usually causes uncomfortable pressure, fullness, squeezing or pain in the center of the chest.
180. (d) Rh factor is a protein found in blood. A person having Rh factor in blood is called Rh positive whereas that who does not carry this protein in the blood is called Rh negative. Marriage should be avoided in between Rh negative female & Rh positive male. This can be fatal for the mother as well as the baby of such parents.
187. (d) During inhalation, the diaphragm contracts and moves downward. This increases the space in the chest cavity and thus the lungs expand. The inter coastal muscles contract to pull the rib cage upward and outward.
Haemoglobin binding affinity for carbon monoxide is 250 times greater than its affinity for oxygen.
188. (c) Left atrium receives oxygenated blood from lungs while right atrium receives deoxygented blood from different parts of the body. Left atrium

transfers oxygenated blood to left ventricle which sends it to different parts of body.

189. (b) Most plants absorb nitrogen in the form of nitrates and nitrites and urea. Atmospheric nitrogen is not available to the plants because the plants do not have enzymes to break the triple bond between the two atoms of Nitrogen.

190. (c) Fermentation takes place in anaerobic bacteria. It occurs in the cytoplasm.

191. (c) Sensory neurons carry signals from receptors to spinal cord. Motor neurons carry signals from spinal cord to the effector muscles which take action accordingly.

192. (c) The fore-brain is the main thinking part of the brain. Cerebellum controls the posture and balance of the body.

193. (a) Offsprings formed by asexual reproduction show greater similarity among themselves because asexual reproduction involve only one parent and their is no involvement of gametes in the process.

194. (c) In the presence of moisture and nutrients, the fungi show enormous growth and produce large number of spores.

195. (c) Ovaries secrete estrogen and progesterone which are responsible for secondary sexual characters of females and for reproduction.

196. (a) New species can be formed if there is considerable change in the genetic make up of an organism. This change can be a significant change in the DNA of germ cells or changes in the number of chromosomes.

198. (b) A Genes codes for an amino acid which give rise to proteins. Each chromosome has many genes.