Aakash
Medical | IIT-JEE | Foundations

Corporate Office : AESL, 3rd Floor, Incuspaze Campus-2, Plot No. 13, Sector-18,
Udyog Vihar, Gurugram, Haryana - 122018, ***Ph.***011-47623456

MM : 720 Final Test Series(P2)-2024-25_Test-08C & D **Time : 180 Min.**

Topics Covered:
Complete Syllabus of Class XI & XII

General Instructions :
Duration of Test is 3 hrs.
The Test consists of 180 questions. The maximum marks are 720.
There are three parts in the question paper consisting of Physics, Chemistry, Biology which have 45 questions each in Physics & Chemistry and 90 questions in Biology.
Each question carries +4 marks. For every wrong response, –1 mark shall be deducted from the total score. Unanswered/unattempted questions will be given no marks.
Use blue/black ballpoint pen only to darken the appropriate circle.
Mark should be dark and completely fill the circle.
Dark only one circle for each entry.
Dark the circle in the space provided only.
Rough work must not be done on the Answer sheet and do not use white fluid or any other rubbing material on the Answer sheet.

PHYSICS

1. Match List-I with List-II

	List-I (Electromagnetic waves)		**List-II (Wavelength)**
(a)	AM radio waves	(i)	10^{-10} m
(b)	Microwaves	(ii)	10^{2} m
(c)	Infrared radiations	(iii)	10^{-2} m
(d)	X-rays	(iv)	10^{-4} m

Choose the correct answer from the options given below

(1) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

(2) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)

(3) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

(4) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)

2. An electric lift with a maximum load of 2000 kg (lift + passengers) is moving up with a constant speed of 1.5 m s^{-1}. The frictional force opposing the motion is 3000 N. The minimum power delivered by the motor to the lift in watts is : (g = 10 m s^{-2})

(1) 34500

(2) 23500

(3) 23000

(4) 20000

3. Two hollow conducting spheres of radii R_1 and R_2 (R_1 >> R_2) have equal charges. The potential would be

(1) Equal on both the spheres

(2) Dependent on the material property of the sphere

(3) More on bigger sphere

(4) More on smaller sphere

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(1) Equal on both the spheres

(2) Dependent on the material property of the sphere

(3) More on bigger sphere

(4) More on smaller sphere

4. If the initial tension on a stretched string is doubled, then the ratio of the initial and final speeds of a transverse wave along the string is

(1) $1 : \sqrt{2}$

(2) 1 : 2

(3) 1 : 1

(4) $\sqrt{2} : 1$

5. If a soap bubble expands, the pressure inside the bubble

(1) Remains the same

(2) Is equal to the atmospheric pressure

(3) Decreases

(4) Increases

6. The ratio of the distances travelled by a freely falling body in the 1^{st}, 2^{nd}, 3^{rd} and 4^{th} second

(1) 1 : 3 : 5 : 7

(2) 1 : 1 : 1 : 1

(3) 1 : 2 : 3 : 4

(4) 1 : 4 : 9 : 16

7. A long solenoid of radius 1 mm has 100 turns per mm. If 1 A current flows in the solenoid, the magnetic field strength at the centre of the solenoid is

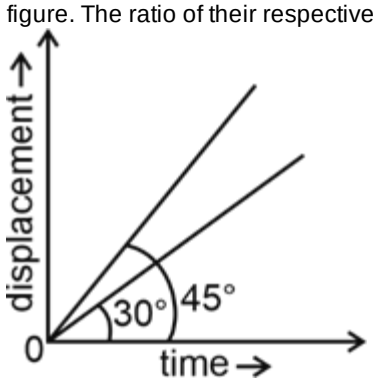
(1) 12.56×10^{-4} T

(2) 6.28×10^{-4} T

(3) 6.28×10^{-2} T

(4) 12.56×10^{-2} T

8. The displacement-time graphs of two moving particles make angles of 30° and 45° with the *x*-axis as shown in the figure. The ratio of their respective velocity is



(1) 1 : 2

(2) $1 : \sqrt{3}$

(3) $\sqrt{3} : 1$

(4) 1 : 1

9. The peak voltage of the ac source is equal to

(1) $\sqrt{2}$ times the rms value of the ac source

(2) $1/\sqrt{2}$ times the rms value of the ac source

(3) The value of voltage supplied to the circuit

(4) The rms value of the ac source

10. Let T_1 and T_2 be the energy of an electron in the first and second excited states of hydrogen atom, respectively. According to the Bohr's model of an atom, the ratio $T_1 : T_2$ is

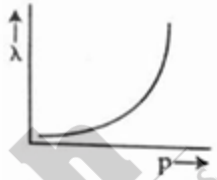
(1) 4 : 9

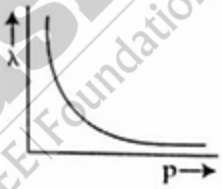
(2) 9 : 4

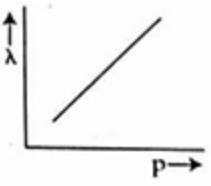
(3) 1 : 4

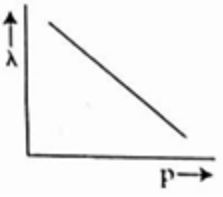
(4) 4 : 1

11. The graph which shows the variation of the de Broglie wavelength (λ) of a particle and its associated momentum (*p*) is

(1) 

(2) 

(3) 

(4) 

12. Plane angle and solid angle have

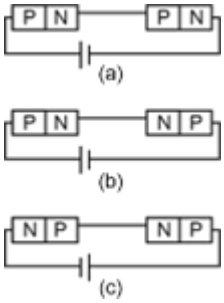
(1) No units and no dimensions

(2) Both units and dimensions

(3) Units but no dimensions

(4) Dimensions but no units

13.



In the given circuits (a), (b) and (c), the potential drop across the two *p-n* junctions are equal in

(1) Circuit (c) only

(2) Both circuits (a) and (c)

(3) Circuit (a) only

(4) Circuit (b) only

14. The ratio of the radius of gyration of a thin uniform disc about an axis passing through its centre and normal to its plane to the radius of gyration of the disc about its diameter is

(1) 4 : 1

(2) $1 : \sqrt{2}$

(3) 2 : 1

(4) $\sqrt{2} : 1$

15. A copper wire of length 10 m and radius $\left(\frac{10^{-2}}{\sqrt{\pi}}\right) m$ has electrical resistance of 10 Ω. The current density in the wire for an electric field strength of 10 (V/m) is

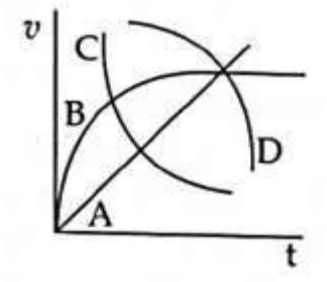
(1) 10^{-5} A/m^2

(2) 10^{5} A/m^2

(3) 10^{4} A/m^2

(4) 10^{6} A/m^2

16. A spherical ball is dropped in a long column of a highly viscous liquid. The curve in the graph shown, which represents the speed of the ball (v) as a function of time (t) is



(1) C

(2) D

(3) A

(4) B

17. Two resistors of resistance, 100 Ω and 200 Ω are connected in parallel in an electrical circuit. The ratio of the thermal energy developed in 100 Ω to that in 200 Ω in a given time is

(1) 1 : 4

(2) 4 : 1

(3) 1 : 2

(4) 2 : 1

18. Two transparent media *A* and *B* are separated by a plane boundary. The speed of light in those media are 1.5×10^8 m/s and 2.0×10^8 m/s, respectively. The critical angle for a ray of light for these two media is

(1) $\tan^{-1}(0.500)$

(2) $\tan^{-1}(0.750)$

(3) $\sin^{-1}(0.500)$

(4) $\sin^{-1}(0.750)$

19. In a Young's double slit experiment, a student observes 8 fringes in a certain segment of screen when a monochromatic light of 600 nm wavelength is used. If the wavelength of light is changed to 400 nm, then the number of fringes he would observe in the same region of the screen is

(1) 9

(2) 12

(3) 6

(4) 8

20. When light propagates through a material medium of relative permittivity ε_r and relative permeability μ_r, the velocity of light, v is given by (c-velocity of light in vacuum)

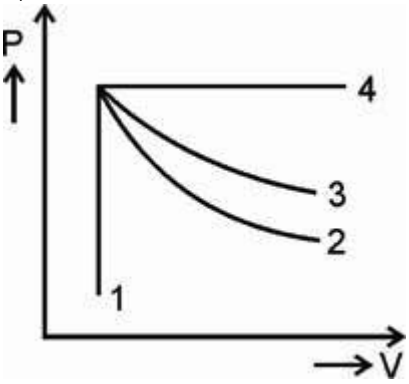
(1) $v = \sqrt{\frac{\varepsilon_r}{\mu_r}}$

(2) $v = \frac{c}{\sqrt{\varepsilon_r \mu_r}}$

(3) $v = c$

(4) $v = \sqrt{\frac{\mu_r}{\varepsilon_r}}$

21. An ideal gas undergoes four different processes from the same initial state as shown in the figure below. Those processes are adiabatic, isothermal, isobaric and isochoric. The curve which represents the adiabatic process among 1, 2, 3 and 4 is



(1) 3

(2) 4

(3) 1

(4) 2

22. As the temperature increases, the electrical resistance

(1) Increases for conductors but decreases for semiconductors

(2) Decreases for conductors but increases for semiconductors

(3) Increases for both conductors and semiconductors

(4) Decreases for both conductors and semiconductors

23. Two objects of mass 10 kg and 20 kg respectively are connected to the two ends of a rigid rod of length 10 m with negligible mass. The distance of the center of mass of the system from the 10 kg mass is

(1) 10 m

(2) 5 m

(3) $\frac{10}{3}$ m

(4) $\frac{20}{3}$ m

24. In half wave rectification, if the input frequency is 60 Hz, then the output frequency would be

(1) 60 Hz

(2) 120 Hz

(3) Zero

(4) 30 Hz

25. Given below are two statements

Statement I : Biot-Savart's law gives us the expression for the magnetic field strength of an infinitesimal current element (Idl) of a current carrying conductor only.

