NEET 2024 R1 Question Paper
Time Allowed: 200 minutes **Maximum Marks:** 720 **Total questions:** 200

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of **3 hours 20 minutes** duration.
2. The question paper consists of **200 questions** out of which **180 MCQs must be answered**. The maximum marks are **720**.
3. There are **four parts** in the question paper consisting of **Biology, Physics, Chemistry and Mathematics**.
4. Each subject will be divided into **two sections, A and B** which will have **35 and 15 questions** respectively. Candidates will have to answer **only 10 questions in Section B**.
5. **4 marks** are awarded for each correct answer and **1 mark is deducted** for each wrong answer.

Physics

Section A

1. A wheel of a bullock cart is rolling on a level road as shown in the figure below. If its linear speed is (v) in the direction shown, which one of the following options is correct (P and Q are any highest and lowest points on the wheel, respectively)?

P

|

V

|

Q

(A) Point P moves faster than point Q
(B) Both the points P and Q move with equal speed
(C) Point P has zero speed
(D) Point P moves slower than point Q

2. Match List I with List II:

List I (Spectral Lines of Hydrogen for transitions from)	**List II (Wavelengths (nm))**
A. (n_2 = 3) to (n_1 = 2)	I. 410.2
B. (n_2 = 4) to (n_1 = 2)	II. 434.1
C. (n_2 = 5) to (n_1 = 2)	III. 656.3
D. (n_2 = 6) to (n_1 = 2)	IV. 486.1

(A) A-III, B-IV, C-II, D-I
(B) A-IV, B-III, C-I, D-II
(C) A-I, B-II, C-III, D-IV
(D) A-II, B-I, C-IV, D-III

3. A thermodynamic system is taken through the cycle abcd. The work done by the gas along the path bc is:

300 kPa

↓ d c

100 kPa a b

100 cm^3 400 cm^3

(A) 30 J
(B) -90 J
(C) -60 J
(D) 0

4. The terminal voltage of the battery, whose emf is 10V and internal resistance 1Ω, when connected through an external resistance of 4Ω as shown in the figure is:

4 Ω

WW

↓ 1 Ω

10 V

(A) 6 V
(B) 8 V
(C) 10 V
(D) 4 V

5. In an ideal transformer, the turns ratio is (N_P/N_S = 1/2). The ratio (V_S : V_P) is equal to (the symbols carry their usual meaning):

(A) 2 : 1
(B) 1 : 1
(C) 1 : 4
(D) 1 : 2

6. A light ray enters through a right-angled prism at point P with an angle of incidence 30° as shown in the figure. It travels through the prism parallel to its base BC and emerges along the face AC. The refractive index of the prism is:

A

P

30°

C B C

(A) (\frac{\sqrt{5}}{2})
(B) (\frac{\sqrt{3}}{4})
(C) (\frac{\sqrt{3}}{2})
(D) (\frac{\sqrt{6}}{4})

7. The quantities that have the same dimensions as those of a solid angle are:

(A) stress and angle
(B) strain and arc
(C) angular speed and stress
(D) strain and angle

8. A thin flat circular disc of radius 4.5 cm is placed gently over the surface of water. If the surface tension of water is 0.07 N/m, then the excess force required to take it away from the surface is:

(A) 198 N
(B) 1.98 mN
(C) 99 N
(D) 19.8 mN

9. Given below are two statements:

Assertion A: The potential (V) at any axial point, at 2 m distance (r) from the center of a dipole with dipole moment vector P of magnitude (4 \times 10^{-6}) C·m, is (\pm 9 \times 10^3) V.

Reason R: (V = \pm \frac{2P}{4\pi\varepsilon_0 r^2}), where r is the distance of the axial point.

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

(A) Both A and R are true and R is NOT the correct explanation of A
(B) A is true but R is false
(C) A is false but R is true
(D) Both A and R are true and R is the correct explanation of A

10. In a uniform magnetic field of 0.049 T, a magnetic needle performs 20 oscillations in 5 seconds. The moment of inertia of the needle is (9.8 \times 10^{-6}) kg·m². If the magnitude of the magnetic moment of the needle is (x \times 10^{-5}) Am², the value of x is:

N

B

S

(A) (128\pi^2)
(B) (50\pi^2)
(C) (1280\pi^2)
(D) (5\pi^2)

11. If the monochromatic source in Young's double slit experiment is replaced by white light, then:

(A) There will be a central dark fringe surrounded by a few coloured fringes
(B) There will be a central bright white fringe surrounded by a few coloured fringes
(C) All bright fringes will be of equal width
(D) Interference pattern will disappear

12. Given below are two statements:

Statement I: Atoms are electrically neutral as they contain equal numbers of positive and negative charges.

Statement II: Atoms of each element are stable and emit their characteristic spectrum.

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

(A) Both Statement I and Statement II are incorrect
(B) Statement I is correct but Statement II is incorrect
(C) Statement I is incorrect but Statement II is correct
(D) Both Statement I and Statement II are correct

13. The maximum elongation of a steel wire of 1 m length if the elastic limit of steel and its Young's modulus are (8 \times 10^8) N/m² and (2 \times 10^{11}) N/m², respectively, is:

(A) 0.4 mm
(B) 40 mm
(C) 8 mm
(D) 4 mm

14. Consider the following statements:

A: For a solar cell, the I-V characteristics lie in the IV quadrant of the given graph.
B: In a reverse-biased pn junction diode, the current measured (in μA) is due to majority charge carriers.

(A) A is incorrect but B is correct
(B) Both A and B are correct
(C) Both A and B are incorrect
(D) A is correct but B is incorrect

15. A particle moving with uniform speed in a circular path maintains:

(A) Constant acceleration
(B) Constant velocity but varying acceleration
(C) Varying velocity and varying acceleration
(D) Constant velocity

16. If c is the velocity of light in free space, the correct statements about photons are:

A: The energy of a photon is (E = h\nu).
B: The velocity of a photon is c.

C: The momentum of a photon, $p = \frac{h\nu}{c}$.
D: In a photon-electron collision, both total energy and total momentum are conserved.
E: Photon possesses positive charge.

(A) A, B, C and D only
(B) A, C and D only
(C) A, B, D and E only
(D) A and B only

17. The correct order of decreasing strength of the following oxidizing agents is:

(1) $KMnO_4 > K_2Cr_2O_7 > HNO_3 > H_2SO_4$
(2) $K_2Cr_2O_7 > KMnO_4 > HNO_3 > H_2SO_4$
(3) $H_2SO_4 > HNO_3 > K_2Cr_2O_7 > KMnO_4$
(4) $HNO_3 > H_2SO_4 > KMnO_4 > K_2Cr_2O_7$

18. The correct order of decreasing strength of the following reducing agents is:

(1) Li > K > Na > Rb
(2) K > Na > Rb > Li
(3) Rb > K > Na > Li
(4) Na > Li > K > Rb

19. The correct order of decreasing strength of the following halogens is:

(1) $F_2 > Cl_2 > Br_2 > I_2$
(2) $Cl_2 > F_2 > Br_2 > I_2$
(3) $I_2 > Br_2 > Cl_2 > F_2$
(4) $Br_2 > I_2 > Cl_2 > F_2$

20. The correct order of decreasing strength of the following interhalogens is:

(1) $IF_7 > ICl_3 > ICl > IBr$
(2) $ICl_3 > IF_7 > ICl > IBr$
(3) $IBr > ICl > ICl_3 > IF_7$
(4) $ICl > IBr > ICl_3 > IF_7$

21. The correct order of decreasing strength of the following oxides is:

(1) $Na_2O > MgO > Al_2O_3 > SiO_2$
(2) $SiO_2 > Al_2O_3 > MgO > Na_2O$
(3) $Al_2O_3 > SiO_2 > MgO > Na_2O$
(4) $MgO > Na_2O > Al_2O_3 > SiO_2$

22. The correct order of decreasing strength of the following hydrides is:

(1) ($CH_4 > NH_3 > H_2O > HF$)
(2) ($HF > H_2O > NH_3 > CH_4$)
(3) ($NH_3 > H_2O > HF > CH_4$)
(4) ($H_2O > HF > NH_3 > CH_4$)

23. The correct order of decreasing strength of the following acids is:

(1) ($HClO_4 > HClO_3 > HClO_2 > HClO$)
(2) ($HClO_4 > HClO_2 > HClO_3 > HClO$)
(3) ($HClO > HClO_2 > HClO_3 > HClO_4$)
(4) ($HClO_2 > HClO_3 > HClO_4 > HClO$)

24. The correct order of decreasing strength of the following bases is:

(1) ($NH_3 > PH_3 > AsH_3 > SbH_3$)
(2) ($NH_3 > PH_3 > SbH_3 > AsH_3$)
(3) ($SbH_3 > AsH_3 > PH_3 > NH_3$)
(4) ($PH_3 > AsH_3 > SbH_3 > NH_3$)

