VIDYAM CLASSES
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(A New Venture by Senior Teachers of Janakpuri-Delhi)

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TEST BOOKLET NO.109

TEST BOOKLET CODE

ROLL NUMBER

Test Series - NEET

TEST - 09

NEET(UG)-2026

T-09

Do not open this Test Booklet until you are asked to do so.

Syllabus

Physics: Modern Physics
Chemistry : *p*-block Elements (complete), *d* & *f* block elements, Coordination Chemistry
Biology : Ecosystem Biodiversity & Conservation, Biotechnology: Principles and Processes, Biotechnology and its Applications

Important Instructions :

1. This test is of **3 Hours** duration.
2. The Test Booklet contains **180** multiple-choice questions [four options **(1), (2), (3) & (4)** with a single correct answer] from **Physics (45 Questions), Chemistry (45 Questions)** & **Biology (90 Questions).**
   All questions are compulsory.
3. Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, **1** mark will be deducted from the total score. No mark will be deducted for the questions which have not been answered. The maximum marks is **720**.
4. Use **Blue/Black Ball Point Pen only** for writing particulars on this page/special Answer Sheet (OMR).
5. Do not encode or darken more than one circle for answering a particular question for it will be treated as a wrong answer.
6. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
7. Calculators, Slide Rules, Log Tables, Geometry Box, Electronic Digital Watches with facilities of calculators, cellular phones, pagers or any other electronic gadget are not allowed inside the Examination Hall.

Name of the Candidate (in Capital) : _____

Centre Name (in Capital) : _____ Date : _____

Candidate's Signature : _____ Invigilator's Signature : _____

PHYSICS

1. Rutherford's atomic model was unstable because **[NCERT Page 293, 294]**

(1) nuclei will break down

(2) electrons do not remain in orbit

(3) orbiting electrons radiate energy

(4) electrons are repelled by the nucleus

2. The wave number of a photon in Brackett series of hydrogen atom is 9/400 R, the electron has transited from the orbit having quantum number

(1) 5 (2) 6

(3) 4 (4) 7

3. A sub-atomic particle of mass 10^{-30} kg is moving with a velocity 2.21×10^6 m/s. Under the matter wave consideration, the particle will behave closely like _____.

[NCERT Page 285]

(1) Infra-red radiation (2) X-rays

(3) Gamma rays (4) Visible radiation

4. Fusion reactions take place at high temperature because **[NCERT Page 316]**

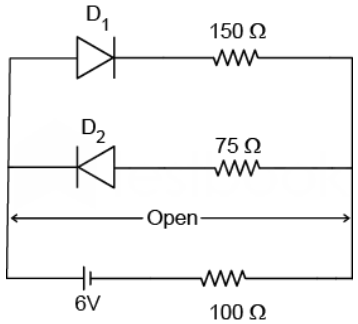
(1) atoms are ionized at high temperature

(2) molecules break up at high temperature

(3) nuclei break up at high temperature

(4) kinetic energy high enough to overcome repulsion between nuclei

5. The circuit shown below contains two ideal diodes, each with a forward resistance of 50 Ω. If the battery voltage is 6V, the current through the 100 Ω resistance (in Amperes) is



[NCERT Page 335, 336]

(1) 0.036 (2) 0.020

(3) 0.027 (4) 0.030

6. A proton of mass 'm_p' has same energy as that of a photon of wavelength 'λ'. If the proton is moving at non-relativistic speed, then ratio of its de-Broglie wavelength to the wavelength of photon is **[NCERT Page 283, 285]**

(1) $\frac{1}{c}\sqrt{\frac{2E}{m_p}}$ (2) $\frac{1}{c}\sqrt{\frac{E}{m_p}}$

(3) $\frac{1}{c}\sqrt{\frac{E}{2m_p}}$ (4) $\frac{1}{2c}\sqrt{\frac{E}{m_p}}$

7. An electron in the ground state of the hydrogen atom has the orbital radius 5.3×10^{-11} m while that for the electron in third excited state is 8.48×10^{-10} m. The ratio of the de-Broglie wavelengths of electron in the ground state to that in excited state is

(1) 1/4 (2) 1/9

(3) 1/3 (4) 1/16

8. The threshold frequency of a metal is f_0. When the light of frequency $2f_0$ is incident on the metal plate, the maximum velocity of photoelectrons is v_1. When the frequency of incident radiation is increased to $5f_0$, the maximum velocity of photoelectrons emitted is v_2. The ratio of v_1 to v_2 is

(1) $\frac{v_1}{v_2} = \frac{1}{2}$ (2) $\frac{v_1}{v_2} = \frac{1}{8}$

(3) $\frac{v_1}{v_2} = \frac{1}{4}$ (4) $\frac{v_1}{v_2} = \frac{1}{16}$

9. What is the conductivity of a semiconductor sample having electron concentration of 5×10^{18} m^{-3}, hole concentration of 5×10^{19} m^{-3}, electron mobility of 2.0 $m^2 V^{-1} s^{-1}$ and hole mobility of 0.01 $m^2V^{-1} s^{-1}$?

[NCERT Page 234]

(1) 1.68 $(\Omega - m)^{-1}$ (2) 1.83 $(\Omega - m)^{-1}$

(3) 0.59 $(\Omega - m)^{-1}$ (4) 1.20 $(\Omega - m)^{-1}$

10. The energy level of a certain atom for first, second and third levels are E, $4\frac{E}{3}$ and $2E$ respectively. A photon of wavelength λ is emitted for a transition $3 \rightarrow 1$. What will be the

wavelength of emission for transition 2 → 1?

(1) λ/3 (2) 3λ

(3) 3λ/4 (4) 4λ/3

11. Calculate the neutron separation energy from the following data : $m(^{40}_{20}Ca) = 39.962591\,u$; $m(^{41}_{20}Ca) = 40.962278\,u$; $m_n = 1.00865, 1u = 931.5\,MeV/C^2$

[NCERT Page 311]

(1) 7.57 MeV (2) 8.35 MeV

(3) 9.12 MeV (4) 9.56 MeV

12. Hydrogen ($_1H^1$), Deuterium ($_1H^2$), singly ionized Helium $(_2He^4)^+$ and double ionized lithium $(_3Li^6)^{++}$ all have one electron around the nucleus. Consider an electron transition from n = 2 to n = 1. If the wavelengths of emitted radiation are λ_1, λ_2, λ_3 and λ_4 respectively then approximately which one of the following is correct.

(1) $4\lambda_1 = 2\lambda_2 = 2\lambda_3 = \lambda_4$

(2) $\lambda_1 = 2\lambda_2 = 2\lambda_3 = \lambda_4$

(3) $\lambda_1 = \lambda_2 = 4\lambda_3 = 9\lambda_4$

(4) $\lambda_1 = 2\lambda_2 = 3\lambda_3 = 4\lambda_4$

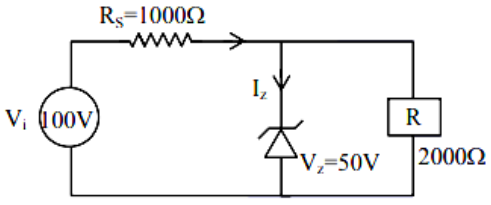
13. An electron of a hydrogen like atom, having Z = 4, jumps from 4th energy state to 2nd energy state. The energy released in this process, will be **[NCERT Page 299]**

(Given Rch = 13.6 eV) ; Where R = Rydberg constant, c = Speed of light in vacuum, h = Planck's constant

(1) 10.5 eV (2) 13.6 eV

(3) 3.4 eV (4) 40.8 eV

14. For the circuit shown below, calculate the value of I_Z :



(1) 25 mA (2) 0.15 A

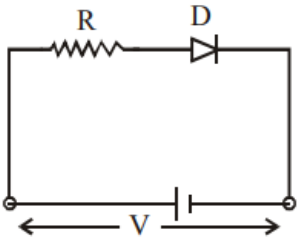
(3) 0.1 A (4) 0.05 A

15. For a hydrogen atom, the ratio of the largest wavelength of Lyman series to that of the Balmer series is

(1) 5 : 36 (2) 5 : 27

(3) 3 : 4 (4) 27 : 5

16. A d.c. battery of V volt is connected to a series combination of a resistor R and an ideal diode D as shown in the figure below. The potential difference across R will be



(1) 2V when diode is forward biased

(2) zero when diode is forward biased

(3) V when diode is reverse biased

(4) V when diode is forward biased

17. The mass of a ^7_3Li nucleus is 0.042 u less than the sum of the masses of all its nucleons. The binding energy per nucleon of ^7_3Li nucleus is nearly **[NCERT Page 311, 312]**

(1) 23 MeV (2) 46 MeV

(3) 5.6 MeV (4) 3.9 MeV

18. If ν_1 is the frequency of the series limit of Lyman series, ν_2 is the frequency of the first line of Lyman series and ν_3 is the frequency of the series limit of the Balmer series then

(1) $\nu_1 - \nu_2 = \nu_3$

(2) $\nu_1 = \nu_2 - \nu_3$

(3) $\frac{1}{\nu_2} = \frac{1}{\nu_1} + \frac{1}{\nu_3}$

(4) $\frac{1}{\nu_1} = \frac{1}{\nu_2} + \frac{1}{\nu_3}$

19. The ratio of the magnitude of the kinetic energy to the potential energy of an electron in the 5th excited state of a hydrogen atom is

[NCERT Page 296]

(1) 4 (2) 1/4

(3) 1/2 (4) 1

20. In Bohr model of hydrogen atom, let P.E. represents potential energy and T.E. represents the total energy. In going to a higher level.