Statement II : Biot-Savart's law is analogous to Coulomb's inverse square law of charge q, with the former being related to the field produced by a scalar source, Idl while the latter being produced by a vector source, q.

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

(1) Statement I is correct and Statement II is incorrect

(2) Statement I is incorrect and Statement II is correct

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

26. The energy that will be ideally radiated by a 100 kW transmitter in 1 hour is

(1) 36×10^5 J

(2) 1×10^5 J

(3) 36×10^7 J

(4) 36×10^4 J

27. A body of mass 60 g experiences a gravitational force of 3.0 N, when placed at a particular point. The magnitude of the gravitational field intensity at that point is

(1) 20 N/kg

(2) 180 N/kg

(3) 0.05 N/kg

(4) 50 N/kg

28. A biconvex lens has radii of curvature, 20 cm each. If the refractive index of the material of the lens is 1.5, the power of the lens is

(1) +5 D

(2) Infinity

(3) +2 D

(4) +20 D

29. A shell of mass m is at rest initially. It explodes into three fragments having mass in the ratio 2 : 2 : 1. If the fragments having equal mass fly off along mutually perpendicular directions with speed v, the speed of the third (lighter) fragment is

(1) $2\sqrt{2}v$

(2) $3\sqrt{2}v$

(3) v

(4) $\sqrt{2}v$

30. The dimensions $[MLT^{-2}A^{-2}]$ belong to the

(1) Magnetic permeability

(2) Electric permittivity

(3) Magnetic flux

(4) Self inductance

31. The angle between the electric lines of force and the equipotential surface is

(1) 90°

(2) 180°

(3) 0°

(4) 45°

32. A square loop of side 1 m and resistance 1 Ω is placed in a magnetic field of 0.5 T. If the plane of loop is perpendicular to the direction of magnetic field, the magnetic flux through the loop is

(1) 1 weber

(2) Zero weber

(3) 2 weber

(4) 0.5 weber

33. A light ray falls on a glass surface of refractive index $\sqrt{3}$, at an angle 60°. The angle between the refracted and reflected rays would be

(1) 90°

(2) 120°

(3) 30°

(4) 60°

34. A ball is projected with a velocity, 10 ms^{-1}, at an angle of 60° with the vertical direction. Its speed at the highest point of its trajectory will be

(1) 5 ms^{-1}

(2) 10 ms^{-1}

(3) Zero

(4) $5\sqrt{3}\ ms^{-1}$

35. A series LCR circuit with inductance 10 H, capacitance $10\ \mu F$, resistance 50 Ω is connected to an ac source of voltage, $V = 200\sin(100t)$ volt. If the resonant frequency of the LCR circuit is ν_0 and the frequency of the ac source is ν, then

(1) $\nu_0 = \frac{50}{\pi}$ Hz, $\nu = 50$ Hz

(2) $\nu = 100$ Hz; $\nu_0 = \frac{100}{\pi}$ Hz

(3) $\nu_0 = \nu = 50$ Hz

(4) $\nu_0 = \nu = \frac{50}{\pi}$ Hz

36. The area of a rectangular field (in m^2) of length 55.3 m and breadth 25 m after rounding off the value for correct significant digits is

(1) 1382.5

(2) 14×10^2

(3) 138×10^1

(4) 1382

37. Two pendulums of length 121 cm and 100 cm start vibrating in phase. At some instant, the two are at their mean position in the same phase. The minimum number of vibrations of the shorter pendulum after which the two are again in phase at the mean position is:

(1) 10

(2) 8

(3) 11

(4) 9

38. Given below are two statements : One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A): The stretching of a spring is determined by the shear modulus of the material of the spring.
Reason (R): A coil spring of copper has more tensile strength than a steel spring of same dimensions.
In the light of the above statements, choose the **most appropriate** answer from the options given below

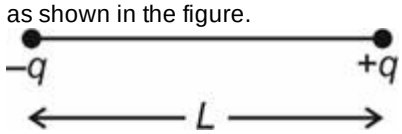
(1) **(A)** is true but **(R)** is false

(2) **(A)** is false but **(R)** is true

(3) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

(4) Both **(A)** and **(R)** are true and **(R)** is not the correct explanation of **(A)**

39. Two point charges $-q$ and $+q$ are placed at a distance of L, as shown in the figure.



The magnitude of electric field intensity at a distance R ($R >> L$) varies as:

(1) $\frac{1}{R^4}$

(2) $\frac{1}{R^6}$

(3) $\frac{1}{R^2}$

(4) $\frac{1}{R^3}$

40. A nucleus of mass number 189 splits into two nuclei having mass number 125 and 64. The ratio of radius of two daughter nuclei respectively is

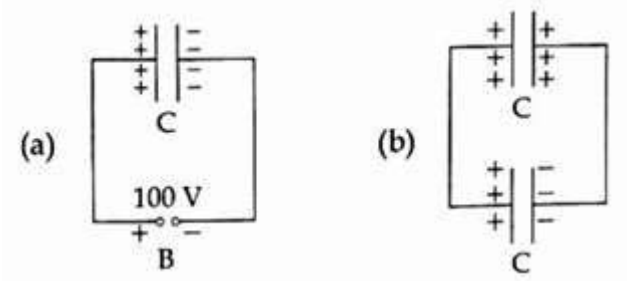
(1) 5 : 4

(2) 25 : 16

(3) 1 : 1

(4) 4 : 5

41. A capacitor of capacitance C = 900 pF is charged fully by 100 V battery B as shown in figure (a). Then it is disconnected from the battery and connected to another uncharged capacitor of capacitance C = 900 pF as shown in figure (b). The electrostatic energy stored by the system (b) is



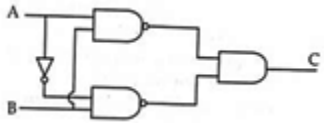
(1) 2.25×10^{-6} J

(2) 1.5×10^{-6} J

(3) 4.5×10^{-6} J

(4) 3.25×10^{-6} J

42.



The truth table for the given logic circuit is

(1)

A	B	C
0	0	1
0	1	0
1	0	1
1	1	0

(2)

A	B	C
0	0	0
0	1	1
1	0	0
1	1	1

(3)

A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

(4)

A	B	C
0	0	1
0	1	0
1	0	0
1	1	1

43. Match List-I with List-II

	List-I		**List-II**
(a)	Gravitational constant (G)	(i)	$[L^2T^{-2}]$
(b)	Gravitational potential energy	(ii)	$[M^{-1}L^3T^{-2}]$
(c)	Gravitational potential	(iii)	$[LT^{-2}]$
(d)	Gravitational intensity	(iv)	$[ML^2T^{-2}]$

Choose the correct answer from the options given below

(1) (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)

(2) (a) - (iv), (b) - (ii), (c) - (i), (d) - (iii)

(3) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

(4) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)

44. From Ampere's circuital law for a long straight wire of circular cross-section carrying a steady current, the variation of magnetic field in the inside and outside region of the wire is

(1) A linearly increasing function of distance r upto the boundary of the wire and then decreasing one with $\frac{1}{r}$ dependence for the outside region.

(2) A linearly decreasing function of distance upto the boundary of the wire and then a linearly increasing one for the outside region.

(3) Uniform and remains constant for both the regions.

(4) A linearly increasing function of distance upto the boundary of the wire and then linearly decreasing for the outside region.

45. A big circular coil of 1000 turns and average radius 10 m is rotating about its horizontal diameter at 2 rad s^{-1}. If the vertical component of earth's magnetic field at that place is 2×10^{-5} T and electrical resistance of the coil is 12.56 Ω, then the maximum induced current in the coil will be

(1) 1 A

(2) 2 A

(3) 0.25 A

(4) 1.5 A

CHEMISTRY

46. Which of the following statement is not correct about diborane?

(1) The four terminal Hydrogen atoms and the two Boron atoms lie in one plane.

(2) Both the Boron atoms are sp^2 hybridised.

(3) There are two 3-centre-2-electron bonds.

(4) The four terminal B-H bonds are two centre two electron bonds.

47. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A): ICl is more reactive than I_2.
Reason (R): I-Cl bond is weaker than I-I bond.
In the light of the above statements, choose the most **appropriate** answer from the options given below:

(1) (A) is correct but (R) is not correct

(2) (A) is not correct but (R) is correct

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

(4) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

48. In one molal solution that contains 0.5 mole of a solute, there is

(1) 100 mL of solvent

(2) 1000 g of solvent

(3) 500 mL of solvent

(4) 500 g of solvent

49. Given below are half cell reactions:

$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$

$E^{\circ}_{Mn^{2+}/MnO_4^-} = -1.510\ V$

$\frac{1}{2}O_2 + 2H^+ + 2e^- \rightarrow H_2O$

$E^{\circ}_{O_2/H_2O} = +1.223\ V$

Will the permanganate ion, MnO_4^- liberate O_2 from water in the presence of an acid?