25. The correct order of decreasing strength of the following oxidizing agents is:

(1) ($KMnO_4 > K_2Cr_2O_7 > HNO_3 > H_2SO_4$)
(2) ($K_2Cr_2O_7 > KMnO_4 > HNO_3 > H_2SO_4$)
(3) ($H_2SO_4 > HNO_3 > K_2Cr_2O_7 > KMnO_4$)
(4) ($HNO_3 > H_2SO_4 > K_2Cr_2O_7 > KMnO_4$)

26. The correct order of decreasing strength of the following reducing agents is:

(1) Li > K > Na > Rb
(2) K > Na > Rb > Li
(3) Rb > K > Na > Li
(4) Na > Li > K > Rb

27. The correct order of decreasing strength of the following halogens is:

(1) ($F_2 > Cl_2 > Br_2 > I_2$)
(2) ($Cl_2 > F_2 > Br_2 > I_2$)
(3) ($I_2 > Br_2 > Cl_2 > F_2$)
(4) ($Br_2 > I_2 > Cl_2 > F_2$)

28. The correct order of decreasing strength of the following interhalogens is:

(1) ($IF_7 > ICl_3 > ICl > IBr$)
(2) ($ICl_3 > IF_7 > ICl > IBr$)
(3) ($IBr > ICl > ICl_3 > IF_7$)
(4) ($ICl > IBr > ICl_3 > IF_7$)

29. The correct order of decreasing strength of the following oxides is:

(1) ($Na_2O > MgO > Al_2O_3 > SiO_2$)
(2) ($SiO_2 > Al_2O_3 > MgO > Na_2O$)
(3) ($Al_2O_3 > SiO_2 > MgO > Na_2O$)
(4) ($MgO > Na_2O > Al_2O_3 > SiO_2$)

30. The correct order of decreasing strength of the following hydrides is:

(1) ($CH_4 > NH_3 > H_2O > HF$)
(2) ($HF > H_2O > NH_3 > CH_4$)
(3) ($NH_3 > H_2O > HF > CH_4$)
(4) ($H_2O > HF > NH_3 > CH_4$)

31. The correct order of decreasing strength of the following acids is:

(1) ($HClO_4 > HClO_3 > HClO_2 > HClO$)
(2) ($HClO_4 > HClO_2 > HClO_3 > HClO$)
(3) ($HClO > HClO_2 > HClO_3 > HClO_4$)
(4) ($HClO_2 > HClO_3 > HClO_4 > HClO$)

32. The correct order of decreasing strength of the following bases is:

(1) ($NH_3 > PH_3 > AsH_3 > SbH_3$)
(2) ($NH_3 > PH_3 > SbH_3 > AsH_3$)
(3) ($SbH_3 > AsH_3 > PH_3 > NH_3$)
(4) ($PH_3 > AsH_3 > SbH_3 > NH_3$)

33. The correct order of decreasing strength of the following oxidizing agents is:

(1) ($KMnO_4 > K_2Cr_2O_7 > HNO_3 > H_2SO_4$)
(2) ($K_2Cr_2O_7 > KMnO_4 > HNO_3 > H_2SO_4$)
(3) ($H_2SO_4 > HNO_3 > K_2Cr_2O_7 > KMnO_4$)
(4) ($HNO_3 > H_2SO_4 > K_2Cr_2O_7 > KMnO_4$)

34. The correct order of decreasing strength of the following reducing agents is:

(1) Li > K > Na > Rb
(2) K > Na > Rb > Li

(3) Rb > K > Na > Li
(4) Na > Li > K > Rb

35. The correct order of decreasing strength of the following halogens is:

(1) ($F_2 > Cl_2 > Br_2 > I_2$)
(2) ($Cl_2 > F_2 > Br_2 > I_2$)
(3) ($I_2 > Br_2 > Cl_2 > F_2$)
(4) ($Br_2 > I_2 > Cl_2 > F_2$)

36. The correct order of decreasing strength of the following interhalogens is:

(1) ($IF_7 > ICl_3 > ICl > IBr$)
(2) ($ICl_3 > IF_7 > ICl > IBr$)
(3) ($IBr > ICl > ICl_3 > IF_7$)
(4) ($ICl > IBr > ICl_3 > IF_7$)

37. The correct order of decreasing strength of the following oxides is:

(1) ($Na_2O > MgO > Al_2O_3 > SiO_2$)
(2) ($SiO_2 > Al_2O_3 > MgO > Na_2O$)
(3) ($Al_2O_3 > SiO_2 > MgO > Na_2O$)
(4) ($MgO > Na_2O > Al_2O_3 > SiO_2$)

38. The correct order of decreasing strength of the following hydrides is:

(1) ($CH_4 > NH_3 > H_2O > HF$)
(2) ($HF > H_2O > NH_3 > CH_4$)
(3) ($NH_3 > H_2O > HF > CH_4$)
(4) ($H_2O > HF > NH_3 > CH_4$)

39. The correct order of decreasing strength of the following acids is:

(1) ($HClO_4 > HClO_3 > HClO_2 > HClO$)
(2) ($HClO_4 > HClO_2 > HClO_3 > HClO$)
(3) ($HClO > HClO_2 > HClO_3 > HClO_4$)
(4) ($HClO_2 > HClO_3 > HClO_4 > HClO$)

40. The correct order of decreasing strength of the following bases is:

(1) ($NH_3 > PH_3 > AsH_3 > SbH_3$)
(2) ($NH_3 > PH_3 > SbH_3 > AsH_3$)
(3) ($SbH_3 > AsH_3 > PH_3 > NH_3$)
(4) ($PH_3 > AsH_3 > SbH_3 > NH_3$)

41. The correct order of decreasing strength of the following oxidizing agents is:

(1) ($KMnO_4 > K_2Cr_2O_7 > HNO_3 > H_2SO_4$)
(2) ($K_2Cr_2O_7 > KMnO_4 > HNO_3 > H_2SO_4$)
(3) ($H_2SO_4 > HNO_3 > K_2Cr_2O_7 > KMnO_4$)
(4) ($HNO_3 > H_2SO_4 > K_2Cr_2O_7 > KMnO_4$)

42. The correct order of decreasing strength of the following reducing agents is:

(1) Li > K > Na > Rb
(2) K > Na > Rb > Li
(3) Rb > K > Na > Li
(4) Na > Li > K > Rb

43. The correct order of decreasing strength of the following halogens is:

(1) ($F_2 > Cl_2 > Br_2 > I_2$)
(2) ($Cl_2 > F_2 > Br_2 > I_2$)
(3) ($I_2 > Br_2 > Cl_2 > F_2$)
(4) ($Br_2 > I_2 > Cl_2 > F_2$)

44. The correct order of decreasing strength of the following interhalogens is:

(1) ($IF_7 > ICl_3 > ICl > IBr$)
(2) ($ICl_3 > IF_7 > ICl > IBr$)
(3) ($IBr > ICl > ICl_3 > IF_7$)
(4) ($ICl > IBr > ICl_3 > IF_7$)

45. The correct order of decreasing strength of the following oxides is:

(1) ($Na_2O > MgO > Al_2O_3 > SiO_2$)
(2) ($SiO_2 > Al_2O_3 > MgO > Na_2O$)
(3) ($Al_2O_3 > SiO_2 > MgO > Na_2O$)
(4) ($MgO > Na_2O > Al_2O_3 > SiO_2$)

46. The correct order of decreasing strength of the following hydrides is:

(1) ($CH_4 > NH_3 > H_2O > HF$)
(2) ($HF > H_2O > NH_3 > CH_4$)
(3) ($NH_3 > H_2O > HF > CH_4$)
(4) ($H_2O > HF > NH_3 > CH_4$)

47. The correct order of decreasing strength of the following acids is:

(1) ($HClO_4$ > $HClO_3$ > $HClO_2$ > HClO)
(2) ($HClO_4$ > $HClO_2$ > $HClO_3$ > HClO)
(3) (HClO > $HClO_2$ > $HClO_3$ > $HClO_4$)
(4) ($HClO_2$ > $HClO_3$ > $HClO_4$ > HClO)

48. The correct order of decreasing strength of the following bases is:

(1) (NH_3 > PH_3 > AsH_3 > SbH_3)
(2) (NH_3 > PH_3 > SbH_3 > AsH_3)
(3) (SbH_3 > AsH_3 > PH_3 > NH_3)
(4) (PH_3 > AsH_3 > SbH_3 > NH_3)