(1) P. E. decreases, T.E. increases

(2) P. E. increases, T.E. decreases

(3) P. E. decreases, T.E. decreases

(4) P. E. increases, T.E. increases

21. The ratio of volume of Al^{27} nucleus to its surface area is (Given $R_0 = 1.2 \times 10^{-15}$m)

(1) 2.1×10^{-15} m (2) 1.3×10^{-15} m

(3) 0.22×10^{-15} m (4) 1.2×10^{-15} m

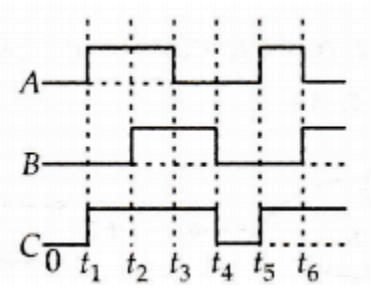
22. An electron in the hydrogen atom initially in the fourth excited state makes a transition to nth energy state by emitting a photon of energy 2.86 eV. The integer value of n will be _____.

[NCERT Page 299]

(1) 1 (2) 2

(3) 3 (4) 4

23. The figure shows a logic circuit with two inputs *A* and *B* and the output *C*. The voltage wave forms across *A*, *B* and *C* are as given. The logic gate circuit is



(1) OR gate (2) NOR gate

(3) AND gate (4) NAND gate

24. In Li^{++}, electron in first Bohr orbit is excited to a level by a radiation of wavelength λ. When the ion gets deexcited to the ground state in all possible ways (including intermediate emissions), a total of six spectral lines are observed. What is the value of λ? (Given : $h = 6.63 \times 10^{-34}$ Js; $c = 3 \times 10^8$ ms^{-1})

[NCERT Page 299, 200]

(1) 11.4 nm (2) 9.4 nm

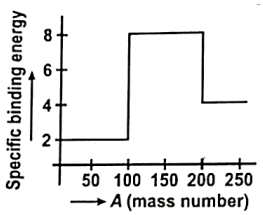
(3) 12.3 nm (4) 10.8 nm

25. A photo-emissive substance is illuminated with a radiation of wavelength λ_i, so that it releases electrons with de-Broglie wavelength λ. The longest wavelength of radiation that can emit photoelectron is λ_e. Expression for de-Broglie wavelength is given by: (m : mass of the electron, h: Planck's constant and c: speed of light) **[NCERT Page 281, 285]**

(1) $\lambda_e = \sqrt{\frac{h}{2mc\left(\frac{1}{\lambda_i}-\frac{1}{\lambda_0}\right)}}$ (2) $\lambda_e = \sqrt{\frac{h\lambda_0}{2mc}}$

(3) $\lambda_e = \sqrt{\frac{h}{2mc\left(\frac{1}{\lambda_i}+\frac{1}{\lambda_0}\right)}}$ (4) $\lambda_e = \sqrt{\frac{h\lambda_i}{2mc}}$

26. Assume the graph of specific binding energy versus mass number is as shown in the figure. Using this graph, select the correct choice from the following: **[NCERT Page 312, 315, 316]**



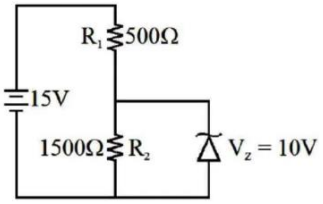
(1) Fusion of two nuclei of mass number lying in the range of 100 < A < 200 will release energy.

(2) Fusion of two nuclei of mass number lying in the range of 51 < A < 100 will release energy.

(3) Fusion of two nuclei of mass number lying in the range of 1 < A < 50 will release energy.

(4) Fusion of the nucleus of mass number lying in the range of 100 < A < 200 will release energy when broken into two fragments.

27. In the given circuit, the current through Zener diode is



(1) 2.5 mA (2) 3.3 mA

(3) 5.5 mA (4) 6.7 mA

28. A proton, a neutron, an electron and an α-particle have same energy. Then, their de-Broglie wavelengths compare as

[NCERT Page 285]

(1) $\lambda_p = \lambda_n > \lambda_e > \lambda_\alpha$

(2) $\lambda_\alpha < \lambda_p = \lambda_n < \lambda_e$

(3) $\lambda_e < \lambda_p = \lambda_n < \lambda_\alpha$

(4) $\lambda_e = \lambda_p = \lambda_n = \lambda_\alpha$

29. The ratio of the longest to shortest wavelengths in Brackett series of hydrogen spectra is

(1) 25/9 (2) 17/6

(3) 9/5 (4) 4/3

30. An electron accelerated through a potential difference V_1 has a de-Broglie wavelength of λ. When the potential is changed to V_2, its de-Broglie wavelength increases by 50%. The value of (V_1/V_2) is equal to

[NCERT Page 285]

(1) 3 (2) 9/4

(3) 3/2 (4) 4

31. Considering the Bohr model of hydrogen like atoms, the ratio of radius 5^{th} orbit of the electron in Li^{2+} and He^{+} is **[NCERT Page 299]**

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

(3) 9/4 (4) 2/3

32. The radius of a nucleus is

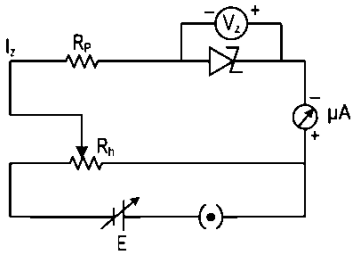
(1) Directly proportional to its mass number

(2) Inversely proportional to its atomic weight

(3) Directly proportional to the cube root of its mass number

(4) None of these

33. The circuit diagram used to study the characteristic curve of a Zener diode is connected to variable power supply (0-15 V) as shown in figure. A Zener diode with maximum potential V_Z = 10 V and maximum power dissipation of 0.4 W is connected across a potential divider arrangement. The value of resistance RP connected in series with the Zener diode to protect it from the damage is ____ Ω **[Practical]**



(1) 25 (2) 50

(3) 125 (4) 250

34. In a hypothetical fission reaction

$$_{92}X^{236} \rightarrow {}_{56}Y^{141} + {}_{36}Z^{92} + 3R$$

The identity of emitted particles (R) is

[NCERT Page 315]

(1) Proton

(2) Electron

(3) Neutron

(4) γ-radiations

35. The frequency of revolution of the electron in Bohr's orbit varies with n, the principal quantum number as **[NCERT Page 299]**

(1) 1/n (2) $1/n^3$

(3) $1/n^4$ (4) $1/n^2$

36. When the wavelength of radiation falling on a metal is changed from 500 nm to 200 nm, the maximum kinetic energy of the photoelectrons becomes three times larger. The work function of the metal is close to **[NCERT Page 281]**

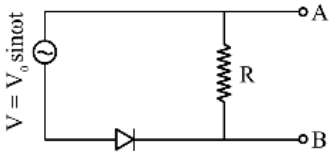
(1) 0.81 eV

(2) 1.02 eV

(3) 0.52 eV

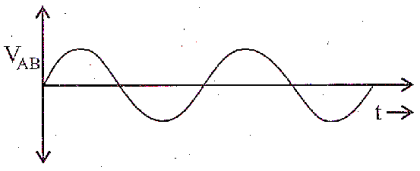
(4) 0.61 eV

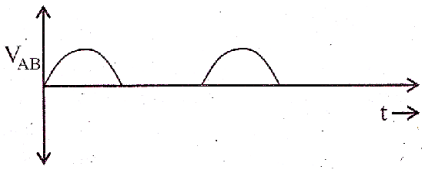
37. In the circuit shown here, assuming threshold voltage of diode is negligibly small, then voltage V_{AB} is correctly represented by