(1) Yes, because $E^{\circ}_{cell} = +2.733\ V$

(2) No, because $E^{\circ}_{cell} = -2.733\ V$

(3) Yes, because $E^{\circ}_{cell} = +0.287\ V$

(4) No, because $E^{\circ}_{cell} = -0.287\ V$

50. Identify the **incorrect** statement from the following.

(1) In an atom, all the five 3*d* orbitals are equal in energy in free state.

(2) The shapes of d_{xy}, d_{yz} and d_{zx} orbitals are similar to each other; and $d_{x^2-y^2}$ and d_{z^2} are similar to each other.

(3) All the five 5*d* orbitals are different in size when compared to the respective 4*d* orbitals.

(4) All the five 4*d* orbitals have shapes similar to the respective 3*d* orbitals.

51. What mass of 95% pure $CaCO_3$ will be required to neutralise 50 mL of 0.5 M HCl solution according to the following reaction?

$CaCO_{3(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$

[Calculate upto second place of decimal point]

(1) 3.65 g

(2) 9.50 g

(3) 1.25 g

(4) 1.32 g

52.

$$RMgX + CO_2 \xrightarrow[\text{ether}]{\text{dry}} Y \xrightarrow{H_3O^+} RCOOH$$

What is Y in the above reaction?

(1) $RCOO^-X^+$

(2) $(RCOO)_2Mg$

(3) $RCOO^-Mg^+X$

(4) $R_3CO^-Mg^+X$

53. Consider the following statements

(a) Methanal is liquid at room temperature.

(b) The boiling point of acetone is more than propanal.

(c) The boiling points of aldehydes and ketones are higher than hydrocarbons and ethers of comparable molecular masses.

The **correct** statements are

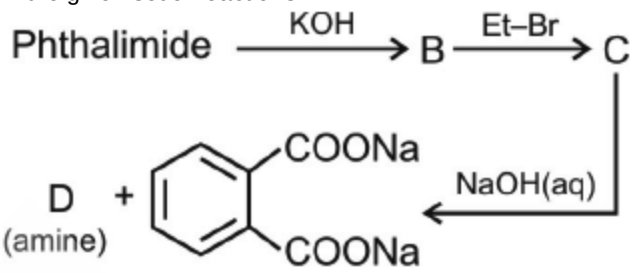
(1) (a) and (b) only

(2) (b) and (c) only

(3) (a) and (c) only

(4) (a), (b) and (c)

54. In the given set of reactions



D is

(1) CH_3NH_2

(2) $CH_3CH_2NH_2$

(3) $CH_3CH_2NHCH_3$

(4) $(CH_3)_2NH$

55. Match List-I with List-II

	List-I Coordination compounds		**List-II Metal present**
a.	Chlorophyll	(i)	Iron
b.	Vitamin B_{12}	(ii)	Rhodium
c.	Wilkinson catalyst	(iii)	Cobalt
d.	Haemoglobin	(iv)	Magnesium

Choose the correct answer from the options given below

(1) a(iv), b(iii), c(i), d(ii)

(2) a(iv), b(iii), c(ii), d(i)

(3) a(iii), b(iv), c(ii), d(i)

(4) a(ii), b(iii), c(iv), d(i)

56. Consider the following statements.
(i) The solutions which show a large positive deviation from Raoult's law form minimum boiling azeotrope.
(ii) Two solutions having same osmotic pressure at a given temperature are called isotonic solutions.
(iii) K_f is independent of solute concentration.
The correct statement(s) is/are

(1) (i) and (ii) only

(2) (ii) and (iii) only

(3) (i), (ii) and (iii)

(4) (ii) only

57. Given below are two statements :
Statement I : The boiling points of aldehydes and ketones are higher than hydrocarbons of comparable molecular masses because of weak molecular association in aldehydes and ketones due to dipole - dipole interactions.
Statement II : The boiling points of aldehydes and ketones are lower than the alcohols of similar molecular masses due to the absence of H-bonding.
In the light of the above statements, choose the **most appropriate** answer from the given below

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

58. The IUPAC name of an element with atomic number 119 is

(1) ununnunnium

(2) ununoctium

(3) ununennium

(4) unnilennium

59. At 298 K, the standard electrode potentials of Cu^{2+} / Cu, Zn^{2+} / Zn, Fe^{2+} / Fe and Ag^{+} / Ag are 0.34 V, –0.76 V, –0.44 V and 0.80 V, respectively.
On the basis of standard electrode potential, predict which of the following reaction cannot occur?

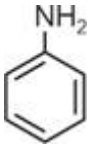
(1) $FeSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Fe(s)$

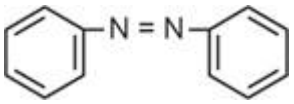
(2) $2CuSO_4(aq) + 2Ag(s) \rightarrow 2Cu(s) + Ag_2SO_4(aq)$

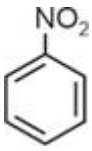
(3) $CuSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Cu(s)$

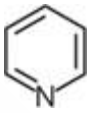
(4) $CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$

60. The Kjeldahl's method for the estimation of nitrogen can be used to estimate the amount of nitrogen in which one of the following compounds?

(1) 

(2) 

(3) 

(4) 

61. The given graph is a representation of kinetics of a reaction.

The y and x axes for zero and first order reactions, respectively are

(1) zero order (y = rate and x = concentration), first order (y = $t_{1/2}$ and x = concentration)

(2) zero order (y = rate and x = concentration), first order (y = rate and x = $t_{1/2}$)

(3) zero order (y = concentration and x = time), first order (y = $t_{1/2}$ and x = concentration)

(4) zero order (y = concentration and x = time), first order (y = rate constant and x = concentration)

62. Platinum on reaction with aqua regia gives

(1) $[PtCl_4]^{2-}$ and N_2O

(2) $[PtCl_4]^{2-}$ and NO

(3) $[PtCl_6]^{2-}$ and NO

(4) $[PtCl_6]^{2-}$ and NO_2

63. The slope of line plotted between ln k versus $\left(\frac{1}{T}\right)$ for Arrhenius equation is given by

(1) $\frac{-E_a}{2.303R}$

(2) $-\frac{E_a}{R}$

(3) $\frac{-2.303E_a}{R}$

(4) $\frac{-R}{E_a}$

64. The IUPAC name of the complex- $[Ag(H_2O)_2][Ag(CN)_2]$ is:

(1) dicyanidosilver(I) diaquaargentate(I)

(2) diaquasilver(I) dicyanidoargentate(I)

(3) dicyanidosilver(II) diaquaargentate(II)

(4) diaquasilver(II) dicyanidoargentate(II)

65. Choose the correct statement:

(1) Diamond is sp^3 hybridised and graphite is sp^2 hybridised.

(2) Both diamond and graphite are used as dry lubricants.

(3) Diamond and graphite have two dimensional network.

(4) Diamond is covalent and graphite is ionic.

66. The total number of structural isomers of C_4H_9Br which are primary halides, is

(1) 1

(2) 2

(3) 3

(4) 4

67. Given below are two statements
Statement I: Primary aliphatic amines react with HNO_2 to give unstable diazonium salts.
Statement II: Primary aromatic amines react with HNO_2 to form diazonium salts which are stable even above 300 K. In the light of the above statements, choose the most **appropriate** answer from the options given below

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

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

(3) Both Statement I and Statement II are correct.

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

68. Gadolinium has a low value of third ionisation enthalpy because of

(1) high electronegativity

(2) high basic character

(3) small size

(4) high exchange enthalpy

69. Match List-I with List-II.

List – I (Products formed)		**List – II (Reaction of carbonyl compound with)**	
(a)	Cyanohydrin	(i)	NH_2OH
(b)	Acetal	(ii)	RNH_2
(c)	Schiff's base	(iii)	alcohol
(d)	Oxime	(iv)	HCN

Choose the correct answer from the options given below

(1) (a) – (i), (b) – (iii), (c) – (ii), (d) – (iv)

(2) (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

(3) (a) – (iii), (b) – (iv), (c) – (ii), (d) – (i)

(4) (a) – (ii), (b) – (iii), (c) – (iv), (d) – (i)

70. Given below are two statements
Statement I: The boiling points of the following hydrides of group 16 elements increases in the order –
$H_2O < H_2S < H_2Se < H_2Te$
Statement II: The boiling points of these hydrides increase with increase in molar mass.
In the light of the above statements, choose the most appropriate answer from the options given below :

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

71. The pH of the solution containing 50 mL each of 0.10 M sodium acetate and 0.01 M acetic acid is
[Given pK_a of CH_3COOH = 4.57]

(1) 4.57

(2) 2.57

(3) 5.57

(4) 3.57

72. Amongst the following which one will have maximum 'lone pair - lone pair' electron repulsions?

(1) SF_4

(2) XeF_2

(3) ClF_3

(4) IF_5

73. The **incorrect** statement regarding chirality is

(1) Enantiomers are superimposable mirror images on each other

(2) A racemic mixture shows zero optical rotation

(3) S_N1 reaction yields mixture of both enantiomers

(4) The product obtained by S_N2 reaction of haloalkane having chirality at the reactive site shows inversion of configuration

74. Which amongst the following is **incorrect** statement?

(1) H_2^+ ion has one electron

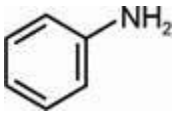
(2) O_2^+ ion is diamagnetic

(3) The bond orders of O_2^+, O_2, O_2^- and O_2^{2-} are 2.5, 2, 1.5 and 1, respectively

(4) C_2 molecule has four electrons in its two degenerate π molecular orbitals

75. Which of the following sequence of reactions is suitable to synthesize chlorobenzene?

(1)  , HCl

(2)  , HCl, Heating

(3) Benzene, Cl_2, anhydrous $FeCl_3$

(4) Phenol, $NaNO_2$, HCl, CuCl

76. Which compound amongst the following is **not** an aromatic compound?

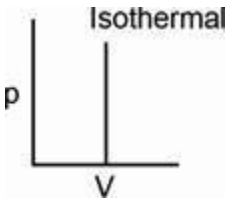
(1) 

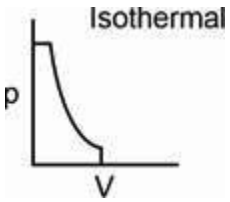
(2) 

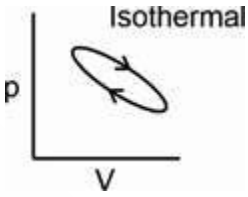
(3) 

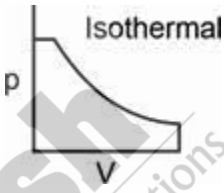
(4) 

77. Which of the following p-V curve represents maximum work done?

(1) 

(2) 

(3) 

(4) 

78. Given below are two statements

Statement I: The acidic strength of monosubstituted nitrophenol is higher than phenol because of electron withdrawing nitro group.