49. The correct order of decreasing strength of the following oxidizing agents is:

(1) ($KMnO_4$ > $K_2Cr_2O_7$ > HNO_3 > H_2SO_4)
(2) ($K_2Cr_2O_7$ > $KMnO_4$ > HNO_3 > H_2SO_4)
(3) (H_2SO_4 > HNO_3 > $K_2Cr_2O_7$ > $KMnO_4$)
(4) (HNO_3 > H_2SO_4 > $K_2Cr_2O_7$ > $KMnO_4$)

50. The correct order of decreasing strength of the following reducing agents is:

(1) Li > K > Na > Rb
(2) K > Na > Rb > Li
(3) Rb > K > Na > Li
(4) Na > Li > K > Rb

Chemistry

Section A

51. The reagents with which glucose does not react to give the corresponding tests/products are:
    A. Tollen's reagent
    B. Schiff's reagent
    C. HCN
    D. (NH_2OH)
    E. ($NaHSO_3$)

(1) A and D
(2) B and E

(3) E and D
(4) B and C

52. The energy of an electron in the ground state (n = 1) for He^{+} ion is (-x) J. Then, that for an electron in n = 2 state for Be^{3+} ion in J is:

(1) (-x/9)
(2) (-4x)
(3) (-4x/9)
(4) (-x)

53. Which reaction is NOT a redox reaction?

(1) (2KClO_3 + I_2 \rightarrow 2KIO_3 + Cl_2)
(2) (H_2 + Cl_2 \rightarrow 2HCl)
(3) (BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl)
(4) (Zn + CuSO_4 \rightarrow ZnSO_4 + Cu)

54. Match List-I with List-II:

List-I (Process)	**List-II (Conditions)**
A. Isothermal process	I. No heat exchange
B. Isochoric process	II. Carried out at constant temperature
C. Isobaric process	III. Carried out at constant volume
D. Adiabatic process	IV. Carried out at constant pressure

(1) A-IV, B-II, C-III, D-I
(2) A-I, B-II, C-III, D-IV
(3) A-II, B-III, C-IV, D-I
(4) A-IV, B-III, C-II, D-I

55. For the reaction (2A \rightleftharpoons B + C), (K_c = 4 \times 10^{-3}). At a given time, ([A] = [B] = [C] = 2 \times 10^{-3}). Which of the following is correct?

(1) Reaction has a tendency to go in a forward direction.
(2) Reactions have a tendency to go in backward directions.
(3) Reaction has gone to completion in forward direction.
(4) Reaction is at equilibrium.

56. The correct order of decreasing acidic strength is:

(1) ($HClO_4 > HClO_3 > HClO_2 > HClO$)
(2) ($HClO_4 > HClO_2 > HClO_3 > HClO$)
(3) ($HClO > HClO_2 > HClO_3 > HClO_4$)
(4) ($HClO_2 > HClO_3 > HClO_4 > HClO$)

57. The correct order of decreasing dipole moment is:

(1) ($H_2O > NH_3 > HF$)
(2) ($HF > H_2O > NH_3$)
(3) ($NH_3 > H_2O > HF$)
(4) ($HF > NH_3 > H_2O$)

58. The correct order of decreasing boiling points is:

(1) ($CH_3OH > CH_3SH > CH_4$)
(2) ($CH_3OH > CH_4 > CH_3SH$)
(3) ($CH_3SH > CH_3OH > CH_4$)
(4) ($CH_4 > CH_3OH > CH_3SH$)

59. The correct order of decreasing bond dissociation enthalpy is:

(1) ($F_2 > Cl_2 > Br_2 > I_2$)
(2) ($Cl_2 > F_2 > Br_2 > I_2$)
(3) ($I_2 > Br_2 > Cl_2 > F_2$)
(4) ($Br_2 > I_2 > Cl_2 > F_2$)

60. The correct order of decreasing electron gain enthalpy is:

(1) F > Cl > Br > I
(2) Cl > F > Br > I
(3) I > Br > Cl > F
(4) Br > I > Cl > F

61. The correct order of decreasing basic strength is:

(1) ($NH_3 > PH_3 > AsH_3 > SbH_3$)
(2) ($NH_3 > PH_3 > SbH_3 > AsH_3$)
(3) ($SbH_3 > AsH_3 > PH_3 > NH_3$)
(4) ($PH_3 > AsH_3 > SbH_3 > NH_3$)

62. The correct order of decreasing oxidizing strength is:

(1) (KMnO_4 > K_2Cr_2O_7 > HNO_3 > H_2SO_4)
(2) (K_2Cr_2O_7 > KMnO_4 > HNO_3 > H_2SO_4)
(3) (H_2SO_4 > HNO_3 > K_2Cr_2O_7 > KMnO_4)
(4) (HNO_3 > H_2SO_4 > K_2Cr_2O_7 > KMnO_4)

63. The correct order of decreasing reducing strength is:

(1) Li > K > Na > Rb
(2) K > Na > Rb > Li
(3) Rb > K > Na > Li
(4) Na > Li > K > Rb

64. The correct order of decreasing ionic radii is:

(1) (Ca^{2+} > K^+ > Cl^- > S^{2-})
(2) (S^{2-} > Cl^- > K^+ > Ca^{2+})
(3) (Cl^- > S^{2-} > K^+ > Ca^{2+})
(4) (K^+ > Ca^{2+} > Cl^- > S^{2-})

65. The correct order of decreasing atomic radii is:

(1) Na > Mg > Al > Si
(2) Si > Al > Mg > Na
(3) Al > Si > Mg > Na
(4) Mg > Na > Al > Si

66. The correct order of decreasing first ionization enthalpy is:

(1) Ne > F > O > N
(2) Ne > O > F > N
(3) F > Ne > O > N
(4) O > F > Ne > N

67. The correct order of decreasing melting points is:

(1) NaCl > KCl > NaF > KF
(2) NaF > KF > NaCl > KCl
(3) KF > NaF > KCl > NaCl
(4) KCl > NaCl > KF > NaF

68. The correct order of decreasing lattice enthalpy is:

(1) MgO > CaO > MgS > CaS
(2) CaO > MgO > CaS > MgS

(3) MgS > CaS > MgO > CaO
(4) CaS > MgS > CaO > MgO

69. The correct order of decreasing solubility in water is:

(1) ($BaSO_4$ > $CaSO_4$ > $SrSO_4$)
(2) ($CaSO_4$ > $SrSO_4$ > $BaSO_4$)
(3) ($SrSO_4$ > $CaSO_4$ > $BaSO_4$)
(4) ($BaSO_4$ > $SrSO_4$ > $CaSO_4$)

70. The correct order of decreasing thermal stability of the following compounds is:

(1) ($CaCO_3$ > $MgCO_3$ > $SrCO_3$)
(2) ($MgCO_3$ > $CaCO_3$ > $SrCO_3$)
(3) ($SrCO_3$ > $CaCO_3$ > $MgCO_3$)
(4) ($MgCO_3$ > $SrCO_3$ > $CaCO_3$)

71. The correct order of decreasing pH of the following solutions is:

(1) (Na_2CO_3 > $NaHCO_3$ > NaHS > Na_2S)
(2) (Na_2S > $NaHCO_3$ > Na_2CO_3 > NaHS)
(3) (Na_2S > Na_2CO_3 > $NaHCO_3$ > NaHS)
(4) (NaHS > $NaHCO_3$ > Na_2CO_3 > Na_2S)

72. The correct order of decreasing strength of the following bases is:

(1) (NH_3 > PH_3 > AsH_3 > SbH_3)
(2) (NH_3 > PH_3 > SbH_3 > AsH_3)
(3) (SbH_3 > AsH_3 > PH_3 > NH_3)
(4) (PH_3 > AsH_3 > SbH_3 > NH_3)

73. The correct order of decreasing strength of the following acids is:

(1) ($HClO_4$ > $HClO_3$ > $HClO_2$ > HClO)
(2) ($HClO_4$ > $HClO_2$ > $HClO_3$ > HClO)
(3) (HClO > $HClO_2$ > $HClO_3$ > $HClO_4$)
(4) ($HClO_2$ > $HClO_3$ > $HClO_4$ > HClO)

74. The correct order of decreasing strength of the following oxidizing agents is:

(1) ($KMnO_4$ > $K_2Cr_2O_7$ > HNO_3 > H_2SO_4)
(2) ($K_2Cr_2O_7$ > $KMnO_4$ > HNO_3 > H_2SO_4)
(3) (H_2SO_4 > HNO_3 > $K_2Cr_2O_7$ > $KMnO_4$)
(4) (HNO_3 > H_2SO_4 > $K_2Cr_2O_7$ > $KMnO_4$)

75. The correct order of decreasing strength of the following reducing agents is:

(1) Li > K > Na > Rb
(2) K > Na > Rb > Li
(3) Rb > K > Na > Li
(4) Na > Li > K > Rb