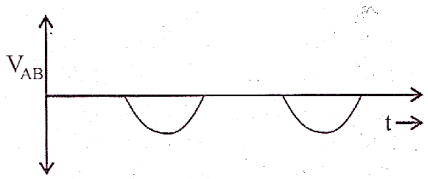


[NCERT Page 335, 336]

(1) V_{AB} would be zero at all times

(2) 

(3) 

(4) 

38. A nucleus at rest splits into two nuclear parts having radii in the ratio 1 : 2. Their velocities are in the ratio **[NCERT Page 309]**

(1) 6 : 1 (2) 2 : 1

(3) 8 : 1 (4) 4 : 1

39. A proton and an electron have the same de Broglie wavelength. If K_p and K_e be the kinetic energies of proton and electron respectively. Then choose the correct relation

(1) $K_p > K_e$ (2) $K_p = K_e$

(3) $K_p = K_e$ (4) $K_p < K_e$

40. A hydrogen atom in its ground state absorbs 10.2 eV of energy. The orbital angular momentum is increased by

[NCERT Page 299]

(1) 1.05×10^{-34} J-s (2) 3.16×10^{-34} J-s

(3) 2.11×10^{-34} J-s (4) 4.22×10^{-34} J-s

41. Consider the nuclear fission reaction:

$${}_0^1n + {}_{92}^{235}U \rightarrow {}_{56}^{144}Ba + {}_{36}^{89}Kr + 3{}_0^1n$$

Assuming all the kinetic energy is carried away by the fast neutrons only and total binding energies of ${}_{92}^{235}U$, ${}_{56}^{144}Ba$, ${}_{36}^{89}Kr$ and to be 1800 MeV, 1200 MeV and 780 MeV respectively, the average kinetic energy carried by each fast neutron is (in MeV)

[NCERT Page 315]

(1) 200 (2) 180

(3) 67 (4) 60

42. The impurity atoms with which pure silicon may be doped to make it a p-type semiconductor are those of

[NCERT Page 331]

(1) phosphorous (2) boron

(3) antimony (4) nitrogen

43. In a P-type semiconductor, the acceptor impurity produces an energy level

[NCERT Page 331, 332]

(1) Just below the valence band

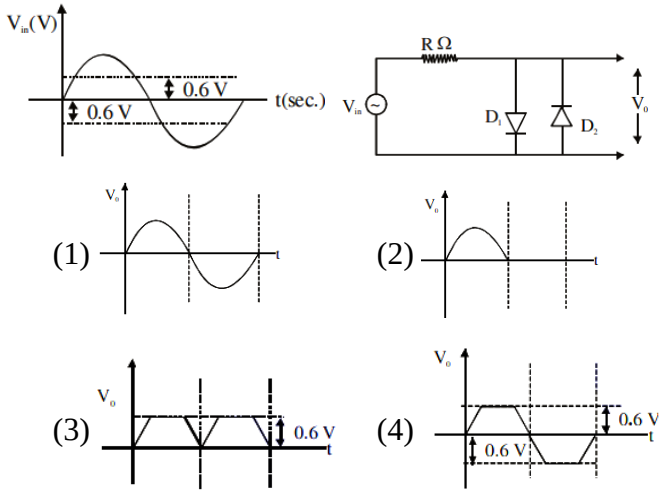
(2) Just above the conduction band

(3) Just below the conduction band

(4) Just above the valence band

44. In the given circuit the input voltage V_{in} is shown in figure. The cut-in voltage of *p-n* junction diode (D_1 or D_2) is 0.6 V. Which of the following output voltage (V_0) waveform across the diode is correct?

[NCERT Page 335, 336, 338, 339]



45. Light emitted during the de execution of electron from n = 3 to n = 2, when incident on a metal, photoelectrons are just emitted from that metal. In which of the following de excitations photoelectric effect is not possible?

[NCERT Page 299]

(1) From $n = 2$ to $n = 1$

(2) From $n = 3$ to $n = 1$

(3) From $n = 5$ to $n = 2$

(4) From $n = 4$ to $n = 3$

46. The metal that has very low melting point and its periodic position is closer to a metalloid is:

(1) Al (2) Ga

(3) Se (4) In

47. What is *x* in the following reaction?

$Al(s) + NaOH\ (aq) + H_2O\ (l) \rightarrow x + H_2(g)$

(1) $Na_2[Al(OH)_4]^-$ (2) $Na^+[Al(OH)_4]^-$

(3) $Na_2[Al(OH)_6]^-$ (4) $Na^+[Al(OH)_6]^-$

48. **Statement I:** Aluminum forms a very their oxide layer on its surface.

Statement II: Ionization energy increases from B to Al.

(1) Both statement I and II are correct.

(2) Both statement I and II are incorrect.

(3) Statement I is correct but statement II is incorrect.

(4) Statement II is correct but statement I is incorrect.

49. Which of the following statement(s) is/are not correct ?

(i) Valence shell electronic configuration of *p*-block elements is $ns^2\ np^{1\text{-}6}$.

(ii) Non-metals and metalloids exist only in the *p*-block of the periodic table.

(iii) In boron, carbon and nitrogen families the group oxidation state is the most stable state for the lighter elements in the group.

(iv) For heavier elements in each group, oxidation state two unit less than the group oxidation state becomes more stable due to inert pair effect.

(1) (ii) only (2) (ii), (iii) and (iv)

(3) (iii) and (iv)

(4) All given statements are correct

50. Which of the following statements is/are correct?

(i) Aluminum forms $[AlF_6]^{3-}$ ion while boron forms only $[BF_4]^-$ ion due to presence of *d*-orbitals in aluminum.

(ii) The first member of a group differs from the heavier members in its ability to form p_π-$p\pi$ multiple bonds to itself and to other second row elements. While heavier member forms d_π-p_π bonds.

(iii) *d*-orbitals contribute more to the overall stability of molecules than p_π-$p\pi$ bonding of second row elements.

(iv) The atomic radius of gallium is less than that of aluminum.

(1) (iii) & (iv)

(2) (ii) & (iv)

(3) (i), (ii) & (iv)

(4) (ii), (iii) & (iv)

51. Match **Column-I** with **Column-II**.

	Column-I		**Column-II**
(A)	Form only covalent compound	(p)	Pb
(B)	Form basic oxide	(q)	C
(C)	Form long chains	(r)	B
(D)	Shows +2 stable oxidation state	(s)	Tl

(1) A - (r), B - (s), C - (q), D - (p)

(2) A - (q), B - (p), C - (s), D - (r)

(3) A - (r), B - (q), C - (p), D - (s)

(4) A - (p), B - (s), C - (r), D - (q)

52. Match **Column-I** with **Column-II**.

	Column-I		**Column-II**
(A)	Pb^{4+}	(p)	Reducing agent in metallurgy
(B)	C	(q)	Non-reactive in crystalline
(C)	B	(r)	Oxidizing agent
(D)	Pb	(s)	Form amphoteric oxide

(1) A - (r), B - (s), C - (q), D - (p)

(2) A - (r), B - (p), C - (q), D - (s)

(3) A - (r), B - (q), C - (p), D - (s)

(4) A - (p), B - (s), C - (r), D - (q)

53. The stability of the hydrides follows the order

(1) $NH_3 > PH_3 > AsH_3 > SbH_3$

(2) $NH_3 < PH_3 < AsH_3 < SbH_3$

(3) $PH_3 > NH_3 > AsH_3 > SbH_3$

(4) $AsH_3 > NH_3 > PH_3 > SbH_3$

54. Dinitrogen and dioxygen, the main constituents of air do not react with each other in atmosphere to form oxides of nitrogen because

(1) N_2 is unreactive in the condition of atmosphere.

(2) Oxides of nitrogen are unstable.

(3) Reaction between them can occur in the presence of a catalyst.

(4) The reaction is endothermic and require very high temperature.

55. Nitrogen forms N_2, but phosphorus is found as P_4 the reason is

(1) Triple bond is present between phosphorus atom

(2) $p_\pi - p_\pi$ bonding is strong

(3) $p_\pi - p_\pi$ bonding is weak

(4) Multiple bond is formed easily

56. Among the following, the correct statement is

(1) Between NH_3, and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies spherical *s*-orbital and is less directional

(2) Between NH_3 and PH_3, PH_3 is a better electron donor because the lone pair of electrons occupies sp^3 orbital and is more directional.

(3) Between NH_3 and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies sp^3 orbital and is more directional.

(4) Between NH_3 and PH_3 PH_3 is a better electron donor because the lone pair of electrons occupies spherical *s*-orbital and is less directional.