Statement II: *o*-nitrophenol, *m*-nitrophenol and *p*-nitrophenol will have same acidic strength as they have one nitro group attached to the phenolic ring.

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

(1) **Statement I** is correct but **Statement II** is incorrect.

(2) **Statement I** is incorrect but **Statement II** is correct.

(3) Both **Statement I** and **Statement II** are correct.

(4) Both **Statement I** and **Statement II** are incorrect.

79. Compound X on reaction with O_3 followed by Zn/H_2O gives formaldehyde and 2-methyl propanal as products. The compound X is

(1) 2-Methylbut-2-ene

(2) Pent-2-ene

(3) 3-Methylbut-1-ene

(4) 2-Methylbut-1-ene

80. $3O_2(g) \rightleftharpoons 2O_3(g)$

for the above reaction at 298 K, K_C is found to be 3.0×10^{-59}. If the concentration of O_2 at equilibrium is 0.040 M then concentration of O_3 in M is

(1) 2.4×10^{31}

(2) 1.2×10^{21}

(3) 4.38×10^{-32}

(4) 1.9×10^{-63}

81. The vapour pressure of pure liquids A and B are 400 and 600 mmHg, respectively at 300 K. Calculate the mole fraction of A and B in liquid mixture if total vapour pressure is 450 mmHg.

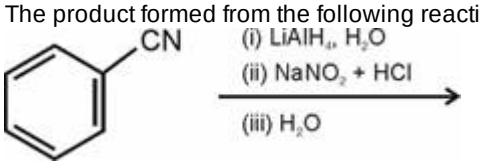
(1) $X_A = 0.75, X_B = 0.25$

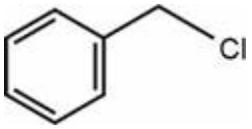
(2) $X_A = 0.25, X_B = 0.75$

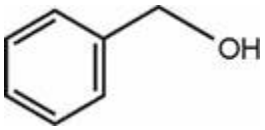
(3) $X_A = 0.60, X_B = 0.40$

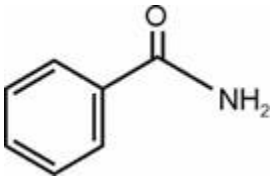
(4) $X_A = 0.40, X_B = 0.60$

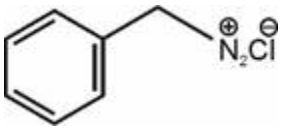
82. The product formed from the following reaction sequence is



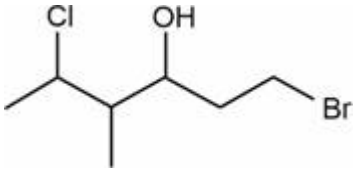
(1) 

(2) 

(3) 

(4) 

83. The correct IUPAC name of the following compound is



(1) 1-bromo-4-methyl-5-chlorohexan-3-ol

(2) 6-bromo-4-methyl-2-chlorohexan-4-ol

(3) 1-bromo-5-chloro-4-methylhexan-3-ol

(4) 6-bromo-2-chloro-4-methythexan-4-ol

84. The order of energy absorbed which is responsible for the color of complexes

(A) $[Ni(H_2O)_2(en)_2]^{2+}$

(B) $[Ni(H_2O)_4(en)]^{2+}$ and

(C) $[Ni(en)_3]^{2+}$

is

(1) (C) > (A) > (B)

(2) (B) > (A) > (C)

(3) (A) > (B) > (C)

(4) (C) > (B) > (A)

85. For a first order reaction A → Products, initial concentration of A is 0.1 M, which becomes 0.001 M after 5 minutes. Rate constant for the reaction in min^{-1} is

(1) 0.4606

(2) 0.2303

(3) 1.3818

(4) 0.9212

86. If radius of second Bohr orbit of the He^+ ion is 105.8 pm, what is the radius of third Bohr orbit of Li^{2+} ion?

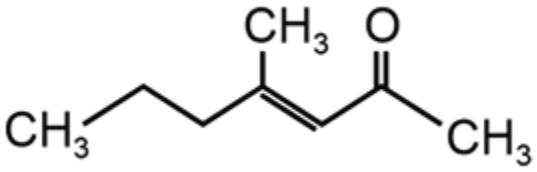
(1) 1.587 pm

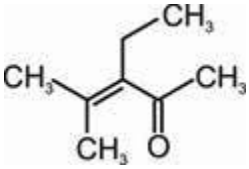
(2) 158.7 Å

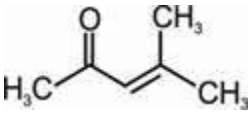
(3) 158.7 pm

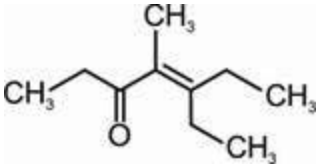
(4) 15.87 pm

87. Which one of the following is not formed when acetone reacts with 2-pentanone in the presence of dilute NaOH followed by heating?

(1) 

(2) 

(3) 

(4) 

88. Find the emf of the cell in which the following reaction takes place at 298 K

$\mathrm{Ni(s) + 2\,Ag^{+}\,(0.001\ M) \rightarrow Ni^{2+}\,(0.001\ M) + 2\,Ag(s)}$

$\left(\text{Given that } \mathrm{E^{\circ}_{cell}} = 1.05\ \mathrm{V}, \frac{2.303\ \mathrm{RT}}{\mathrm{F}} = 0.059 \text{ at } 298\ \mathrm{K}\right)$

(1) 0.96 V

(2) 1.05 V

(3) 1.0385 V

(4) 1.385 V

89. Given below are two statements:

Statement I: In Lucas test, primary, secondary and tertiary alcohols are distinguished on the basis of their reactivity with conc. HCl + $ZnCl_2$, known as Lucas Reagent.

Statement II: Primary alcohols are most reactive and immediately produce turbidity at room temperature on reaction with Lucas Reagent.

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

(1) Statement I is correct but Statement II is incorrect

(2) Statement I is incorrect but Statement II is correct

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

90. In the neutral or faintly alkaline medium, $KMnO_4$ oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from

(1) +7 to +3

(2) +6 to +5

(3) +7 to +4

(4) +6 to +4

BIOLOGY

91. Given below are two statements :

Statement I : Sickle cell anaemia and Haemophilia are autosomal dominant traits.

Statement II : Sickle cell anaemia and Haemophilia are disorders of the blood.

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

(1) **Statement I** is incorrect but **Statement II** is correct

(2) Both **Statement I** and **Statement II** are correct

(3) Both **Statement I** and **Statement II** are incorrect

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

92. Which stage of meiosis can last for months or years in the oocytes of some vertebrates?

(1) Diakinesis

(2) Leptotene

(3) Pachytene

(4) Diplotene

93. Give the **correct** descending order of organisms with reference to their estimated number of species found in Amazon forest.
(a) Plants
(b) Invertebrates
(c) Fishes
(d) Mammals
(e) Birds
Choose the **correct** answer from the options given below :

(1) (b) > (a) > (c) > (e) > (d)

(2) (a) > (b) > (e) > (d) > (c)

(3) (a) > (c) > (d) > (b) > (e)

(4) (b) > (a) > (e) > (d) > (c)

94. The process of translation of mRNA to proteins begins as soon as :

(1) Both the subunits join together to bind with mRNA

(2) The tRNA is activated and the larger subunit of ribosome encounters mRNA

(3) The small subunit of ribosome encounters mRNA

(4) The larger subunit of ribosome encounters mRNA

95. In meiosis, crossing over and exchange of genetic material between homologous chromosomes are catalyzed by the enzyme

(1) Polymerase

(2) Phosphorylase

(3) Recombinase

(4) Transferase

96. When one CO_2 molecule is fixed as one molecule of triose phosphate, which of the following photochemically made, high energy chemical intermediates are used in the reduction phase?