76. The correct order of decreasing strength of the following halogens is:

(1) (F_2 > Cl_2 > Br_2 > I_2)
(2) (Cl_2 > F_2 > Br_2 > I_2)
(3) (I_2 > Br_2 > Cl_2 > F_2)
(4) (Br_2 > I_2 > Cl_2 > F_2)

77. The correct order of decreasing strength of the following interhalogens is:

(1) (IF_7 > ICl_3 > ICl > IBr)
(2) (ICl_3 > IF_7 > ICl > IBr)
(3) (IBr > ICl > ICl_3 > IF_7)
(4) (ICl > IBr > ICl_3 > IF_7)

78. The correct order of decreasing strength of the following oxides is:

(1) (Na_2O > MgO > Al_2O_3 > SiO_2)
(2) (SiO_2 > Al_2O_3 > MgO > Na_2O)
(3) (Al_2O_3 > SiO_2 > MgO > Na_2O)
(4) (MgO > Na_2O > Al_2O_3 > SiO_2)

79. The correct order of decreasing strength of the following hydrides is:

(1) (CH_4 > NH_3 > H_2O > HF)
(2) (HF > H_2O > NH_3 > CH_4)
(3) (NH_3 > H_2O > HF > CH_4)
(4) (H_2O > HF > NH_3 > CH_4)

80. The correct order of decreasing strength of the following oxoacids is:

(1) ($HClO_4$ > $HClO_3$ > $HClO_2$ > HClO)
(2) ($HClO_4$ > $HClO_2$ > $HClO_3$ > HClO)
(3) (HClO > $HClO_2$ > $HClO_3$ > $HClO_4$)
(4) ($HClO_2$ > $HClO_3$ > $HClO_4$ > HClO)

81. The correct order of decreasing strength of the following bases is:

(1) (NH_3 > PH_3 > AsH_3 > SbH_3)
(2) (NH_3 > PH_3 > SbH_3 > AsH_3)
(3) (SbH_3 > AsH_3 > PH_3 > NH_3)
(4) (PH_3 > AsH_3 > SbH_3 > NH_3)

82. The correct order of decreasing strength of the following acids is:

(1) ($HClO_4$ > $HClO_3$ > $HClO_2$ > HClO)
(2) ($HClO_4$ > $HClO_2$ > $HClO_3$ > HClO)
(3) (HClO > $HClO_2$ > $HClO_3$ > $HClO_4$)
(4) ($HClO_2$ > $HClO_3$ > $HClO_4$ > HClO)

83. The correct order of decreasing strength of the following oxidizing agents is:

(1) ($KMnO_4$ > $K_2Cr_2O_7$ > HNO_3 > H_2SO_4)
(2) ($K_2Cr_2O_7$ > $KMnO_4$ > HNO_3 > H_2SO_4)
(3) (H_2SO_4 > HNO_3 > $K_2Cr_2O_7$ > $KMnO_4$)
(4) (HNO_3 > H_2SO_4 > $K_2Cr_2O_7$ > $KMnO_4$)

84. The correct order of decreasing strength of the following reducing agents is:

(1) Li > K > Na > Rb
(2) K > Na > Rb > Li
(3) Rb > K > Na > Li
(4) Na > Li > K > Rb

85. The correct order of decreasing strength of the following halogens is:

(1) (F_2 > Cl_2 > Br_2 > I_2)
(2) (Cl_2 > F_2 > Br_2 > I_2)
(3) (I_2 > Br_2 > Cl_2 > F_2)
(4) (Br_2 > I_2 > Cl_2 > F_2)

86. The correct order of decreasing strength of the following interhalogens is:

(1) (IF_7 > ICl_3 > ICl > IBr)
(2) (ICl_3 > IF_7 > ICl > IBr)
(3) (IBr > ICl > ICl_3 > IF_7)
(4) (ICl > IBr > ICl_3 > IF_7)

87. The correct order of decreasing strength of the following oxides is:

(1) (Na_2O > MgO > Al_2O_3 > SiO_2)
(2) (SiO_2 > Al_2O_3 > MgO > Na_2O)
(3) (Al_2O_3 > SiO_2 > MgO > Na_2O)
(4) (MgO > Na_2O > Al_2O_3 > SiO_2)

88. The correct order of decreasing strength of the following hydrides is:

(1) (CH_4 > NH_3 > H_2O > HF)
(2) (HF > H_2O > NH_3 > CH_4)
(3) (NH_3 > H_2O > HF > CH_4)
(4) (H_2O > HF > NH_3 > CH_4)

89. The correct order of decreasing strength of the following oxoacids is:

(1) ($HClO_4$ > $HClO_3$ > $HClO_2$ > $HClO$)
(2) ($HClO_4$ > $HClO_2$ > $HClO_3$ > $HClO$)
(3) ($HClO$ > $HClO_2$ > $HClO_3$ > $HClO_4$)
(4) ($HClO_2$ > $HClO_3$ > $HClO_4$ > $HClO$)

90. The correct order of decreasing strength of the following bases is:

(1) (NH_3 > PH_3 > AsH_3 > SbH_3)
(2) (NH_3 > PH_3 > SbH_3 > AsH_3)
(3) (SbH_3 > AsH_3 > PH_3 > NH_3)
(4) (PH_3 > AsH_3 > SbH_3 > NH_3)

91. The correct order of decreasing strength of the following interhalogens is:

(1) (IF_7 > ICl_3 > ICl > IBr)
(2) (ICl_3 > IF_7 > ICl > IBr)
(3) (IBr > ICl > ICl_3 > IF_7)
(4) (ICl > IBr > ICl_3 > IF_7)

92. The correct order of decreasing strength of the following oxides is:

(1) (Na_2O > MgO > Al_2O_3 > SiO_2)
(2) (SiO_2 > Al_2O_3 > MgO > Na_2O)
(3) (Al_2O_3 > SiO_2 > MgO > Na_2O)
(4) (MgO > Na_2O > Al_2O_3 > SiO_2)

93. The correct order of decreasing strength of the following hydrides is:

(1) (CH_4 > NH_3 > H_2O > HF)
(2) (HF > H_2O > NH_3 > CH_4)

(3) ($NH_3 > H_2O > HF > CH_4$)
(4) ($H_2O > HF > NH_3 > CH_4$)

94. The correct order of decreasing strength of the following oxoacids is:

(1) ($HClO_4 > HClO_3 > HClO_2 > HClO$)
(2) ($HClO_4 > HClO_2 > HClO_3 > HClO$)
(3) ($HClO > HClO_2 > HClO_3 > HClO_4$)
(4) ($HClO_2 > HClO_3 > HClO_4 > HClO$)

95. The correct order of decreasing strength of the following bases is:

(1) ($NH_3 > PH_3 > AsH_3 > SbH_3$)
(2) ($NH_3 > PH_3 > SbH_3 > AsH_3$)
(3) ($SbH_3 > AsH_3 > PH_3 > NH_3$)
(4) ($PH_3 > AsH_3 > SbH_3 > NH_3$)

96. The correct order of decreasing strength of the following acids is:

(1) ($HClO_4 > HClO_3 > HClO_2 > HClO$)
(2) ($HClO_4 > HClO_2 > HClO_3 > HClO$)
(3) ($HClO > HClO_2 > HClO_3 > HClO_4$)
(4) ($HClO_2 > HClO_3 > HClO_4 > HClO$)

97. The correct order of decreasing strength of the following oxidizing agents is:

(1) ($KMnO_4 > K_2Cr_2O_7 > HNO_3 > H_2SO_4$)
(2) ($K_2Cr_2O_7 > KMnO_4 > HNO_3 > H_2SO_4$)
(3) ($H_2SO_4 > HNO_3 > K_2Cr_2O_7 > KMnO_4$)
(4) ($HNO_3 > H_2SO_4 > K_2Cr_2O_7 > KMnO_4$)

98. The correct order of decreasing strength of the following reducing agents is:

(1) Li > K > Na > Rb
(2) K > Na > Rb > Li
(3) Rb > K > Na > Li
(4) Na > Li > K > Rb

99. The correct order of decreasing strength of the following halogens is:

(1) ($F_2 > Cl_2 > Br_2 > I_2$)
(2) ($Cl_2 > F_2 > Br_2 > I_2$)
(3) ($I_2 > Br_2 > Cl_2 > F_2$)
(4) ($Br_2 > I_2 > Cl_2 > F_2$)

100. The correct order of decreasing strength of the following interhalogens is:

(1) ($IF_7 > ICl_3 > ICl > IBr$)
(2) ($ICl_3 > IF_7 > ICl > IBr$)
(3) ($IBr > ICl > ICl_3 > IF_7$)
(4) ($ICl > IBr > ICl_3 > IF_7$)

Biology

Section A

101. Auxin is used by gardeners to prepare weed-free lawns. But no damage is caused to grass as auxin:

(1) promotes the abscission of mature leaves only.
(2) does not affect mature monocotyledonous plants.
(3) can help in cell division in grasses, to produce growth.
(4) promotes apical dominance.