57. Match **Column-I** with **Column-II**.

	Column-I		**Column-II**
(A)	Oxygen	(p)	Use in metallurgy and thermoelectric device
(B)	Sulphur	(q)	Used in photo copying and semiconductor
(C)	Selenium	(r)	Use in respiration & combustion
(D)	Tellurium	(s)	Use in vulcanization of rubber and as fungicide

(1) A - (p), B - (q), C - (r), D - (s)

(2) A - (r), B - (s), C - (q), D - (p)

(3) A - (p), B - (r), C - (q), D - (s)

(4) A - (r), B - (s), C - (p), D - (q)

58. Which of the following is most volatile?

(1) HI (2) HBr

(3) HCl (4) HF

59. In which case, the order of acidic strength is not correct?

(1) HI > HBr > HCl

(2) $HIO_4 > HBrO_4 > HC1O_4$

(3) $HClO_4 > HC1O_3 > HClO_2$

(4) $HF > H_2O > NH_3$

60. Which one of the following statements regarding helium is incorrect?

(1) It is used to produce and sustain powerful superconducting magnets.

(2) It is used as a cryogenic agent for carrying out experiments at low temperatures.

(3) It is used to fill gas balloons instead of hydrogen because it is lighter and non-inflammable.

(4) It is used in gas-cooled nuclear reactors.

61. Match **Column-I** with **Column-II**.

	Column-I		Column-II
(A)	It is used in discharge tube and fluorescent bulbs	(p)	He
(B)	It is used in modern diving apparatus	(q)	Ne
(C)	It is used to provide inert atmosphere for filling electrical bulbs	(r)	Liquid He
(D)	It is use as cryogenic agent	(s)	Ar

(1) A - (p), B - (s), C - (q), D - (r)

(2) A - (p), B - (q), C - (r), D - (s)

(3) A - (q), B - (p), C - (s), D - (r)

(4) A - (p), B - (r), C - (q), D - (s)

62. The basic character of the transition metal monoxides follows the order (Atomic No, Ti = 22, V = 23, Cr = 24, Fe = 26)

(1) TiO > VO > CrO > FeO

(2) VO > CrO > TIO > FeO

(3) CrO > VO > FeO > TiO

(4) TiO > FeO > VO > CrO

63. A blue colouration is not obtained when

(1) ammonium hydroxide dissolves in copper sulphate

(2) copper sulphate solution reacts with $K_4[Fe(CN)_6]$

(3) ferric chloride reacts with sod. Ferrocyanide

(4) anhydrous $CuSO_4$ is dissolved in water

64. Which of the following does not represent the correct order of the properties indicated?

(1) $Ni^{2+} > Cr^{2+} > Fe^{2+} > Mn^{2+}$ (size)

(2) Sc > Ti > Cr > Mn (size)

(3) $Mn^{2+} > Ni^{2+} < Co^{2+} < Fe^{2+}$ (unpaired electron)

(4) $Fe^{2+} > Co^{2+} > Ni^{2+} > Cu^{2+}$ (unpaired electron)

65. For *d*-block elements, the first ionization potential is of the order:

(1) Zn > Fe > Cu > Cr (2) Sc = Ti < V = Cr

(3) Zn < Cu < Ni < Co (4) V > Cr > Mn > Fe

66. Identify the incorrect statement.

(1) The transition metals and their compounds are known for their catalytic activity due to their ability to adopt multiple oxidation states and to form complexes.

(2) Interstitial compounds are those that are formed when small atoms like H, C or N are trapped inside the crystal lattices of metals.

(3) The oxidation states of chromium in CrO^{2-}_4 and Cr_2O_7 are not the same.

(4) Cr^{2+} (d^4) is a stronger reducing agent than Fe^{2+} (d^6) in water.

67. **Assertion:** Cu^{2+} in water is more stable than Cu^{+}.

Reason: Enthalpy of hydration for Cu^{2+} is more than that of Cu^{+}.

(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

(3) If the Assertion is correct but Reason is incorrect.

(4) If the Assertion is incorrect and Reason is correct.

68. Match **Column-I** with **Column-II**.

	Column-I (Ion)		Column-II ($\mu_{calculated}$)
(A)	Ti^{2+}	(p)	2.84
(B)	Zn^{2+}	(q)	5.92
(C)	Mn^{2+}	(r)	0
(D)	Fe^{2+}	(s)	4.90

(1) A - (s), B - (p), C - (q), D - (r)

(2) A - (r), B - (p), C - (q), D - (s)

(3) A - (p), B - (r), C - (q), D - (s)

(4) A - (p), B - (s), C - (q), D - (r)

69. $A \xrightarrow{4KOH,O_2} \underset{(Green)}{2B} + 2H_2O$

$B \xrightarrow{4\ HCl} \underset{(Purple)}{2C} + MnO_2 + 2H_2O$

$2C \xrightarrow{H_2O,KI} 2A + KOH + D$

In the above sequence of reactions, A and D, respectively, are

(1) KI and $KMnO_4$ (2) MnO_2 and KIO_3

(3) KIO_3 and MnO_2 (4) KI and K_2MnO_4

70. Identify correct statements from below:

A. The chromate ion is square planar.

B. Dichromates are generally prepared from chromates.

C. The green manganate ion is diamagnetic.

D. Dark green coloured K_2MnO_4 disproportionates in a neutral or acidic medium to give permanganate.

E. With increasing oxidation number of transition metal, ionic character of the oxides decreases.

Choose the correct answer from the options given below:

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

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

71. Match **Column-I** with **Column-II**.

	Column-I		**Column-II**
(A)	Compound formed when yellow CrO^{2-}_4 is acidified.	(p)	Acidified MnO_4^-
(B)	Reagent oxidises Fe^{2+} to Fe^{3+}	(q)	$Cr_2O_7^{2-}$
(C)	Compound produced when MnO_2 is fused with KNO_3 and KOH.	(r)	K_2MnO_4
(D)	Compound having dark purple crystals isostructural with $KClO_4$	(s)	$KMnO_4$

(1) A - (q), B - (p), C - (r), D - (s)

(2) A - (p), B - (q), C - (r), D - (s)

(3) A - (q), B - (r), C - (p), D - (s)

(4) A - (q), B - (p), C - (s), D - (r)

72. The correct order of ionic radii of Y^{3+}, La^{3+}, Eu^{3+} and Lu^{3+} is (Atomic nos. Y = 39, La = 57, Eu = 63, Lu = 71)

(1) $La^{3+} < Eu^{3+} < Lu^{3+} < Y^{3+}$

(2) $Y^{3+} < La^{3+} < Eu^{3+} < Lu^{3+}$

(3) $Y^{3+} < Lu^{3+} < Eu^{3+} < La^{3+}$

(4) $Lu^{3+} < Eu^{3+} < La^{3+} < Y^{3+}$

73. The hypothetical complex chloro di aquatri ammine cobalt (III) chloride can be represented as

(1) $[CoCl(NH_3)_3(H_2O)_2]Cl_2$

(2) $[Co(NH_3)_3(H_2O)Cl_3]$

(3) $[Co(NH_3)_3(H_2O)_2Cl]$

(4) $[Co(NH_3)_3(H_2O),]Cl_3$

74. Which one is the most likely structure of $CrCl_3 \cdot 6H_2O$ if 1/3 of total chlorine of the compound is precipitated by adding $AgNO_3$.

(1) $CrCl_3 \cdot 6H_2O$

(2) $[Cr(H_2O)_3C1_3] \cdot (H_2O)_3$

(3) $[CrCl_2(H_2O)]C1 \cdot 2H_2O$

(4) $[CrCl(H_2O)_5]C1 \cdot H_2O$

75. Consider the following complex $[Co(NH_3)CO_3]ClO_4$. The coordination number, oxidation number, number of *d*-electrons and number of unpaired *d*-electrons on the metal are respectively

(1) 6, 3, 6, 0 (2) 7, 2, 7, 1

(3) 7, 1, 6, 4 (4) 6, 2, 7, 3

76. The complex ion

$[Pt(NO_2)(Py)(NH_3)(NH_2OH)]$ will give

(1) 2 isomers (Geometrical)

(2) 3 isomers (Geometrical)

(3) 6 isomers (Geometrical)

(4) 4 isomers (Geometrical)

77. $[Co(NH_3)_4(NO_2)_2]Cl$ exhibits

(1) linkage isomerism, ionization isomerism and geometrical isomerism.

(2) ionization isomerism, geometrical isomerism and optical isomerism.

(3) linkage isomerism, geometrical isomerism and optical isomerism.

(4) linkage isomerism, ionization isomerism and optical isomerism.