(1) 2 ATP + 2 NADPH

(2) 1 ATP + 1 NADPH

(3) 1 ATP + 2 NADPH

(4) 2 ATP + 1 NADPH

97. The ability of plants to follow different pathways in response to environment leading to formation of different kinds of structures is called

(1) Differentiation

(2) Redifferentiation

(3) Development

(4) Plasticity

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

List-I		**List-II**	
(a)	*Chlamydomonas*	(i)	Moss
(b)	*Cycas*	(ii)	Pteridophyte
(c)	*Selaginella*	(iii)	Alga
(d)	*Sphagnum*	(iv)	Gymnosperm

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

(1) (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)

(2) (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv)

(3) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

(4) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)

99. Match List-I with List-II.

	List-I		**List-II**
(a)	Metacentric chromosome	(i)	Centromere situated close to the end forming one extremely short and one very long arms
(b)	Acrocentric chromosome	(ii)	Centromere at the terminal end
(c)	Submetacentric	(iii)	Centromere in the middle forming two equal arms of chromosomes
(d)	Telocentric chromosome	(iv)	Centromere slightly away from the middle forming one shorter arm and one longer arm

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

(1) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

(2) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

(3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

(4) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

100. Which of the following growth regulators is an adenine derivative?

(1) Abscisic acid

(2) Auxin

(3) Cytokinin

(4) Ethylene

101. The chromosomal theory of inheritance was proposed by

(1) Robert Brown

(2) Thomas Morgan

(3) Sutton and Boveri

(4) Gregor Mendel

102. Which of the following statements is **not** correct?

(1) The rhizome is thick, prostrate and branched

(2) Rhizome is a condensed form of stem

(3) The apical bud in rhizome always remains above the ground

(4) The rhizome is aerial with no distinct nodes and internodes

103. The phenomenon by which the undividing parenchyma cells start to divide mitotically during plant tissue culture is called as

(1) Secondary growth

(2) Differentiation

(3) Dedifferentiation

(4) Redifferentiation

104. The residual persistent part which forms the perisperm in the seeds of beet is

(1) Integument

(2) Calyx

(3) Endosperm

(4) Nucellus

105. The World Summit on sustainable development held in 2002 in Johannesburg, South Africa pledged for:

(1) Collection and preservation of seeds of different genetic strains of commercially important plants.

(2) A significant reduction in the current rate of biodiversity loss.

(3) Declaration of more biodiversity hotspots.

(4) Increase in agricultural production.

106. Which one of the following statement is **not true** regarding gel electrophoresis technique?

(1) The presence of chromogenic substrate gives blue coloured DNA bands on the gel.

(2) Bright orange coloured bands of DNA can be observed in the gel when exposed to UV light.

(3) The process of extraction of separated DNA strands from gel is called elution.

(4) The separated DNA fragments are stained by using ethidium bromide.

107. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A) : Polymerase chain reaction is used for DNA amplification.
Reason (R) : The ampicillin resistant gene is used as a selectable marker to check transformation.
In the light of above statements, choose the **correct** answer from the options given below:

(1) **(A)** is correct but **(R)** is not correct

(2) **(A)** is not correct but **(R)** is correct

(3) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(4) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

108. Exoskeleton of arthropods is composed of :

(1) Chitin

(2) Glucosamine

(3) Cutin

(4) Cellulose

109. Read the following statements on lipids and find out correct set of statements:
(a) Lecithin found in the plasma membrane is a glycolipid.
(b) Saturated fatty acids possess one or more C = C bonds.
(c) Gingelly oil has lower melting point, hence remains as oil in winter.
(d) Lipids are generally insoluble in water but soluble in some organic solvents.
(e) When a fatty acid is esterified with glycerol, monoglycerides are formed.
Choose the correct answer from the options given below:

(1) (c), (d) and (e) only

(2) (a), (b) and (d) only

(3) (a), (b) and (c) only

(4) (a), (d) and (e) only

110. In the following palindromic base sequences of DNA, which one can be cut easily by a particular restriction enzyme?

(1) 5′CTCAGT3′; 3′GAGTCA5′

(2) 5′GTATTC3′; 3′CATAAG5′

(3) 5′GATACT3′; 3′CTATGA5′

(4) 5′GAATTC3′; 3′CTTAAG5′

111. Transposons can be used during which one of the following?

(1) Autoradiography

(2) Gene sequencing

(3) Polymerase Chain Reaction

(4) Gene Silencing

112. Natural selection where more individuals acquire specific character value other than the mean character value, leads to

(1) Disruptive change

(2) Random change

(3) Stabilising change

(4) Directional change

113. A dehydration reaction links two glucose molecules to produce maltose. If the formula for glucose is $C_6H_{12}O_6$, then what is the formula of maltose?

(1) $C_{12}H_{22}O_{11}$

(2) $C_{12}H_{24}O_{11}$

(3) $C_{12}H_{20}O_{10}$

(4) $C_{12}H_{24}O_{12}$

114. Tegmina in cockroach, arises from

(1) Metathorax

(2) Prothorax and Mesothorax

(3) Prothorax

(4) Mesothorax

115. Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A) : All vertebrates are chordates but all chordates are not vertebrates.
Reason (R) : Notochord is replaced by vertebral column in the adult vertebrates.
In the light of the above statements, choose the **most appropriate** answer from the option given below :

(1) **(A)** is correct but **(R)** is not correct

(2) **(A)** is not correct but **(R)** is correct

(3) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(4) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

116. The type of tissue commonly found in the fruit wall of nuts is :

(1) Sclereid

(2) Parenchyma

(3) Collenchyma

(4) Sclerenchyma

117. Given below are two statements
Statement I: DNA polymerases catalyse polymerisation only in one direction, that is 5′ → 3′.
Statement II: During replication of DNA, on one strand the replication is continuous while on other strand it is discontinuous.
In the light of the above statements, choose the **correct** answer from the options given below:

(1) Statement I is incorrect but Statement II is correct

(2) Both Statement I and Statement II are correct

(3) Both Statement I and Statement II are incorrect

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

118. Initiation of lateral roots and vascular cambium during secondary growth takes place in cells of

(1) Pericycle

(2) Epiblema

(3) Cortex

(4) Endodermis

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

List - I		**List – II**
(a) In *lac* operon *i* gene codes for	(i)	transacetylase
(b) In *lac* operon *z* gene codes for	(ii)	permease
(c) In *lac* operon *y* gene codes for	(iii)	β-galactosidase
(d) In *lac* operon *a* gene codes for	(iv)	Repressor

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

(1) (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

(2) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)

(3) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

(4) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)

120. The 5-C compound formed during TCA cycle is

(1) Fumaric acid

(2) α-ketoglutaric acid

(3) Oxalo succinic acid

(4) Succinic acid

121. To ensure that only the desired pollens fall on the stigma in artificial hybridization process
(a) the female flower buds of plant producing unisexual flowers need not be bagged.
(b) there is no need to emasculate unisexual flowers of selected female parent
(c) emasculated flowers are to be bagged immediately after cross pollination
(d) emasculated flowers are to be bagged after removal of anthers
(e) bisexual flowers, showing protogyny are never selected for cross
Choose the **correct answer** from the options given below:

(1) (a), (d) and (e) only

(2) (a), (b) and (c) only

(3) (b), (c) and (d) only

(4) (b), (c) and (e) only

122. Match **List - I** with **List – II.**

List - I		**List - II**
(a) Imbricate	(i)	*Calotropis*
(b) Valvate	(ii)	*Cassia*
(c) Vexillary	(iii)	Cotton
(d) Twisted	(iv)	Bean

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

(1) (a) - (i), (b) - (iii), (c) - (iv), (d) - (ii)

(2) (a) - (ii), (b) - (i), (c) - (iii), (d) - (iv)

(3) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

(4) (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)

123. What is the net gain of ATP when each molecule of glucose is converted to two molecules of pyruvic acid?

(1) Two

(2) Eight

(3) Four

(4) Six

124. The Floral Diagram represents which one of the following families?

(1) Liliaceae

(2) Fabaceae

(3) Brassicaceae

(4) Solanaceae

125. Match List-I with List-II:

	List-I		**List-II**
(a)	Bacteriophage $\phi \times 174$	(i)	48502 base pairs
(b)	Bacteriophage lambda	(ii)	5386 nucleotides
(c)	*Escherichia coli*	(iii)	3.3×10^9 base pairs
(d)	Haploid content of human DNA	(iv)	4.6×10^6 base pairs

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

(1) (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

(2) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

(3) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

(4) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

126. Which type of substance would face difficulty to pass through the cell membrane?

(1) Substance soluble in lipids

(2) Substance with hydrophobic moiety

(3) Substance with hydrophilic moiety

(4) All substance irrespective of hydrophobic and hydrophilic moiety

127. What is the expected percentage of F_2 progeny with yellow and inflated pod in dihybrid cross experiment involving pea plants with green coloured, inflated pod and yellow coloured constricted pod?

(1) 9%

(2) 100%

(3) 56.25%

(4) 18.75%

128. Given below are two statements:

Statement I: Decomposition is a process in which the detritus is degraded into simpler substances by microbes.

Statement II: Decomposition is faster if the detritus is rich in lignin and chitin.

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

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

129. If a female individual is with small round head, furrowed tongue, partially open mouth and broad palm with characteristic palm crease. Also the physical, psychomotor and mental development is retarded. The karyotype analysis of such an individual will show :

(1) Trisomy of chromosome 21

(2) 47 chromosomes with XXY sex chromosomes

(3) 45 chromosomes with XO sex chromosomes

(4) 47 chromosomes with XYY sex chromosomes

130. While explaining interspecific interaction of population, (+) sign is assigned for beneficial interaction, (–) sign is assigned for detrimental interaction and (0) for neutral interaction. Which of the following interactions can be assigned (+) for one species and (–) for another species involved in the interaction ?

(1) Commensalism

(2) Competition

(3) Predation

(4) Amensalism

131. Match the following columns and select the correct option:

Column I		Column II	
(a)	Ovary	(i)	Human chorionic gonadotropin
(b)	Placenta	(ii)	Estrogen and progesterone
(c)	Corpus luteum	(iii)	Androgens
(d)	Leydig cells	(iv)	Progesterone only

(1) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

(2) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

(3) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

(4) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

132. Under normal physiological conditions in human beings, every 100 mL of oxygenated blood can deliver _____ mL of O_2 to the tissues. Select the correct option to fill in the blank.