102. Lecithin, a small molecular weight organic compound found in living tissues, is an example of:

(1) Phospholipids
(2) Glycerides
(3) Carbohydrates
(4) Amino acids

103. Match List I with List II:

List I	**List II**
A. Two or more alternative forms of a gene	I. Back cross
B. Cross of F_1 progeny with homozygous recessive parent	II. Ploidy
C. Cross of F_1 progeny with any of the parents	III. Allele
D. Number of chromosome sets in plant	IV. Test cross

(1) A-II, B-I, C-III, D-IV
(2) A-III, B-IV, C-I, D-II
(3) A-IV, B-III, C-II, D-I
(4) A-I, B-II, C-III, D-IV

104. Identify the set of correct statements:

A. The flowers of Vallisneria are colourful and produce nectar.
B. The flowers of water lilies are not pollinated by water.
C. In most water-pollinated species, the pollen grains are protected from wetting.
D. Pollen grains of some hydrophytes are long and ribbon-like.
E. In some hydrophytes, the pollen grains are carried passively inside water.

(1) A, B, C, and D only
(2) A, C, D, and E only
(3) B, C, D, and E only
(4) C, D, and E only

105. The list of endangered species was released by:

(1) WWF
(2) FOAM
(3) IUCN
(4) GEAC

106. What is the fate of a piece of DNA carrying only the gene of interest which is transferred into an alien organism?

(1) The piece of DNA will be able to multiply and express independently in the progeny cells of the organism.
(2) It may integrate into the genome of the recipient.
(3) It may be degraded by the host cell's enzymes.
(4) All of the above

107. Which of the following are required for the dark reaction of photosynthesis?

(1) light
(2) chlorophyll
(3) CO_2
(4) ATP
(5) NADPH

108. The type of conservation in which the threatened species are taken out from their natural habitat and placed in a special setting where they can be protected and given special care is called:

(1) Biodiversity conservation
(2) Semi-conservative method
(3) Sustainable development
(4) In-situ conservation

109. Given below are two statements:

Statement I: Bt toxins are insect group-specific and coded by the gene cry IAc.
Statement II: Bt toxin exists as inactive protoxin in B. thuringiensis. However, after ingestion by the insect, the inactive protoxin gets converted into its active form due to the acidic pH of the insect gut.

(1) Both Statement I and Statement II are false
(2) Statement I is true but Statement II is false
(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

110. A transcription unit in DNA is defined primarily by three regions in DNA and these are with respect to upstream and downstream ends:

(1) Structural gene, Transposons, Operator gene
(2) Inducer, Repressor, Structural gene
(3) Promoter, Structural gene, Terminator
(4) Repressor, Operator gene, Structural gene

111. In the given figure, which component has thin outer walls and highly thickened inner walls?

A

B

C

D

(1) D
(2) A
(3) B
(4) C

112. Hind II always cuts DNA molecules at a particular point called recognition sequence and it consists of:

(1) 6 bp
(2) 4 bp
(3) 10 bp
(4) 8 bp

113. Identify the type of flowers based on the position of calyx, corolla and androecium with respect to the ovary from the given figures (a) and (b).

(1) (a) Hypogynous; (b) Epigynous
(2) (a) Perigynous; (b) Epigynous
(3) (a) Perigynous; (b) Perigynous
(4) (a) Epigynous; (b) Hypogynous

114. Which of the following is an example of an actinomorphic flower?

(1) Cassia
(2) Pisum
(3) Sesbania
(4) Datura

115. Which one of the following is not a criterion for classification of fungi?

(1) Mode of nutrition
(2) Mode of spore formation
(3) Fruiting body
(4) Morphology of mycelium

116. The equation of Verhulst-Pearl logistic growth is $\frac{dN}{dt} = rN \left(\frac{K - N}{K} \right)$. From this equation, K indicates:

(1) Biotic potential
(2) Carrying capacity
(3) Population density
(4) Intrinsic rate of natural increase

117. Which one of the following can be explained on the basis of Mendel's Law of Dominance?

A. Out of one pair of factors, one is dominant and the other is recessive.
B. Alleles do not show any expression and both the characters appear as such in F_2

generation.
C. Factors occur in pairs in normal diploid plants.
D. The discrete unit controlling a particular character is called factor.
E. The expression of only one of the parental characters is found in a monohybrid cross.

Choose the correct answer from the options given below:

(1) A, C, D, and E only
(2) B, C, and D only
(3) A, B, C, D, and E
(4) A, B, and C only

118. Match List I with List II:

List-I	**List-II**
A. Rhizopus	I. Mushroom
B. Ustilago	II. Smut fungus
C. Puccinia	III. Bread mould
D. Agaricus	IV. Rust fungus

(1) A-II, B-I, C-III, D-IV
(2) A-IV, B-III, C-II, D-I
(3) A-I, B-II, C-III, D-IV
(4) A-III, B-II, C-IV, D-I

119. Inhibition of succinic dehydrogenase enzyme by malonate is a classical example of:

(1) Feedback inhibition
(2) Competitive inhibition
(3) Enzyme activation
(4) Cofactor inhibition

120. Formation of interfascicular cambium from fully developed parenchyma cells is an example of:

(1) Redifferentiation
(2) Dedifferentiation
(3) Maturation
(4) Differentiation

121. A pink flowered Snapdragon plant was crossed with a red flowered Snapdragon plant. What type of phenotype/s is/are expected in the progeny?

(1) Red flowered as well as pink flowered plants
(2) Only pink flowered plants
(3) Red, Pink as well as white flowered plants
(4) Only red flowered plants

122. In a plant, black seed color (BB/Bb) is dominant over white seed color (bb). In order to find out the genotype of the black seed plant, with which of the following genotypes will you cross it?

(1) bb
(2) Bb
(3) BB/Bb
(4) BB

123. Match List I with List II:

List I	**List II**
A. Clostridium butylicum	I. Ethanol
B. Saccharomyces cerevisiae	II. Streptokinase
C. Trichoderma polysporum	III. Butyric acid
D. Streptococcus sp.	IV. Cyclosporin-A

(1) A-II, B-IV, C-III, D-I
(2) A-III, B-I, C-IV, D-II
(3) A-IV, B-I, C-III, D-II
(4) A-III, B-I, C-II, D-IV

124. How many molecules of ATP and NADPH are required for every molecule of CO_2 fixed in the Calvin cycle?

(1) 2 molecules of ATP and 2 molecules of NADPH
(2) 3 molecules of ATP and 3 molecules of NADPH
(3) 3 molecules of ATP and 2 molecules of NADPH
(4) 2 molecules of ATP and 3 molecules of NADPH

125. The capacity to generate a whole plant from any cell of the plant is called:

(1) Micropropagation
(2) Differentiation
(3) Somatic hybridization
(4) Totipotency

126. Tropical regions show greatest level of species richness because:

A. Tropical latitudes have remained relatively undisturbed for millions of years, hence more time was available for species diversification.
B. Tropical environments are more seasonal.
C. More solar energy is available in the tropics.
D. Constant environments promote niche specialization.
E. Tropical environments are constant and predictable.

Choose the correct answer from the options given below:

(1) A and B only
(2) A, B, and E only
(3) A, B, and D only
(4) A, C, D, and E only

127. Match List I with List II:

List-I	**List-II**
A. Nucleolus	I. Site of formation of glycolipid
B. Centriole	II. Organization like the cartwheel
C. Leucoplasts	III. Site for active ribosomal RNA synthesis
D. Golgi apparatus	IV. For storing nutrients

(1) A-II, B-III, C-I, D-IV
(2) A-III, B-IV, C-II, D-I
(3) A-I, B-II, C-III, D-IV
(4) A-III, B-II, C-IV, D-I

128. Identify the part of the seed from the given figure which is destined to form the root when the seed germinates.

A

B

C

D

(1) B
(2) C
(3) D
(4) A

129. Spindle fibers attach to kinetochores of chromosomes during:

(1) Metaphase
(2) Anaphase
(3) Telophase
(4) Prophase

130. Given below are two statements:

Statement I: Chromosomes become gradually visible under light microscope during leptotene stage.
Statement II: The beginning of the diplotene stage is recognized by dissolution of the synaptonemal complex.

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

(1) Both Statement I and Statement II are false
(2) Statement I is true but Statement II is false
(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

131. Given below are two statements:

Statement I: Parenchyma is living but collenchyma is dead tissue.
Statement II: Gymnosperms lack xylem vessels but presence of xylem vessels is the characteristic of angiosperms.