78. Among the following complexes, optical activity is possible in

(1) $[Co(NH_3)_6]^{3+}$

(2) $[Co(H_2O)_2(NH_3)_2Cl_2]$

(3) $[Cr(H_2O)_2Cl_2]^+$

(4) $[Co(CN)_5NC]$

79. The number of geometrical isomers from $[Co(NH_3)_3(NO_2)_3]$ is

(1) 2 (2) 3

(3) 4 (4) 0

80. **Assertion:** The total number of geometrical isomers shown by $[Co(en)_2Cl_2]^+$ complex ion is three

Reason: $[Co(en)Cl_2]$ complex ion has an octahedral geometry.

(1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

(2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

(3) If the Assertion is correct but Reason is incorrect.

(4) If the Assertion is incorrect and Reason is correct.

81. Match each coordination compound in **List-I** with an appropriate pair of characteristics from **List- II** and select the correct answer using the code given below the lists. {en = $H_2NCH_2CH_2NH_2$; atomic numbers: Ti = 22 Cr = 24 Co = 27 Pt = 78}

	Column-I		**Column-II**
(A)	$[Cr(NH_3)_4Cl_2]Cl$	(p)	Paramagnetic and exhibits ionisation isomerism
(B)	$[Ti(H_2O)_3Cl](NO_3)_2$	(q)	Diamagnetic and exhibits *cis*-trans isomerism
(C)	$[Pt(en)(NH_3)CI]NO_3$	(r)	Paramagnetic and exhibits *cis-trans* isomerism
(D)	$[Co(NH_3)_4(NO_3)_2]NO_3$	(s)	Diamagnetic and exhibits ionisation isomerism

(1) A - (s), B - (q), C - (r), D - (p)

(2) A - (r), B - (p), C - (s), D - (q)

(3) A - (q), B - (p), C - (r), D - (s)

(4) A - (p), B - (r), C - (s), D - (q)

82. As aqueous solution of titanium bromide shows zero magnetic moment. Assuming the complex as octahedral in aqueous solution, the formula of the complex is

(1) $[TiBr]^-$ (2) $[Ti(H_2O)]Br_4$

(3) $[TiBr]^{2-}$ (4) $[Ti(H_2O)Br_2]$

83. Which one of the following cyano complexes would exhibit the lowest value of paramagnetic behaviour? (At. Nos: Cr = 24, Mn = 25, Fe = 26, Co = 27)

(1) $[Co(CN)_6]^{3-}$ (2) $[Fe(CN)_6]^{3-}$

(3) $[Mn(CN)_6]^{3-}$ (4) $[Cr(CN)_6]^{3-}$

84. Which of the following complex will show largest splitting of *d*-orbitals?

(1) $[Fe(CN)_6]_3$ (2) $[Fe(C_2O_4)_3]$

(3) $[FeF_6]^{3-}$ (4) $[Fe(NH_2)]^{3-}$

85. The correct statement about the magnetic properties of [Fe(CN)] and $[FeF]^3$ is (Z = 26) :

(1) both are paramagnetic.

(2) both are diamagnetic.

(3) $[Fe(CN)_6]^{3-}$ is diamagnetic, $[FeF_6]^{3-}$ is paramagnetic.

(4) $[Fe(CN)]_3$ is paramagnetic, $[FeF_6]^{3-}$ is diamagnetic.

86. Number of complexes with even number of electrons in t_{2g} orbitals is -

$[Fe(H_2O)]^{2+}$, $[Co(H_2O)_6]^{2+}$, $[Co(H_2O)_6]^{3+}$, $[Cu(H_2O)]^{2+}$, $[Cr(H_2O)]^{2+}$

(1) 1 (2) 3

(3) 2 (4) 5

87. The hybridization of central metal ion in $K_2[Ni(CN)_4]$ and $K_2[NiCl_4]$ are respectively

(1) dsp^2, sp^3 (2) sp^3, sp^3

(3) dsp^2, dsp^2 (4) sp^3, sp^3d^2

88. For a d^4metal ion in an octahedral field, the correct electronic configuration is

(1) $t_{2g}^3 e_g^1$ when $\Delta_0 < P$

(2) $t_{2g}^3 e_g^1$ when $\Delta_0 > P$

(3) $t_2^4 g e_g^0$ when $\Delta_0 < P$

(4) $e_g^2 t_{2g}^2$ when $\Delta_0 < P$

89. **Statement I:** $[Fe(CN)_6]^{3-}$ is weakly paramagnetic, while $[Fe(CN)_6]^{4-}$ is diamagnetic.

Statement II: $[Fe(CN)_6]^{3-}$ has +3 oxidation state while $[Fe(CN)_6]^{4-}$ has +2 oxidation state.

(1) Both statement I and II are correct.

(2) Both statement I and II are incorrect.

(3) Statement I is correct but statement II is incorrect.

(4) Statement II is correct but statement I is incorrect.

90. Which of the following statements related to crystal field splitting in octahedral coordination entities is incorrect?

(1) The $dx^2–y^2$ and dz^2 orbitals has more energy as compared to d_{xy}, d_{yz} and d_{xz} orbitals.

(2) Crystal field splitting energy (Δ_0) depends directly on the charge of the metal ion and on the field produced by the ligand.

(3) In the presence of Br^- as a ligand the distribution of electrons for d^4 configuration will be t_{2g}^3, e_g^1

(4) In the presence of CN^- as a ligand $\Delta_0 < P$.

BOTANY

91. Amazon rain forests are considered as lungs of the planet as they contribute of the total oxygen in the earth's atmosphere. **[NCERT Page 224]**

(1) 10% (2) 15%

(3) 20% (4) 30%

92. In the given equation: GPP-R = NPP, GPP is:

[NCERT Page 207]

(1) Gross primary productivity

(2) Net productivity

(3) Primary productivity (4) Oxygen loss

93. *Rauwolfia vomitoria* is an example of -

(1) Species diversity **[NCERT Page 217]**

(2) Genetic diversity

(3) Ecological diversity

(4) Community diversity

94. Who is regarded as the Father of Ecology in India, and what was one of his major contributions to ecological education? **[NCERT Page 189]**

(1) M.S. Swaminathan; Introduced GM crops in India

(2) Ramdeo Misra; Established the first postgraduate course in ecology in India

(3) Salim Ali; Founded the Bombay Natural History Society

(4) R. Mishra; Proposed the Chipko Movement

95. The breakdown of detritus into smaller particles by earthworm is a process called **[NCERT Page 207]**

(1) Humification (2) Fragmentation

(3) Mineralisation (4) Catalbolism

96. Match List-I with List-II. **[NCERT Page 225]**

	List-I		**List-II**
A.	Khasi and Jaintia hills	I.	Rajasthan
B.	Aravalli hills	II.	Madhya Pradesh

C.	Western ghat region	III.	Maharashtra
D.	Sarguja, Chanda and Bastar areas	IV.	Meghalaya

Choose the correct answer from the options given below:

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

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

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

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

97. The term "The Evil Quartet" is related with **[NCERT Page 222]**

(1) four major causes of forest loss

(2) four major causes of population explosion

(3) four major causes of air pollution

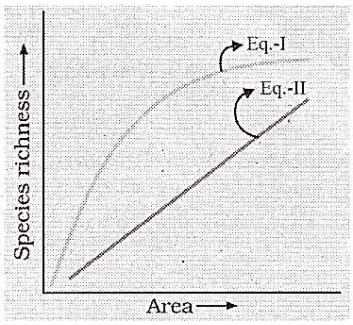
(4) four major causes of biodiversity losses.

98. Pyramid of numbers in grassland ecosystem is

(1) linear (2) upright

(3) inverted (4) negative

99. The great German naturalist and geographer Alexander von Humboldt observed that within a region species richness increased with increasing explored area, but only up to a limit. Identify the correct equations that shown the relationship between species richness and area.



[NCERT Page 220]

(1) (I)-A= CA^Z + log A; (II) - Log S = log C + Z log A

(2) (I)-Log S = log C + Z log A; (II) - S = CA^Z

(3) (I)-S = CA^Z + log C; (II) - Log S = log C + Z log A

(4) (I)-S = CA^Z; (II) - Log S = log C + Z log A

100. Match List-I with List-II. **[NCERT Page 210]**

	List-I		**List-II**
A.	Tertiary consumer	I.	Trees
B.	Secondary consumer	II.	Man
C.	Primary consumer	III.	Wolf
D.	Producer	IV.	Grasshopper

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

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

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

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

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

101. Given below are two statements:

Statement I: When a host fish species becomes extinct, its unique assemblage of parasites also becomes extinct.

Statement II: When a species becomes extinct, no other plant or animal species associated with it is affected. 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 correct.