(1) 4 mL

(2) 10 mL

(3) 2 mL

(4) 5 mL

133. In which of the following animals, digestive tract has additional chambers like crop and gizzard?

(1) *Catla*, *Columba*, *Crocodilus*

(2) *Pavo*, *Psittacula*, *Corvus*

(3) *Corvus*, *Columba*, *Chameleon*

(4) *Bufo*, *Balaenoptera*, *Bangarus*

134. In human beings, at the end of 12 weeks(first trimester) of pregnancy, which of the following is observed?

(1) Movement of the foetus

(2) Eyelids and eyelashes are formed

(3) Most of the major organ systems are formed

(4) The head is covered with fine hair

135. Nitrogenous waste is excreted in the form of pellet or paste by :

(1) *Hippocampus*

(2) *Pavo*

(3) *Ornithorhynchus*

(4) *Salamandra*

136. Which of the following is present between the adjacent bones of the vertebral column?

(1) Areolar tissue

(2) Smooth muscle

(3) Intercalated discs

(4) Cartilage

137. Match the following columns and select the correct option:

Column I		Column II	
(a)	Pituitary hormone	(i)	Steroid
(b)	Epinephrine	(ii)	Neuropeptides
(c)	Endorphins	(iii)	Peptides, proteins
(d)	Cortisol	(iv)	Biogenic amines

(1) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

(2) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

(3) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

(4) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

138. Given below are two statements:

Statement I : The release of sperms into the seminiferous tubules is called spermiation.

Statement II : Spermiogenesis is the process of formation of sperms from spermatogonia.

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

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

139. Given below are two statements:

Statement I : The coagulum is formed of network of threads called thrombins.

Statement II : Spleen is the graveyard of erythrocytes.

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

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

140. Which of the following statements are true for spermatogenesis but do not hold true for Oogenesis?

(a) It results in the formation of haploid gametes

(b) Differentiation of gamete occurs after the completion of meiosis

(c) Meiosis occurs continuously in a mitotically dividing stem cell population

(d) It is controlled by the Luteinising hormone (LH) and Follicle Stimulating Hormone (FSH) secreted by the anterior pituitary

(e) It is initiated at puberty

Choose the most appropriate answer from the options given below:

(1) (b), (d) and (e) only

(2) (b), (c) and (e) only

(3) (c) and (e) only

(4) (b) and (c) only

141. Lippes loop is a type of contraceptive used as:

(1) Non-Medicated IUD

(2) Copper releasing IUD

(3) Cervical barrier

(4) Vault barrier

142. Which of the following is a correct match for disease and its symptoms?

(1) Myasthenia gravis – Genetic disorder resulting in weakening and paralysis of skeletal muscle

(2) Muscular dystrophy – An auto immune disorder causing progressive degeneration of skeletal muscle

(3) Arthritis – Inflammed joints

(4) Tetany – High Ca^{2+} level causing rapid spasms.

143. Which of the following is not the function of conducting part of respiratory system?

(1) Temperature of inhaled air is brought to body temperature

(2) Provides surface for diffusion of O_2 and CO_2

(3) It clears inhaled air from foreign particles

(4) Inhaled air is humidified

144. Which of the following is **not** a connective tissue?

(1) Cartilage

(2) Neuroglia

(3) Blood

(4) Adipose tissue

145. Given below are two statements:
Statement I: Restriction endonucleases recognise specific sequence to cut DNA known as palindromic nucleotide sequence.
Statement II: Restriction endonucleases cut the DNA strand a little away from the centre of the palindromic site.
In the light of the above statements, choose the **most appropriate** answer from the options given below:

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

146. In gene therapy of Adenosine Deaminase (ADA) deficiency, the patient requires periodic infusion of genetically engineered lymphocytes because :

(1) Lymphocytes from patient's blood are grown in culture, outside the body.

(2) Genetically engineered lymphocytes are not immortal cells.

(3) Retroviral vector is introduced into these lymphocytes.

(4) Gene isolated from marrow cells producing ADA is introduced into cells at embryonic stages

147. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A): Osteoporosis is characterised by decreased bone mass and increased chance of fractures.
Reason (R): Common cause of osteoporosis is increased levels of estrogen.
In the light of the above statements, choose the **most appropriate** answer from the options given below.

(1) **(A)** is correct but **(R)** is not correct

(2) **(A)** is not correct but **(R)** is correct

(3) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(4) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

148. At which stage of life the oogenesis process is initiated?

(1) Birth

(2) Adult

(3) Puberty

(4) Embryonic development stage

149. Given below are two statements:
Statement I: Auto-immune disorder is a condition where body defense mechanism recognizes its own cells as foreign bodies.
Statement II: Rheumatoid arthritis is a condition where body does not attack self-cells.
In the light of the above statements, choose the **most appropriate** answer from the options given below:

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

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

	List-I (Biological molecules)		**List-II (Biological functions)**
(a)	Glycogen	(i)	Hormone
(b)	Globulin	(ii)	Biocatalyst
(c)	Steroids	(iii)	Antibody
(d)	Trypsin	(iv)	Storage product

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

(1) (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)

(2) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)

(3) (a) - (iii), (b) - (ii), (c) - (iv), (d) - (i)

(4) (a) - (iv), (b) - (ii), (c) - (i), (d) - (iii)

151. Which of the following are **not** the effects of parathyroid hormone?

(a) Stimulates the process of bone resorption

(b) Decreases Ca^{2+} levels in blood

(c) Reabsorption of Ca^{2+} by renal tubules

(d) Decreases the absorption of Ca^{2+} from digested food

(e) Increases metabolism of carbohydrates

Choose the **most appropriate** answer from the options given below:

(1) (a) and (e) only

(2) (b) and (c) only

(3) (a) and (c) only

(4) (b), (d) and (e) only

152. Which of the following is **not** a desirable feature of a cloning vector?

(1) Presence of single restriction enzyme site

(2) Presence of two or more recognition sites

(3) Presence of origin of replication

(4) Presence of a marker gene

153. Match **List I** with **List II** with respect to methods of Contraception and their respective actions

	List I		**List II**
(a)	Diaphragms	(i)	Inhibit ovulation and implantation
(b)	Contraceptive pills	(ii)	Increase phagocytosis of sperms within uterus
(c)	Intra uterine devices	(iii)	Absence of menstrual cycle and ovulation following parturition
(d)	Lactational amenorrhea	(iv)	They cover the cervix blocking the entry of sperms

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

(1) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)

(2) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)

(3) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)

(4) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)

154. Which of the following statements **is not** true?

(1) Homology indicates common ancestry

(2) Flippers of penguins and dolphins are a pair of homologous organs

(3) Analogous structures are a result of convergent evolution

(4) Sweet potato and potato is an example of analogy

155. Select the **incorrect** statement with respect to acquired immunity.

(1) Anamnestic response is due to memory of first encounter.

(2) Acquired immunity is non-specific type of defense present at the time of birth.

(3) Primary response is produced when our body encounters a pathogen for the first time.

(4) Anamnestic response is elicited on subsequent encounters with the same pathogen.

156. Match the **List-I** with **List-II** :

	List-I		**List-II**
(a)	Sacred groves	(i)	Alien species
(b)	Zoological park	(ii)	Release of large quantity of oxygen
(c)	Nile perch	(iii)	*Ex-situ* conservation
(d)	Amazon forest	(iv)	Khasi Hills in Meghalaya

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

(1) (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

(2) (a) – (iv), (b) – (iii), (c) – (i), (d) – (ii)

(3) (a) – (ii), (b) – (iv), (c) – (i), (d) – (iii)

(4) (a) – (iv), (b) – (i), (c) – (ii), (d) – (iii)

157. Identify the **correct** sequence of events during Prophase I of meiosis:

(a) Synapsis of homologous chromosomes

(b) Chromosomes become gradually visible under microscope

(c) Crossing over between non-sister chromatids of homologous chromosomes

(d) Terminalisation of chiasmata

(e) Dissolution of synaptonemal complex

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

(1) (a), (c), (d), (e), (b)

(2) (a), (b), (c), (d), (e)

(3) (b), (c), (d), (e), (a)

(4) b), (a), (c), (e), (d)

158. Frugivorous birds are found in large numbers in tropical forests mainly because of :

(1) Temperature conducive for their breeding

(2) Lack of niche specialisation

(3) Higher annual rainfall

(4) Availability of fruits throughout the year

159. Identify the **correct** statements regarding chemiosmotic hypothesis:
(a) Splitting of the water molecule takes place on the inner side of the membrane.
(b) Protons accumulate within the lumen of the thylakoids.
(c) Primary acceptor of electron transfers the electrons to an electron carrier.
(d) NADP reductase enzyme is located on the stroma side of the membrane.
(e) Protons increase in number in stroma.
Choose the **correct answer** from the options given below:

(1) (b), (c) and (e)

(2) (a), (b) and (e)

(3) (a), (b) and (d)

(4) (b), (c) and (d)

160. Which of the following can be expected if scientists succeed in introducing apomictic gene into hybrid varieties of crops?