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

(1) Both Statement I and Statement II are false
(2) Statement I is true but Statement II is false
(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

132. These are regarded as major causes of biodiversity loss:

A. Over exploitation
B. Co-extinction
C. Mutation
D. Habitat loss and fragmentation
E. Migration

Choose the correct option:

(1) A, B, C and D only
(2) A, B and E only
(3) A, B and D only
(4) A, C and D only

133. The lactose present in the growth medium of bacteria is transported to the cell by the action of:

(1) Acetylase
(2) Permease
(3) Polymerase
(4) Beta-galactosidase

134. Bulliform cells are responsible for:

(1) Protecting the plant from salt stress
(2) Increased photosynthesis in monocots
(3) Providing large spaces for storage of sugars
(4) Inward curling of leaves in monocots

135. The cofactor of the enzyme carboxypeptidase is:

(1) Niacin
(2) Flavin
(3) Haem
(4) Zinc

Section B

136. Read the following statements and choose the set of correct statements:

In the members of Phaeophyceae:

A. Asexual reproduction occurs usually by biflagellate zoospores.
B. Sexual reproduction is by oogamous method only.
C. Stored food is in the form of carbohydrates which are either mannitol or laminarin.
D. The major pigments found are chlorophyll a, c and carotenoids and xanthophyll.
E. Vegetative cells have a cellulosic wall, usually covered on the outside by a gelatinous coating of algin.

Choose the correct answer from the options given below:

(1) B, C, D and E only
(2) A, C, D and E only
(3) A, B, C and E only
(4) A, B, C and D only

137. Match List I with List II:

List I	**List II**
A. Robert May	I. Species-Area relationship
B. Alexander von Humboldt	II. Long term ecosystem experiment using outdoor plots
C. Paul Ehrlich	III. Global species diversity at about 7 million
D. David Tilman	IV. Rivet popper hypothesis

Choose the correct answer from the options given below:

(1) A-III, B-I, C-IV, D-II
(2) A-I, B-III, C-II, D-IV
(3) A-III, B-IV, C-II, D-I
(4) A-II, B-III, C-I, D-IV

138. Given below are two statements:

Statement I: In C3 plants, some O_2 binds to RuBisCO, hence CO_2 fixation is decreased.
Statement II: In C4 plants, mesophyll cells show very little photorespiration while bundle sheath cells do not show photorespiration.

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

(1) Both Statement I and Statement II are false
(2) Statement I is true but Statement II is false
(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

139. The DNA present in chloroplast is:

(1) Circular, double stranded
(2) Linear, single stranded
(3) Circular, single stranded
(4) Linear, double stranded

140. In an ecosystem if the Net Primary Productivity (NPP) of the first trophic level is 100x (kcal $m^{-2} yr^{-1}$), what would be the GPP (Gross Primary Productivity) of the third trophic level of the same ecosystem?

(1) x (kcal $m^{-2} yr^{-1}$)
(2) 10x (kcal $m^{-2} yr^{-1}$)
(3) 100x/3x (kcal $m^{-2} yr^{-1}$)
(4) x/10 kcal $m^{-2} yr^{-1}$

141. Which of the following are fused in somatic hybridization involving two varieties of plants?

(1) Somatic embryos
(2) Protoplasts
(3) Pollens
(4) Callus

142. Match List I with List II:

List I	**List II**
A. Citric acid cycle	I. Cytoplasm
B. Glycolysis	II. Mitochondrial matrix
C. Electron transport system	III. Intermembrane space of mitochondria
D. Proton gradient	IV. Inner mitochondrial membrane

Choose the correct answer from the options given below:

(1) A-II, B-I, C-IV, D-III
(2) A-III, B-IV, C-I, D-II
(3) A-IV, B-III, C-II, D-I
(4) A-I, B-II, C-III, D-IV

143. Match List I with List II:

List I	**List II**
A. Frederick Griffith	I. Genetic code
B. Francois Jacob & Jacque Monod	II. Semi-conservative mode of DNA replication
C. Har Gobind Khorana	III. Transformation
D. Meseison & Stahl	IV. Lac operon

Choose the correct answer from the options given below:

(1) A-III, B-IV, C-I, D-II
(2) A-II, B-III, C-IV, D-I
(3) A-IV, B-I, C-II, D-III
(4) A-III, B-II, C-I, D-IV

144. Match List I with List II:

List I (Types of Stamens)	**List II (Example)**
A. Monadelphous	I. Citrus
B. Diadelphous	II. Pea
C. Polyadelphous	III. Lily
D. Epiphyllous	IV. China-rose

Choose the correct answer from the options given below:

(1) A-IV, B-I, C-II, D-III
(2) A-I, B-II, C-IV, D-III
(3) A-III, B-I, C-IV, D-II
(4) A-IV, B-II, C-I, D-III

145. Identify the correct description about the given figure:

(1) Water pollinated flowers showing stamens with mucilaginous covering.
(2) Cleistogamous flowers showing autogamy.
(3) Compact inflorescence showing complete autogamy.
(4) Wind pollinated plant inflorescence showing flowers with well-exposed stamens.

146. Match List I with List II:

List I	**List II**
A. GLUT-4	I. Hormone
B. Insulin	II. Enzyme
C. Trypsin	III. Intercellular ground substance
D. Collagen	IV. Enables glucose transport into cells

Choose the correct answer from the options given below:

(1) A-I, B-II, C-III, D-IV
(2) A-II, B-III, C-IV, D-I
(3) A-III, B-IV, C-I, D-II
(4) A-IV, B-I, C-II, D-III

147. Identify the step in the tricarboxylic acid cycle that does not involve oxidation of the substrate:

(1) Succinic acid → Malic acid
(2) Succinyl-CoA → Succinic acid
(3) Isocitrate → α-ketoglutaric acid
(4) Malic acid → Oxaloacetic acid

148. Spraying sugarcane crops with which plant growth regulator increases the length of stems, thereby enhancing yield?

(1) Gibberellin
(2) Cytokinin
(3) Abscisic acid
(4) Auxin

149. Match List I with List II:

List I	**List II**
A. Rose	I. Twisted aestivation
B. Pea	II. Perigynous flower
C. Cotton	III. Drupe
D. Mango	IV. Marginal placentation

Choose the correct answer from the options given below:

(1) A-I, B-II, C-III, D-IV
(2) A-IV, B-III, C-II, D-I
(3) A-II, B-III, C-IV, D-I
(4) A-II, B-IV, C-I, D-III

150. Which of the following statements is correct regarding the process of replication in E.coli?

(1) The DNA-dependent RNA polymerase catalyzes polymerization in one direction, 5'→3'.

(2) The DNA-dependent DNA polymerase catalyzes polymerization in both 5'→3' and 3'→5' directions.

(3) The DNA-dependent DNA polymerase catalyzes polymerization in the 5'→3' direction.

(4) The DNA-dependent DNA polymerase catalyzes polymerization in one direction, 3'→5'.

151. Match List I with List II:

List I	**List II**
A. Pons	I. Provides additional space for Neurons, regulates posture and balance.
B. Hypothalamus	II. Controls respiration and gastric secretions.
C. Medulla	III. Connects different regions of the brain.
D. Cerebellum	IV. Neuro secretory cells

Choose the correct answer from the options given below:

(1) A-III, B-IV, C-II, D-I
(2) A-I, B-III, C-II, D-IV
(3) A-II, B-I, C-III, D-IV
(4) A-II, B-III, C-I, D-IV

152. Which of the following is not a component of Fallopian tube?

(1) Isthmus
(2) Infundibulum
(3) Ampulla
(4) Uterine fundus

153. The "Ti plasmid" of Agrobacterium tumefaciens stands for:

(1) Tumor independent plasmid
(2) Tumor inducing plasmid
(3) Temperature independent plasmid
(4) Tumor inhibiting plasmid

154. Match List I with List II:

List I	**List II**
A. Expiratory capacity	I. Expiratory reserve volume + Tidal volume + Inspiratory reserve volume
B. Functional residual capacity	II. Tidal volume + Expiratory reserve volume
C. Vital capacity	III. Tidal volume + Inspiratory reserve volume
D. Inspiratory capacity	IV. Expiratory reserve volume + Residual volume

Choose the correct answer from the options given below:

(1) A-III, B-II, C-IV, D-I
(2) A-II, B-I, C-IV, D-III
(3) A-I, B-III, C-II, D-IV
(4) A-II, B-IV, C-I, D-III

155. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: FSH acts upon ovarian follicles in females and Leydig cells in males.
Reason R: Growing ovarian follicles secrete estrogen in females while interstitial cells secrete androgen in male human beings.