(2) Both Statement I and Statement II are incorrect.

(3) Statement I is correct but Statement II is incorrect.

(4) Statement I is incorrect but Statement II is correct.

102. Which of the following is an example of alien species invading a new ecosystem resulting in biodiversity losses? **[NCERT Page 223]**

(1) Introduction of Nile perch into Dead Sea in east Africa.

(2) Introduction of water hyacinth nto India.

(3) Introduction of African catfish to Indian rivers.

(4) Both (2) and (3).

103. Identify the statement that is **NOT** correct?

[NCERT Page 211]

(1) Quantity of biomass in a trophic level at a particular period is called standing crop.

(2) The energy content in a trophic level is determined by considering a few individuals of a species in that trophic level.

(3) The standing crop is measured as the mass of living organisms or the number in a unit area.

(4) The biomass of a species is expressed in terms of fresh or dry weight.

104. Long-term ecosystem experiments using outdoor plots were done by **[NCERT Page 221]**

(1) Edward Wilson (2) David Tilman

(3) Robert Constanza (4) Paul Ehrlich

105. Millions of species is being cut and cleared for cultivating soya beans or for raising beef cattle in Amazon rain forest. Which of the following sobriquet is associated with it?

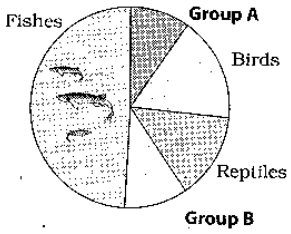
(1) Over-exploitation **[NCERT Page 222]**

(2) Co-extinctions

(3) Habitat loss and fragmentation

(4) Alien-species invasions

106. Given figure represents the proportionate number of species of major taxa of vertebrates. Identify the group A and B.



[NCERT Page 218]

(1) A-Reptiles B-Birds

(2) A-Mammals B-Amphibians

(3) A-Birds B- Fishes

(4) A-Birds B- Reptiles

107. The raw material for decomposition is called:

[NCERT Page 207]

(1) Humus (2) Detritus

(3) Biomass (4) Compost

108. Match List-I with List-II. **[NCERT Page 207,209]**

	List-I		List-II
A.	Detritivores	I.	Autotrophs
B.	GPP-R	II.	Herbivores
C.	Producers	III.	Consumers of dead matter
D.	Primary consumers	IV.	NPP

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

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

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

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

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

109. Identify the statement that is **NOT** correct?

[NCERT Page 209]

(1) In terrestrial ecosystem, maximum energy is present in Trees.

(2) In grasslands ecosystem, the pyramid of biomass is upright.

(3) In pyramid of food, the producers occupy the base /bottom.

(4) Energy flow in an ecosystem is bidirectional

110. Secondary productivity is defined as the rate of formation of new organic matter by

[NCERT Page 207]

(1) detrivores (2) saprotrophs

(3) producers (4) consumers

111. Match List-I with List-II.

[NCERT Page 217,221-223]

	List-I		List-II
A.	Lungs of planet	I.	*Lantana*
B.	Reserpine	II.	Amazon rain forests
C.	Dodo	III.	Mauritius
D.	Alien species	IV.	*Rauwolfia*

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

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

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

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

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

112. Introduction of Nile perch in lake Victoria of East Africa resulted in **[NCERT Page 223]**

(1) Excessive growth of water weeds

(2) Elimination of water weeds

(3) Elimination of many species of cichlid fish

(4) Excessive growth of cichlid fish

113. Vertical distribution of different species occupying different levels in a biotic community is known as

[NCERT Page 206]

(1) Pyramid (2) Divergence

(3) Stratification (4) Zonation

114. Match List-I with List-II.

[NCERT Page 217, 218, 221]

	List-I		**List-II**
A.	Ecological diversity	I.	Insects
B.	Reserpine	II.	Paul Ehrlich
C.	Species-rich group	III.	Alpine Meadows
D.	The Rivet popper hypothesis	IV.	Rauwolfia vomitoria

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

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

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

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

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

115. Given below are two statements:

Statement I: All animals depend on plants for their food needs.

Statement II: Animals are called consumers and also heterotrophs. **[NCERT Page 209]**

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 correct.

(2) Both Statement I and Statement II are incorrect.

(3) Statement I is correct but Statement II is incorrect.

(4) Statement I is incorrect but Statement II is correct.

116. Match List-I with List-II. **[NCERT Page 221]**

	List-I		**List-II**
A.	Thylacine	I.	Russia
B.	Dodo	II.	Mauritius
C.	Quagga	III.	Australia
D.	Steller's sea cow	IV.	Africa

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-III, B-II, C-IV, D-I

117. Ecology is considered a unifying thread in biology because: **[NCERT Page 188]**

(1) It focuses only on environmental conservation.

(2) It integrates molecular biology with evolutionary biology.

(3) It explains the interactions of organisms with each other and with their environment, forming organized systems like populations and ecosystems.

(4) It classifies organisms based on their physical traits alone.

118. The world summit on sustainable development held in. **[NCERT Page 225]**

(1) 2000, US (2) 2000, Australia

(3) 2002, Asia (4) 2002, South Africa

119. The annual net primary productivity of whole biosphere is approximately- of organic matter

[NCERT Page 207]

(1) 100 billion tons (2) 120 billion tons

(3) 170 billion tons (4) 180 billion tons

120. The available biomass for the consumption to herbivores and decomposers is

[NCERT Page 207]

(1) Secondary productivity

(2) Net primary productivity

(3) Primary productivity

(4) Gross primary productivity

121. During the analysis of surface area relationship among very large area like entire continents, the slope of the line is found much steeper and the Z values ranges **[NCERT Page 220]**

(1) 0.1 to 0.2 (2) 1.15 to 3

(3) 0 (4) 0.6 to 1.2

122. Which one of the following regarding ecological pyramid is not correct? **[NCERT Page 213]**

(1) In most ecosystems, the pyramid of numbers and biomass are upright.

(2) Energy at a lower trophic level is always more than at a higher level.

(3) The pyramid of energy is always upright and never be inverted.

(4) In deep water ecosystem, the pyramid of biomass is upright.

123. Find the wrongly matched pair. **NCERT Pg. 224]**

(1) Lungs of the planet - Amazon rainforest.

(2) Endemism - Species confined to one region and also found in other regions.

(3) Hotspots Regions with species richness.

(4) Alien species - *Clarias gariepinus.*

124. Given below are two statement: One is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): Western ghats are included among the hot spots of biodiversity.

Reason (R): Western ghats have greater amphibian diversity than eastern ghats.

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

(1) Both A and R are true and R is the correct explanation of A.

(2) Both A and R are true but R is NOT the correct explanation of A.

(3) A is true but R is false.

(4) A is false but R is true. **[NCERT Pg.,217, 224]**

125. Match List-I with List-II.

[NCERT Page 179, 182, 183]

	List-I		**List-II**
A.	Productivity	I.	kcal m^{-2}
B.	Gross primary productivity	II.	kg m^{-2}
C.	Primary production	III.	NPP + R
D.	Dry weight	IV.	(kcal m^{-2}) yr^{-1}

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

(1) A - IV, B - III, C - I, D – II

(2) A - III, B - II, C - IV, D – I

(3) A - III, B - IV, C - I, D – II

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

126. Increased diversity contributed to higher productivity" this statement is given by

(1) Alexander Von Humboldt

(2) Paul Ehrlich

(3) David Tilman

(4) Edward Wilson **[NCERT Page 221]**

127. Given below are two statements:

Statement I: India is considered one of the 12 mega diversity countries of the world.

Statement II: India has only 2.4% of the world's land area but contributes 8.1% to the global species diversity.

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 correct.

(2) Both Statement I and Statement II are incorrect.

(3) Statement I is correct but Statement II is incorrect.

(4) Statement I is incorrect but Statement II is correct.

128. The pattern of bodiversity is affected by

(1) Latitudinal gradients

(2) Species-area relationships

(3) Both (1) and (2)

(4) Longitude **[NCERT Page 219, 220]**

129. The number of trophic levels in the grazing food chain is restricted as the transfer of energy follows

[NCERT Page 211]

(1) 10 percent law (2) 20 percent law

(3) 50 percent law (4) 5 percent law

130. Match List-I with List-II.

[NCERT Page 224, 225]

	List-I		List-II
A.	Khasi and Jaintia	I.	Conserving seeds
B.	Western Ghats and Sri Lanka	II.	Hot spot
C.	Zoological parks	III.	Sacred groves
D.	Seed Banks	IV.	*Ex-situ* mode of conservation

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

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

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

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

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

131. Identify the possible link "A" in the following food chain:

Plant $\rightarrow$ insect $\rightarrow$ frog "A" Eagle

[NCERT Page 209]

(1) Rabbit (2) Wolf

(3) Cobra (4) Parrot

132. Given below are two statement: One is labelled as Assertion (A) and the other is labelled as Reason (R). **[NCERT Page 220]**

Assertion (A): Alexander von Humboldt found that within a region, species richness increased with increasing explored area, but only up to a limit.