(1) There will be segregation of the desired characters only in the progeny

(2) Polyembryony will be seen and each seed will produce many plantlets

(3) Seeds of hybrid plants will show longer dormancy

(4) Farmers can keep on using the seeds produced by the hybrids to raise new crop year after year

161. Which one of the following plants does **not** show plasticity?

(1) Buttercup

(2) Maize

(3) Cotton

(4) Coriander

162. Given below are two statements :
Statement I : Mendel studied seven pairs of contrasting traits in pea plants and proposed the Laws of Inheritance.
Statement II : Seven characters examined by Mendel in his experiment on pea plants were seed shape and colour, flower colour, pod shape and colour, flower position and stem height.
In the light of the above statements, choose the correct answer from the options given below :

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

163. Hydrocolloid carrageen is obtained from:

(1) Rhodophyceae only

(2) Phaeophyceae only

(3) Chlorophyceae and Phaeophyceae

(4) Phaeophyceae and Rhodophyceae

164. The flowers are zygomorphic in:
(a) Mustard
(b) Gulmohar
(c) *Cassia*
(d) *Datura*
(e) Chilly
Choose the **correct answer** from the options given below:

(1) (d), (e) Only

(2) (c), (d), (e) Only

(3) (a), (b), (c) Only

(4) (b), (c) Only

165. Which of the following is **not** a method of *ex situ* conservation?

(1) Micropropagation

(2) Cryopreservation

(3) *In vitro* fertilization

(4) National Parks

166. What amount of energy is released from glucose during lactic acid fermentation?

(1) About 10%

(2) Less than 7%

(3) Approximately 15%

(4) More than 18%

167. Read the following statements and choose the set of **correct** statements :
(a) Euchromatin is loosely packed chromatin
(b) Heterochromatin is transcriptionally active
(c) Histone octomer is wrapped by negatively charged DNA in nucleosome
(d) Histones are rich in lysine and arginine
(e) A typical nucleosome contains 400 bp of DNA helix
Choose the **correct** answer from the options given below :

(1) (b), (e) Only

(2) (a), (c), (e) Only

(3) (b), (d), (e) Only

(4) (a), (c), (d) Only

168. The gaseous plant growth regulator is used in plants to :

(1) help overcome apical dominance

(2) kill dicotyledonous weeds in the fields

(3) speed up the malting process

(4) promote root growth and root hair formation to increase the absorption surface

169. XO type of sex determination can be found in :

(1) Grasshoppers

(2) Monkeys

(3) *Drosophila*

(4) Birds

170. Production of Cucumber has increased manifold in recent years. Application of which of the following phytohormones has resulted in this increased yield as the hormone is known to produce female flowers in the plants :

(1) Ethylene

(2) Cytokinin

(3) ABA

(4) Gibberellin

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

	List-I		**List-II**
(a)	Bronchioles	(i)	Dense Regular Connective Tissue
(b)	Goblet Cell	(ii)	Loose Connective Tissue
(c)	Tendons	(iii)	Glandular Tissue
(d)	Adipose Tissue	(iv)	Ciliated Epithelium

Choose the correct answer from the options given below:

(1) (a)-(ii), (b)-(i), (c)-(iv), (d)–(iii)

(2) (a)-(iii), (b)-(iv), (c)-(ii), (d)–(i)

(3) (a)-(iv), (b)-(iii), (c)-(i), (d)–(ii)

(4) (a)-(i), (b)-(ii), (c)-(iii), (d)–(iv)

172. Statements related to human Insulin are given below.
Which statement(s) is/are **correct** about genetically engineered Insulin?
(a) Pro-hormone insulin contains extra stretch of C-peptide
(b) A-peptide and B-peptide chains of insulin were produced separately in *E.coli*, extracted and combined by creating disulphide bonds between them.
(c) Insulin used for treating Diabetes was extracted from cattles and pigs.
(d) Pro-hormone Insulin needs to be processed for converting into a mature and functional hormone.
(e) Some patients develop allergic reactions to the foreign insulin.
Choose **the most appropriate** answer from the options given below:

(1) (c) and (d) only

(2) (c), (d) and (e) only

(3) (a), (b) and (d) only

(4) (b) only

173. Select the **incorrect** statement regarding synapses :

(1) Chemical synapses use neurotransmitters

(2) Impulse transmission across a chemical synapse is always faster than that across an electrical synapse.

(3) The membranes of presynaptic and postsynaptic neurons are in close proximity in an electrical synapse.

(4) Electrical current can flow directly from one neuron into the other across the electrical synapse.

174. Which one of the following statements is **correct**?

(1) Blood moves freely from atrium to the ventricle during joint diastole.

(2) Increased ventricular pressure causes closing of the semilunar valves.

(3) The atrio-ventricular node (AVN) generates an action potential to stimulate atrial contraction

(4) The tricuspid and the bicuspid valves open due to the pressure exerted by the simultaneous contraction of the atria

175. Use of bioresources by multinational companies and organisations without authorisation from the concerned country and its people is called

(1) Biodegradation

(2) Biopiracy

(3) Bio-infringement

(4) Bioexploitation

176. The correct order of steps in Polymerase Chain Reaction (PCR) is

(1) Denaturation, Extension, Annealing

(2) Annealing, Extension, Denaturation

(3) Extension, Denaturation, Annealing

(4) Denaturation, Annealing, Extension

177. Which of the following is an amino acid derived hormone?

(1) Estradiol

(2) Ecdysone

(3) Epinephrine

(4) Estriol

178. Which part of poppy plant is used to obtain the drug "Smack"?

(1) Roots

(2) Latex

(3) Flowers

(4) Leaves

179. According to Hugo de Vries, the mechanism of evolution is

(1) Phenotypic variations

(2) Saltation

(3) Multiple step mutations

(4) Minor mutations

180. Nissl bodies are mainly composed of

(1) Nucleic acids and SER

(2) DNA and RNA

(3) Proteins and lipids

(4) Free ribosomes and RER

Aakash

Medical | IIT-JEE | Foundations

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4. If the initial tension on a stretched string is doubled, then the ratio of the initial and final speeds of a transverse wave along the string is

(1) $1 : \sqrt{2}$

(2) 1 : 2

(3) 1 : 1

(4) $\sqrt{2} : 1$

5. If a soap bubble expands, the pressure inside the bubble

(1) Remains the same

(2) Is equal to the atmospheric pressure

(3) Decreases

(4) Increases

6. The ratio of the distances travelled by a freely falling body in the 1^{st}, 2^{nd}, 3^{rd} and 4^{th} second

(1) 1 : 3 : 5 : 7

(2) 1 : 1 : 1 : 1

(3) 1 : 2 : 3 : 4

(4) 1 : 4 : 9 : 16

7. A long solenoid of radius 1 mm has 100 turns per mm. If 1 A current flows in the solenoid, the magnetic field strength at the centre of the solenoid is

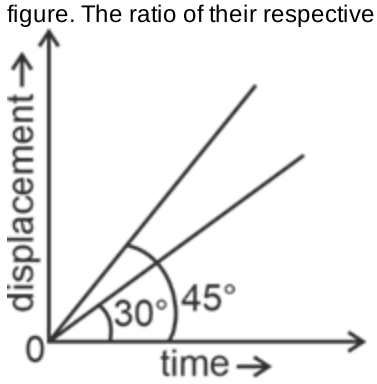
(1) 12.56×10^{-4} T

(2) 6.28×10^{-4} T

(3) 6.28×10^{-2} T

(4) 12.56×10^{-2} T

8. The displacement-time graphs of two moving particles make angles of 30° and 45° with the *x*-axis as shown in the figure. The ratio of their respective velocity is



(1) 1 : 2

(2) $1 : \sqrt{3}$

(3) $\sqrt{3} : 1$

(4) 1 : 1

9. The peak voltage of the ac source is equal to

(1) $\sqrt{2}$ times the rms value of the ac source

(2) $1/\sqrt{2}$ times the rms value of the ac source

(3) The value of voltage supplied to the circuit

(4) The rms value of the ac source

10. Let T_1 and T_2 be the energy of an electron in the first and second excited states of hydrogen atom, respectively. According to the Bohr's model of an atom, the ratio $T_1 : T_2$ is

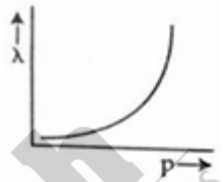
(1) 4 : 9

(2) 9 : 4

(3) 1 : 4

(4) 4 : 1

11. The graph which shows the variation of the de Broglie wavelength (λ) of a particle and its associated momentum (*p*) is

(1)


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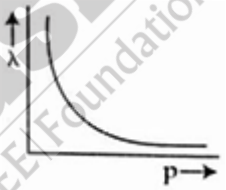

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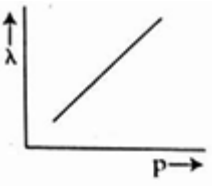
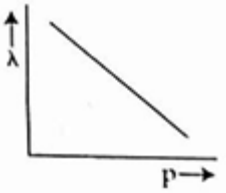


(4)


12. Plane angle and solid angle have

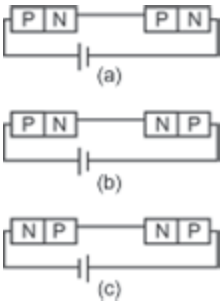
(1) No units and no dimensions

(2) Both units and dimensions

(3) Units but no dimensions

(4) Dimensions but no units

13.