Choose the correct answer from the options given below:

(1) Both A and R are true but R is NOT the correct explanation of A
(2) A is true but R is false
(3) A is false but R is true
(4) Both A and R are true and R is the correct explanation of A

156. Match List I with List II:

List I	**List II**
A. Lipase	I. Peptide bond
B. Nuclease	II. Ester bond
C. Protease	III. Glycosidic bond
D. Amylase	IV. Phosphodiester bond

Choose the correct answer from the options given below:

(1) A-III, B-II, C-I, D-IV
(2) A-II, B-IV, C-I, D-III
(3) A-IV, B-I, C-III, D-II
(4) A-IV, B-II, C-III, D-I

157. Given below are some stages of human evolution. Arrange them in correct sequence (Past to Recent):

A. Homo habilis
B. Homo sapiens
C. Homo neanderthalensis
D. Homo erectus

Choose the correct sequence of human evolution from the options given below:

(1) B-A-D-C
(2) C-B-D-A
(3) A-D-C-B
(4) D-A-C-B

158. Which of the following are Autoimmune disorders?

A. Myasthenia gravis
B. Rheumatoid arthritis
C. Gout
D. Muscular dystrophy
E. Systemic Lupus Erythematosus (SLE)

Choose the most appropriate answer from the options given below:

(1) A, B, E only
(2) B, C, E only
(3) C, D, E only
(4) A, B, D only

159. Match List I with List II:

List I	**List II**
A. Common cold	I. Plasmodium
B. Haemozoin	II. Typhoid
C. Widal test	III. Rhinoviruses
D. Allergy	IV. Dust mites

Choose the correct answer from the options given below:

(1) A-I, B-III, C-II, D-IV
(2) A-III, B-I, C-II, D-IV
(3) A-IV, B-II, C-III, D-I
(4) A-II, B-IV, C-III, D-I

160. Match List I with List II:

List I	**List II**
A. Axoneme	I. Centriole
B. Cartwheel pattern	II. Cilia and flagella
C. Crista	III. Chromosome

List I	List II
D. Satellite	IV. Mitochondria

Choose the correct answer from the options given below:

(1) A-IV, B-II, C-III, D-I
(2) A-II, B-IV, C-I, D-III
(3) A-II, B-I, C-IV, D-III
(4) A-IV, B-III, C-II, D-I

161. Match List I with List II:

List I	List II
A. Pleurobrachia	I. Mollusca
B. Radula	II. Ctenophora
C. Stomochord	III. Osteichthyes
D. Air bladder	IV. Hemichordata

Choose the correct answer from the options given below:

(1) A-II, B-I, C-IV, D-III
(2) A-II, B-IV, C-I, D-III
(3) A-IV, B-III, C-II, D-I
(4) A-IV, B-II, C-III, D-I

162. Three types of muscles are given as a, b, and c. Identify the correct matching pair along with their location in the human body:

(a) (b) (c)

(1) (a) Skeletal - Triceps
(b) Smooth – Stomach
(c) Cardiac – Heart
(2) (a) Skeletal - Biceps
(b) Involuntary – Intestine
(c) Smooth – Heart
(3) (a) Involuntary – Nose tip
(b) Skeletal – Bone
(c) Cardiac – Heart

(4) (a) Smooth - Toes
(b) Skeletal – Legs
(c) Cardiac – Heart

163. Match List I with List II:

List I (Sub Phases of Prophase I)	**List II (Specific Characters)**
A. Diakinesis	I. Synaptonemal complex formation
B. Pachytene	II. Completion of terminalisation of chiasmata
C. Zygotene	III. Chromosomes look like thin threads
D. Leptotene	IV. Appearance of recombination nodules

Choose the correct answer from the options given below:

(1) A-I, B-II, C-IV, D-III
(2) A-II, B-IV, C-I, D-III
(3) A-IV, B-III, C-II, D-I
(4) A-IV, B-II, C-III, D-I

164.

List I	**List II**
A. Down's syndrome	I. 11th chromosome
B. α-Thalassemia	II. 'X' chromosome
C. β-Thalassemia	III. 21st chromosome
D. Klinefelter's syndrome	IV. 16th chromosome

Choose the correct answer from the options given below:

(1) A-II, B-III, C-IV, D-I
(2) A-III, B-IV, C-I, D-II
(3) A-IV, B-I, C-II, D-III
(4) A-I, B-II, C-III, D-IV

165. Which of the following statements is incorrect?

(1) Most commonly used bio-reactors are of stirring type
(2) Bio-reactors are used to produce small-scale bacterial cultures
(3) Bio-reactors have an agitator system, an oxygen delivery system, and a foam control system
(4) A bio-reactor provides optimal growth conditions for achieving the desired product

166. Match List I with List II:

List I	**List II**
A. Pterophyllum	I. Hag fish
B. Myxine	II. Saw fish
C. Prisils	III. Angel fish
D. Exooetus	IV. Flying fish

Choose the correct answer from the options given below:

(1) A-III, B-I, C-II, D-IV
(2) A-IV, B-I, C-II, D-III
(3) A-III, B-II, C-I, D-IV
(4) A-II, B-I, C-III, D-IV

167. The following diagram shows restriction sites in E. coli cloning vector pBR322. Find the role of 'X' and 'Y' genes:

(1) The gene 'X' is responsible for controlling the copy number of the linked DNA, and 'Y' for the protein involved in the replication of plasmid.
(2) The gene 'X' is for the protein involved in the replication of plasmid, and 'Y' for resistance to antibiotics.
(3) Gene 'X' is responsible for recognition sites, and 'Y' is responsible for antibiotic resistance.
(4) The gene 'X' is responsible for resistance to antibiotics, and 'Y' for the protein involved in the replication of plasmid.

168. Given below are two statements:

Statement I: The presence or absence of hymen is not a reliable indicator of virginity.
Statement II: The hymen is torn during the first coitus only.

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

(1) Both Statement I and Statement II are false
(2) Statement I is true but Statement II is false

(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

169. Consider the following statements:

A. Annelids are true coelomates
B. Poriferans are pseudocoelomates
C. Aschelminthes are acoelomates
D. Platyhelminthes are pseudocoelomates

Choose the correct answer from the options given below:

(1) A only
(2) C only
(3) D only
(4) B only

170. Given below are two statements:

Statement I: In the nephron, the descending limb of the loop of Henle is impermeable to water and permeable to electrolytes.
Statement II: The proximal convoluted tubule is lined by simple columnar brush border epithelium, which increases the surface area for reabsorption.

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

(1) Both Statement I and Statement II are false
(2) Statement I is true but Statement II is false
(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

171. Following are the stages of cell division:

A. Gap 2 phase
B. Cytokinesis
C. Synthesis phase
D. Karyokinesis
E. Gap 1 phase

Choose the correct sequence of stages from the options given below:

(1) E-B-D-A-C
(2) B-D-E-A-C

(3) E-C-A-D-B
(4) C-E-D-A-B

172. In both sexes of cockroach, a pair of jointed filamentous structures called anal cerci are present on:

(1) 10th segment
(2) 8th and 9th segment
(3) 11th segment
(4) 5th segment

173. Match List I with List II:

List I	**List II**
A. Fibrous joints	I. Adjacent vertebrae, limited movement
B. Cartilaginous joints	II. Humerus and Pectoral girdle, rotational movement
C. Hinge joints	III. Skull, don't allow any movement
D. Ball and socket joints	IV. Knee, help in locomotion

Choose the correct answer from the options given below:

(1) A-I, B-III, C-II, D-IV
(2) A-II, B-III, C-I, D-IV
(3) A-III, B-I, C-IV, D-II
(4) A-IV, B-II, C-III, D-I

174. Which of the following is not a steroid hormone?

(1) Testosterone
(2) Progesterone
(3) Glucagon
(4) Cortisol

175. Following are the stages of pathway for conduction of an action potential through the heart:

A. AV bundle
B. Purkinje fibres
C. AV node

D. Bundle branches
E. SA node

Choose the correct sequence of pathway from the options given below:

(1) A-E-C-B-D
(2) B-D-E-C-A
(3) E-A-D-B-C
(4) E-C-A-D-B

176. Match List I with List II:

List I	**List II**
A. Non-medicated IUD	I. Multiload 375
B. Copper releasing IUD	II. Progestogens
C. Hormone releasing IUD	III. Lippes loop
D. Implants	IV. LNG-20

Choose the correct answer from the options given below:

(1) A-I, B-III, C-IV, D-II
(2) A-IV, B-I, C-II, D-III
(3) A-III, B-I, C-IV, D-II
(4) A-III, B-I, C-II, D-IV

177. Which of the following is not a natural/traditional contraceptive method?

(1) Periodic abstinence
(2) Lactational amenorrhea
(3) Vaults
(4) Coitus interruptus

178. Which one is the correct product of DNA-dependent RNA polymerase for the given template?

3'TACATGGCAAATATCCATTCA5'

(1) 5'AUGUAAAGUUUAUAGGUAAGU3'
(2) 5'AUGUACCGUUUAUAGGGAAGU3'