Reason (R): Relationship between species richness(S) and area (A) for a wide variety of taxa turns out to be a rectangular hyperbola on a logarithmic scale.

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

(1) Both A and R are true and R is the correct explanation of A.

(2) Both A and R are true but R is NOT the correct explanation of A.

(3) A is true but R is false.

(4) A is false but R is true.

133. Given below are two statement: One is labelled as Assertion (A) and the other is labelled as Reason (R). **[NCERT Page 208]**

Assertion (A): Warm and moist environment can enhance the rate of decomposition.

Reason (R): Warm and moist climate leads to create anaerobic condition which promotes decomposition.

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

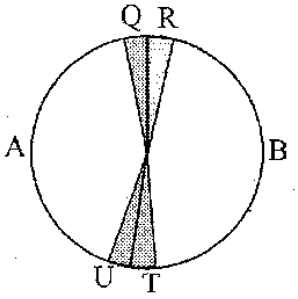
(1) Both A and R are true and R is the correct explanation of A.

(2) Both A and R are true but R is NOT the correct explanation of A.

(3) A is true but R is false.

(4) A is false but R is true.

134. A and B are expected to be, in the given diagram



[NCERT Page 218]

(1) Mosses and fungi

(2) Algae and fungi

(3) Angiosperms and ferns

(4) Fungi and angiosperms

135. Given below are two statement: One is labelled as Assertion (A) and the other is labelled as Reason (R). **[NCERT Page 210]**

Assertion (A): Detritus food chain begins with detritus.

Reason (R): Detrivores like fungi and bacteria are major decomposers in such food chains.

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

(1) Both A and R are true and R is the correct explanation of A.

(2) Both A and R are true but R is NOT the correct explanation of A.

(3) A is true but R is false.

(4) A is false but R is true.

136. The cry II Ab and cry I Ab produce toxins that control **[NCERT Page 180]**

(1) Tobacco budworms and nematodes respectively

(2) Corn borers and cotton bollworms respectively

(3) Cotton bollworms and corn borers respectively

(4) Nematodes and tobacco budworms respectively

137. Match List-I with List-II.

[NCERT Page 179, 180, 182, 183]

List – I	**List – II**
A. ELISA	I. Mobile genetic elements
B. C-peptide	II. Early diagnosis
C. Transposons	III. Inactive Insulin
D. DNA probes	IV. Radioactive isotopes

Choose the correct answer from the options given below:

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

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

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

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

138. Match List-I with List-II.

[NCERT Page 179, 180, 182]

List – I	**List - II**
A. Adenosine deaminase	I. RNAi
B. *Bacillus thuringiensis*	II. Immune system
C. *Meloidegyne*	III. Bt toxin
D. Eli Lilly	IV. Insulin

Choose the correct answer from the options given below:

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

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

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

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

139. Match List-I with List-II.

[NCERT Page 182, 183]

	List-I		**List-II**
A.	Serum and urine analysis	I.	Antigen-antibody interaction
B.	PCR	II.	Conventional methods
C.	ssDNA tagged with a probe	III.	Detect very low amount of DNA
D.	ELISA	IV.	Autoradiography

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

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

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

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

140. Which of the following is correctly related to 'ethical issues' for the conservation of biodiversity? **[NCERT Page 224].**

(1) Every species has an intrinsic value, even if may not be of current or any economic value

(2) Obtaining plant products for drugs manufacture

(3) Bioprospecting

(4) Both (1) and (3)

141. "Rosie" a trangenic cow known to produce a type of milk which has all the following characteristics except- **[NCERT Page 184]**

(1) Protein content of 2.4 gm/litre

(2) Has human α-lactalbumin

(3) More balance diet than normal milk for babies

(4) Use to treat emphysema

142. Match List-I with List-II.

[NCERT Page 179, 180, 182]

	List-I		List-II
A.	Bt-cotton	I.	Vitamin A rich
B.	RNA interference	II.	Nematode
C.	Golden rice	III.	Insecticide
D.	Insulin	IV.	Used for diabetes

Choose the correct answer from the options given below:

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

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

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

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

143. Which of the following protein product has been used to treat emphysema? **[NCERT Page 184]**

(1) alpha-lactalbumin

(2) TPA

(3) alpha-1-antitrypsin

(4) C-peptide

144. Match List-I with List-II. **[NCERT Page 179]**

	List-I		List-II
A.	Lepidopterans	I.	Army worm
B.	*Cry* I *AB*	II.	Corn borer
C.	Coleopterans	III.	Beetles
D.	Dipterans	IV.	Flies

Choose the correct answer from the options given below:

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

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

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

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

145. Enzyme required to catalyse polymerization of deoxyribonucleotides is

(1) RNA polymerase

(2) DNA polymerase

(3) Beta galactosidase

(4) DNA ligase

146. How does Bt toxin kill the larvae of certain insects? **[NCERT Page 179]**

(1) By altering central dogma taking place in the cells of gut of larve

(2) By stopping transcription of larval cells

(3) By binding of activated toxin on mid gut epithelial cells, creating pores, leading to swelling and lysis

(4) By stopping protein synthesis

147. For increasing the food production, which biotechnological application is applied

(1) Agro chemical based agriculture

(2) Organic agriculture

(3) Ancient agriculture

(4) Both (1) and (2)

148. Biopiracy is **[NCERT Page 185]**

(1) Exploitation of bioresources

(2) Patenting bioresources of others

(3) Use of bioresources without authorization

(4) Both (2) and (3)

149. Which of the following terms refers to mobile genetic elements? **[NCERT Page 180]**

(1) Exons (2) Operons

(3) Transposons (4) Introns

150. Transgenic animals are produced

[NCERT Page 183, 184]

A. to test vaccine safety.

B. to obtain useful synthetic non-biological products.

C. to study how genes are regulated and how they affect the normal functions of body and its development.

D. to study diseases.

E. to test toxicity and chemical safety.

Choose the correct answer from the options given below:

(1) A only (2) A, C, D and E only

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

151. Bt cotton has been produced by

[NCERT Page 179]

(1) In situ hybridisation of Bt gene

(2) Northern blotting of Bt gene

(3) Cloning of Bt gene

(4) Southern blotting of Bt gene

152. Transgenic plants are developed by

[NCERT Page 180]

(1) Introducing foreign genes

(2) Introducing gene mutations

(3) Deleting certain chromosome parts

(4) Stopping spindle formation

153. Which of the following techniques serve the purpose of early diagnosis?

A. R-DNA technology **[NCERT Page 183]**

B. PCR

C. ELISA

D. Conventional method of diagnosis (serum, urine analysis, etc)

Choose the correct answer from the options given below:

(1) A, B and C only (2) D only

(3) C only

(4) A, B, C and D only

154. Given below are two statements:

Statement I: Two DNA sequences in plasmids of yeast is used to produce insulin chains.

Statement II: Chains A and B were produced separately, extracted and combined by creating disulfide bonds to form human insulin.

[NCERT Page 182]

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 correct.

(2) Both Statement I and Statement II are incorrect.

(3) Statement I is correct but Statement II is incorrect.

(4) Statement I is incorrect but Statement II is correct.

155. Arrange the following events in the correct sequence regarding the production of human insulin using recombinant DNA technology by Eli Lilly (1983): **[NCERT Page 181, 182]**

A. DNA sequences corresponding to A and B chains of insulin were prepared.

B. Chains A and B were separately extracted from E. coli.

C. Disulfide bonds were created to combine chains A and B into mature insulin.

D. DNA sequences were introduced into plasmids of E. coli to produce insulin chains.

(1) A, D, B, C (2) D, A, B, C

(3) A, B, D, C (4) A, C, B, D

156. Given below are two statements:

Statement I: Recombinant therapeutics developed for curing human diseases are 30.

Statement II: Strategy used to prevent nematode infection of tobacco roots is RNA interference.
[NCERT Page 180, 181]

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 correct.

(2) Both Statement I and Statement II are incorrect.

(3) Statement I is correct but Statement II is incorrect.

(4) Statement I is incorrect but Statement II is correct.

157. Match List-I with List-II.

[NCERT Page 180, 185]

List-I	List-II
A. Biopiracy	I. 27 documented varieties
B. Basmati	II. Indian patents bill
C. Indian parliament	III. Mobile genetic element
D. Transposons	IV. Bioresources

Choose the correct answer from the options given below:

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

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

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

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

158. Golden rice

I. It is a transgenic variety of rice

II. It contains a goods quality of β-carotene (provitamin-A)

III. β-carotene is a principal source of vitamin-A

IV. The grains of the rice are yellow in colour due to β-carotene. The rice is commonly called golden rice

Which of the statements given above are correct?

(1) I, II and III (2) II, III and IV

(3) I, III and IV (4) I, II, III and IV

159. Match List-I with List-II.

[NCERT Page 179, 180, 182, 184]

List-I	List-II
A. Gene therapy	I. Engineered lymphocytes
B. RNAi	II. dsRNA
C. Transgenic mice	III. Polio vaccine
D. Bt toxin coded by	IV. cry gene

Choose the correct answer from the options given below:

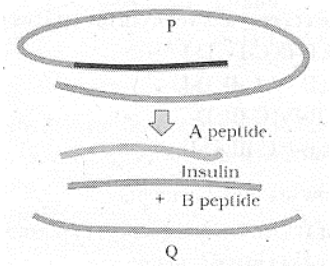
(1) A-I, B-IV, C-II, D-III

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

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

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

160. Select the correct statement about the labelled parts 'P' and 'Q'. **[NCERT Page 182]**



(1) P is A peptide chain

(2) Q is B peptide chain

(3) Q is present in mature insulin

(4) P is removed during maturation into insulin

161. Which of the following statements about insulin synthesis and production using recombinant DNA technology is NOT correct?

[NCERT Page 181, 182]

(1) In humans, insulin is initially synthesized as a pro-hormone containing an extra stretch called the C peptide.

(2) The C peptide is present in the mature and functional insulin.

(3) The main challenge in recombinant insulin production was proper assembly of A and B chains into mature insulin.

(4) Mature insulin consists of two long polypeptide chains linked by disulfide bonds.

162. The tumour-inducing capacity of Agrobacterium tumefaciens is located in large extrachromosomal plasmids called **[NCERT Page 170]**

(1) Ri plasmids

(2) plasmid pBR 322

(3) lambs phage

(4) Ti plasmid (Natural Vector)

163. In case of pBR322, which of the following act as selectable markers? **[NCERT Page 169]**

(1) amp^R (2) 'ori' site

(3) tet^R (4) Both (1) and (3)

164. From the statements given below choose the correct option: **[NCERT Page 168, 175]**

A. In elution the separated bands of DNA are cut out from agarose gel and extracted from the gel piece.

B. *E. Coli* cloning vector pBR322 shows several restriction sites, Ori, antibiotic resistance genes and Rop.

C. The downstream processing and quality control testing vary from product to product.

D. Competent bacterial cell cannot take up the plasmid.

E. Agarose is a natural polymer obtained from sea-weed.

(1) A and B only

(2) B and C only

(3) Only E

(4) A, B, C and E only

165. Antibiotic resistance gene present on BamHI site of a E. coli cloning vector is

[NCERT Page 169]

(1) Ampicillin resistance

(2) Tetracycline resistance

(3) Chloramphenicol resistance

(4) Kanamycin resistance

166. Match List-I with List-II.

List-I	**List-II**
A. PCR	I. Restriction endonuclease
B. *Eco*RI	II. Vector
C. pBR322	III. Bacterium
D. *E.coli*	IV. Gene amplification

Choose the correct answer from the options given below:

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

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

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

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

167. Match List-I with List-II.

[NCERT Page 166, 167, 169, 170]

List-I	List-II
A. Cloning vector	I. *Agrobacterium*
B. Ti-DNA	II. pBR322
C. DNA ligase	III. Nucleases
D. Restriction enzyme	IV. Sticky-ends

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

(1) A-ЦI, B-IV, C-II, D-I

(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

168. Match List-I with List-II.

[NCERT Page 165, 168-170]

List-I	**List-II**
A. Elution	I. Cloning vector
B. Ampicillin resistant gene	II. Obtaining DNA fragments with sticky ends
C. Ti plasmid	III. Selectable marker
D. Restriction enzyme	IV. Obtaining bands of DNA from agarose gel

Choose the correct answer from the options given below:

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

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

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

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

169. Match List-I with List-II.

[NCERT Page 165, 169, 170]

List-I

A. Cloning

B. Molecular scissor

C. Restriction endonuclease

D. T-DNA

List-II

I. Making multiple identical copies

II. Tumour

III. Restriction enzymes

IV. Enzyme

Choose the correct answer from the options given below:

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

(2) AII, B-I, C-IV, D-III

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

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

170. Match List-I with List-II.

[NCERT Page 164, 169, 170, 174]

List-I	**List-II**
A. Ti plasmid	I. *Agrobacterium tumifaciens*
B. Sal I	II. 100-1000L
C. Bioreactors	III. Origin of replication
D. Ori	IV. Restriction enzyme

Choose the correct answer from the options given below:

(1) A - IV, B - I, C - II, D – III

(2) A - II, B - I, C - IV, D – III

(3) A - IV, B - I, C - III, D – II

(4) A - I, B - IV, C - II, D – III

171. Match List-I with List-II.

[NCERT Page 168, 169, 173]

	List-I		**List-II**
A.	Band	I.	Restriction fragments moves towards it
B.	Positive pole	II.	Where specific restriction fragment collects in gel
C.	Thermostable DNA polymerase	III.	Piece of DNA cut up by restriction enzymes
D.	Restriction fragment	IV.	PCR

Choose the correct answer from the options given below:

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

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

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

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

172. If a protein encoding gene is expressed in a heterologous host it is called

(1) recombinant protein **[NCERT Page 173]**

(2) primary protein

(3) secondary protein

(4) tertiary protein

173. GEAC stands for

(1) Genetic and Biotechnique Approval Committee

(2) Gene Environment Action Committee

(3) Genetic Engineering Approval Committee

(4) Genome Engineering Action Committee

174. The first capital letter in the name of restriction enzymes indicates **[NCERT Page 165]**

(1) Order in which enzymes were synthesized inside the prokaryotic cell.

(2) Order in which enzymes were discovered.

(3) Order in which enzymes function inside the body.

(4) Genus of the prokaryotic cell from which they were isolated.

175. The introduction of T-DNA into plants involves

[NCERT Page 170]

(1) Exposing the plants to cold for a brief period

(2) Allowing the plant roots to stand in water

(3) Infection of the plant by Agrobacterium tumefaciens

(4) Altering the pH of the soil, then heat-shocking the plants

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

Assertion (A): All endonuclease cut DNA at specific sites.

Reason (R): Endonuclease are used in recombinant DNA technology.

[NCERT Page 166]

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

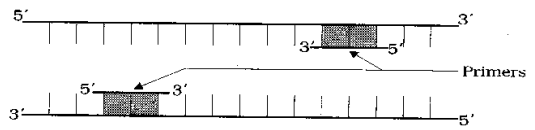
(1) Both A and R are true and R is the correct explanation of A.

(2) Both A and R are true but R is NOT the correct explanation of A.

(3) A is true but R is false.

(4) A is false but R is true.

177. Choose the correct step of PCR given in the diagram **[NCERT Page 172]**



(1) Extension of primer

(2) Denaturation of DNA

(3) Annealing of primer

(4) Exposure of high temperature

178. From the statements given below choose the correct option **[NCERT Page 169, 170]**

A. The vector requires a selectable marker.

B. Selectable marker helps in identifying and eliminating transformants and selectively permitting the growth of the non-transformants.

C. Recombinant DNA technology involves using many methods and equipment to insert a desired gene from one organism into another.

D. Antibiotic resistance genes on the plasmid can be used as selective markers to separate transformants from non-transformants.

E. In order to link the alien DNA, the vector needs to have many recognition sites.

(1) A, B and E only

(2) C and D only

(3) B and D only

(4) A, C and D only

179. Given below are two statements:

Statement I: Agrobacterium tumefaciens is popular in genetic engineering because this bacterium is associated with the roots of all cereal and pulse crops.

Statement II: 'T-DNA' transform normal plant cells into a tumor and direct these tumor cells to produce the chemicals required by the pathogens.

[NCERT Page 170]

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 correct.

(2) Both Statement I and Statement II are incorrect.

(3) Statement I is correct but Statement II is incorrect.

(4) Statement I is incorrect but Statement II is correct.

180. Bacillus thuringiensis used in agriculture for the formation of **[NCERT Page 179]**

(1) Antibiotic resistant plant

(2) Nematode resistant plant

(3) Insect resistant plant

(4) Herbicide resistant plant