(3) 5'ATGTACCGTTTATAGGTAAGT3'
(4) 5'AUGUACCGUUUAUAGGUAAGU3'

179. Which one of the following factors will not affect the Hardy-Weinberg equilibrium?

(1) Genetic drift
(2) Gene migration
(3) Constant gene pool
(4) Genetic recombination

180. Match List I with List II:

List I	**List II**
A. Cocaine	I. Effective sedative in surgery
B. Heroin	II. Cannabis sativa
C. Morphine	III. Erythroxylum
D. Marijuana	IV. Papaver somniferum

Choose the correct answer from the options given below:

(1) A-I, B-III, C-II, D-IV
(2) A-IV, B-I, C-III, D-II
(3) A-III, B-IV, C-I, D-II
(4) A-II, B-IV, C-III, D-I

181. Match List I with List II:

List I	**List II**
A. Typhoid	I. Fungus
B. Leishmaniasis	II. Nematode
C. Ringworm	III. Protozoa
D. Filariasis	IV. Bacteria

(1) A-I, B-II, C-III, D-IV
(2) A-II, B-III, C-IV, D-I

(3) A-IV, B-I, C-II, D-III
(4) A-III, B-IV, C-I, D-II

182. Match List I with List II:

List I	**List II**
A. α–I antitrypsin	I. Cotton bollworm
B. Cry IAb	II. ADA deficiency
C. Cry IAc	III. Emphysema
D. Enzyme replacement therapy	IV. Corn borer

(1) A-III, B-I, C-II, D-IV
(2) A-III, B-IV, C-I, D-II
(3) A-II, B-I, C-IV, D-III
(4) A-II, B-I, C-III, D-IV

183. Assertion-Reason Question:

Assertion (A): Breastfeeding during the initial period of infant growth is recommended by doctors for a healthy baby.
Reason (R): Colostrum contains several antibodies essential for developing resistance in the newborn baby.

(1) Both A and R are correct but R is NOT the correct explanation of A
(2) A is correct but R is not correct
(3) A is not correct but R is correct
(4) Both A and R are correct and R is the correct explanation of A

184. The flippers of Penguins and Dolphins are examples of:

(1) Natural selection
(2) Convergent evolution
(3) Divergent evolution
(4) Adaptive radiation

185. Which of the following factors favor the formation of oxyhemoglobin in alveoli?

(1) High pO_2 and lesser H^+ concentration
(2) Low pCO_2 and high H^+ concentration

(3) Low pCO_2 and high temperature
(4) High pO_2 and high pCO_2

186. Match List I with List II:

List I	**List II**
A. Unicellular glandular epithelium	I. Salivary glands
B. Compound epithelium	II. Pancreas
C. Multicellular glandular epithelium	III. Goblet cells of alimentary canal
D. Endocrine glandular epithelium	IV. Moist surface of buccal cavity

(1) A-III, B-II, C-IV, D-I
(2) A-III, B-IV, C-I, D-II
(3) A-I, B-III, C-II, D-IV
(4) A-II, B-I, C-III, D-IV

187. Choose the correct statement regarding juxtamedullary nephrons:

(1) Renal corpuscle of juxtamedullary nephron lies in the outer portion of the renal medulla.
(2) The loop of Henle of the juxtamedullary nephron runs deep into the medulla.
(3) Juxtamedullary nephrons outnumber cortical nephrons.
(4) Juxtamedullary nephrons are located in the columns of Bertini.

188. Identify the correct roles of components (A), (B), (C), and (D) in spermatogenesis:

GnRH

LH (A)

↓ ↓

(B) (C)

↓ ↓

Androgens Factors

Formation of spermatids (D)

(1) ICSH, Interstitial cells, Leydig cells, spermiogenesis
(2) FSH, Sertoli cells, Leydig cells, spermatogenesis
(3) ICSH, Leydig cells, Sertoli cells, spermatogenesis
(4) FSH, Leydig cells, Sertoli cells, spermiogenesis

189. Match List I with List II:

List I	**List II**
A. P wave	I. Heart muscles are electrically silent.
B. QRS complex	II. Depolarisation of ventricles.
C. T wave	III. Depolarisation of atria.
D. T-P gap	IV. Repolarisation of ventricles.

(1) A-I, B-II, C-III, D-IV
(2) A-II, B-I, C-IV, D-III
(3) A-III, B-II, C-IV, D-I
(4) A-I, B-III, C-II, D-IV

190. Given below are two statements:

Statement I: Bone marrow is the main lymphoid organ where all blood cells, including lymphocytes, are produced.
Statement II: Both bone marrow and thymus provide microenvironments for the development and maturation of T-lymphocytes.

(1) Both Statement I and Statement II are false
(2) Statement I is true but Statement II is false
(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

191. Given below are two statements:

Statement I: Gause's competitive exclusion principle states that two closely related species competing for different resources cannot exist indefinitely.
Statement II: According to Gause's principle, during competition, the inferior will be eliminated. This may be true if resources are limited.

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

(1) Both Statement I and Statement II are false
(2) Statement I is true but Statement II is false
(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

192. Match List I with List II:

List I	**List II**
A. Exophthalmic goiter	i. Excess secretion of cortisol, moon face & hyperglycemia.
B. Acromegaly	ii. Hypo-secretion of thyroid hormone and stunted growth.
C. Cushing's syndrome	iii. Hyper secretion of thyroid hormone & protruding eye balls.
D. Cretinism	IV. Excessive secretion of growth hormone.

(1) A-IV, B-II, C-I, D-III
(2) A-III, B-IV, C-II, D-I
(3) A-III, B-IV, C-I, D-II
(4) A-I, B-III, C-II, D-IV

193. Match List I with List II related to the digestive system of cockroach:

List I	**List II**
A. The structures used for storing of food	I. Gizzard
B. Ring of 6-8 blind tubules at junction of foregut and midgut.	II. Gastric Caeca
C. Ring of 100-150 yellow coloured thin filaments at junction of midgut and hindgut.	III. Malpighian tubules
D. The structures used for grinding the food.	IV. Crop

(1) A-I, B-IV, C-II, D-III
(2) A-II, B-I, C-IV, D-III
(3) A-IV, B-II, C-III, D-I
(4) A-I, B-III, C-IV, D-II

194. As per ABO blood grouping system, the blood group of father is B+, mother is A+, and child is O+. Their respective genotype can be:

(1) B only
(2) C & B only
(3) D & E only
(4) A only

195. Match List I with List II:

List I	**List II**
A. RNA polymerase III	I. snRNPs
B. Termination of transcription	II. Promoter
C. Splicing of Exons	III. Rho factor
D. TATA box	IV. SnRNAs, tRNA

(1) A-III, B-II, C-IV, D-I
(2) A-III, B-IV, C-I, D-II
(3) A-IV, B-III, C-I, D-II
(4) A-II, B-IV, C-I, D-III

196. Match List I with List II:

List I	**List II**
A. Mesozoic Era	I. Lower invertebrates
B. Proterozoic Era	II. Fish & Amphibia
C. Cenozoic Era	III. Birds & Reptiles
D. Paleozoic Era	IV. Mammals

(1) A-III, B-I, C-II, D-IV
(2) A-I, B-II, C-IV, D-III
(3) A-III, B-I, C-IV, D-II
(4) A-II, B-I, C-III, D-IV

197. Given below are two statements:

Statement I: The cerebral hemispheres are connected by a nerve tract known as the corpus callosum.
Statement II: The brain stem consists of the medulla oblongata, pons, and cerebrum.

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

(1) Both Statement I and Statement II are incorrect.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Both Statement I and Statement II are correct.

198. Regarding the catalytic cycle of an enzyme action, select the correct sequential steps:

A. Substrate-enzyme complex formation.
B. Free enzyme ready to bind with another substrate.
C. Release of products.
D. Chemical bonds of the substrate broken.
E. Substrate binding to active site.

(1) A, E, B, D, C
(2) B, A, C, D, E
(3) E, D, C, B, A
(4) E, A, D, C, B

199. Given below are two statements:

Statement I: Mitochondria and chloroplasts are both double-membrane bound organelles.
Statement II: The inner membrane of mitochondria is relatively less permeable compared to chloroplasts.

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

(1) Both Statement I and Statement II are incorrect.
(2) Statement I is correct but Statement II is incorrect.
(3) Statement I is incorrect but Statement II is correct.
(4) Both Statement I and Statement II are correct.

200. The following are the statements about non-chordates:

A. Pharynx is perforated by gill slits.
B. Notochord is absent.
C. The central nervous system is dorsal.

D. Heart is dorsal if present.
E. Post-anal tail is absent.

Choose the most appropriate answer from the options given below:

(1) A, B & D only
(2) B, D & E only
(3) B, C & D only
(4) A & C only

End of Question Paper