In the given circuits (a), (b) and (c), the potential drop across the two *p-n* junctions are equal in

(1) Circuit (c) only

(2) Both circuits (a) and (c)

(3) Circuit (a) only

(4) Circuit (b) only

14. The ratio of the radius of gyration of a thin uniform disc about an axis passing through its centre and normal to its plane to the radius of gyration of the disc about its diameter is

(1) 4 : 1

(2) $1:\sqrt{2}$

(3) 2 : 1

(4) $\sqrt{2}:1$

15. A copper wire of length 10 m and radius $\left(\frac{10^{-2}}{\sqrt{\pi}}\right) m$ has electrical resistance of 10 Ω. The current density in the wire for an electric field strength of 10 (V/m) is

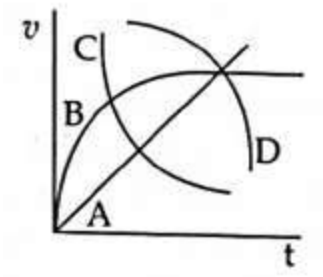
(1) 10^{-5} A/m^2

(2) 10^{5} A/m^2

(3) 10^{4} A/m^2

(4) 10^{6} A/m^2

16. A spherical ball is dropped in a long column of a highly viscous liquid. The curve in the graph shown, which represents the speed of the ball (*v*) as a function of time (*t*) is



(1) C

(2) D

(3) A

(4) B

17. Two resistors of resistance, 100 Ω and 200 Ω are connected in parallel in an electrical circuit. The ratio of the thermal energy developed in 100 Ω to that in 200 Ω in a given time is

(1) 1 : 4

(2) 4 : 1

(3) 1 : 2

(4) 2 : 1

18. Two transparent media *A* and *B* are separated by a plane boundary. The speed of light in those media are 1.5×10^8 m/s and 2.0×10^8 m/s, respectively. The critical angle for a ray of light for these two media is

(1) $\tan^{-1}(0.500)$

(2) $\tan^{-1}(0.750)$

(3) $\sin^{-1}(0.500)$

(4) $\sin^{-1}(0.750)$

19. In a Young's double slit experiment, a student observes 8 fringes in a certain segment of screen when a monochromatic light of 600 nm wavelength is used. If the wavelength of light is changed to 400 nm, then the number of fringes he would observe in the same region of the screen is

(1) 9

(2) 12

(3) 6

(4) 8

20. When light propagates through a material medium of relative permittivity ε_r and relative permeability μ_r, the velocity of light, *v* is given by (*c*-velocity of light in vacuum)

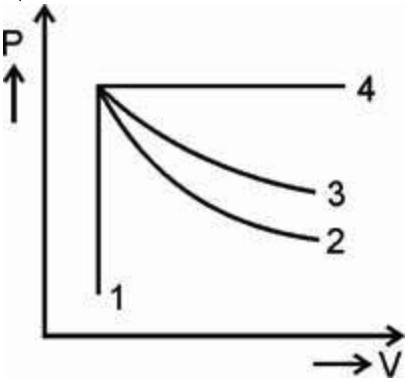
(1) $v=\sqrt{\frac{\varepsilon_r}{\mu_r}}$

(2) $v=\frac{c}{\sqrt{\varepsilon_r \mu_r}}$

(3) $v = c$

(4) $v=\sqrt{\frac{\mu_r}{\varepsilon_r}}$

21. An ideal gas undergoes four different processes from the same initial state as shown in the figure below. Those processes are adiabatic, isothermal, isobaric and isochoric. The curve which represents the adiabatic process among 1, 2, 3 and 4 is



(1) 3

(2) 4

(3) 1

(4) 2

22. As the temperature increases, the electrical resistance

(1) Increases for conductors but decreases for semiconductors

(2) Decreases for conductors but increases for semiconductors

(3) Increases for both conductors and semiconductors

(4) Decreases for both conductors and semiconductors

23. Two objects of mass 10 kg and 20 kg respectively are connected to the two ends of a rigid rod of length 10 m with negligible mass. The distance of the center of mass of the system from the 10 kg mass is

(1) 10 m

(2) 5 m

(3) $\frac{10}{3}$ m

(4) $\frac{20}{3}$ m

24. In half wave rectification, if the input frequency is 60 Hz, then the output frequency would be

(1) 60 Hz

(2) 120 Hz

(3) Zero

(4) 30 Hz

25. Given below are two statements

Statement I : Biot-Savart's law gives us the expression for the magnetic field strength of an infinitesimal current element (Idl) of a current carrying conductor only.

Statement II : Biot-Savart's law is analogous to Coulomb's inverse square law of charge q, with the former being related to the field produced by a scalar source, Idl while the latter being produced by a vector source, q.

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

(1) Statement I is correct and Statement II is incorrect

(2) Statement I is incorrect and Statement II is correct

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

26. The energy that will be ideally radiated by a 100 kW transmitter in 1 hour is

(1) 36×10^5 J

(2) 1×10^5 J

(3) 36×10^7 J

(4) 36×10^4 J

27. A body of mass 60 g experiences a gravitational force of 3.0 N, when placed at a particular point. The magnitude of the gravitational field intensity at that point is

(1) 20 N/kg

(2) 180 N/kg

(3) 0.05 N/kg

(4) 50 N/kg

28. A biconvex lens has radii of curvature, 20 cm each. If the refractive index of the material of the lens is 1.5, the power of the lens is

(1) +5 D

(2) Infinity

(3) +2 D

(4) +20 D

29. A shell of mass m is at rest initially. It explodes into three fragments having mass in the ratio 2 : 2 : 1. If the fragments having equal mass fly off along mutually perpendicular directions with speed v, the speed of the third (lighter) fragment is

(1) $2\sqrt{2}v$

(2) $3\sqrt{2}v$

(3) v

(4) $\sqrt{2}v$

30. The dimensions $[MLT^{-2}A^{-2}]$ belong to the

(1) Magnetic permeability

(2) Electric permittivity

(3) Magnetic flux

(4) Self inductance

31. The angle between the electric lines of force and the equipotential surface is

(1) 90°

(2) 180°

(3) 0°

(4) 45°

32. A square loop of side 1 m and resistance 1 Ω is placed in a magnetic field of 0.5 T. If the plane of loop is perpendicular to the direction of magnetic field, the magnetic flux through the loop is

(1) 1 weber

(2) Zero weber

(3) 2 weber

(4) 0.5 weber

33. A light ray falls on a glass surface of refractive index $\sqrt{3}$, at an angle 60°. The angle between the refracted and reflected rays would be

(1) 90°

(2) 120°

(3) 30°

(4) 60°

34. A ball is projected with a velocity, 10 ms^{-1}, at an angle of 60° with the vertical direction. Its speed at the highest point of its trajectory will be

(1) 5 ms^{-1}

(2) 10 ms^{-1}

(3) Zero

(4) $5\sqrt{3}\ ms^{-1}$

35. A series LCR circuit with inductance 10 H, capacitance $10\ \mu F$, resistance 50 Ω is connected to an ac source of voltage, $V = 200\sin(100t)$ volt. If the resonant frequency of the LCR circuit is ν_0 and the frequency of the ac source is ν, then

(1) $\nu_0 = \frac{50}{\pi}$ Hz, $\nu = 50$ Hz

(2) $\nu = 100$ Hz; $\nu_0 = \frac{100}{\pi}$ Hz

(3) $\nu_0 = \nu = 50$ Hz

(4) $\nu_0 = \nu = \frac{50}{\pi}$ Hz

36. The area of a rectangular field (in m^2) of length 55.3 m and breadth 25 m after rounding off the value for correct significant digits is

(1) 1382.5

(2) 14×10^2

(3) 138×10^1

(4) 1382

37. Two pendulums of length 121 cm and 100 cm start vibrating in phase. At some instant, the two are at their mean position in the same phase. The minimum number of vibrations of the shorter pendulum after which the two are again in phase at the mean position is:

(1) 10

(2) 8

(3) 11

(4) 9

38. Given below are two statements : One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A): The stretching of a spring is determined by the shear modulus of the material of the spring.
Reason (R): A coil spring of copper has more tensile strength than a steel spring of same dimensions.
In the light of the above statements, choose the **most appropriate** answer from the options given below

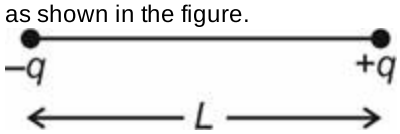
(1) **(A)** is true but **(R)** is false

(2) **(A)** is false but **(R)** is true

(3) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

(4) Both **(A)** and **(R)** are true and **(R)** is not the correct explanation of **(A)**

39. Two point charges $-q$ and $+q$ are placed at a distance of L, as shown in the figure.



The magnitude of electric field intensity at a distance R ($R >> L$) varies as:

(1) $\frac{1}{R^4}$

(2) $\frac{1}{R^6}$

(3) $\frac{1}{R^2}$

(4) $\frac{1}{R^3}$

40. A nucleus of mass number 189 splits into two nuclei having mass number 125 and 64. The ratio of radius of two daughter nuclei respectively is

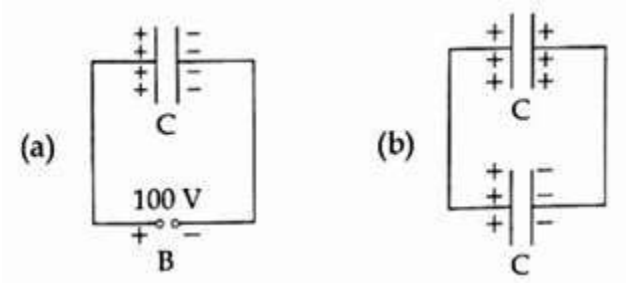
(1) 5 : 4

(2) 25 : 16

(3) 1 : 1

(4) 4 : 5

41. A capacitor of capacitance C = 900 pF is charged fully by 100 V battery B as shown in figure (a). Then it is disconnected from the battery and connected to another uncharged capacitor of capacitance C = 900 pF as shown in figure (b). The electrostatic energy stored by the system (b) is



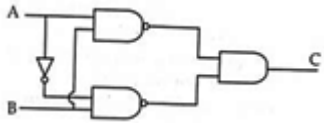
(1) 2.25×10^{-6} J

(2) 1.5×10^{-6} J

(3) 4.5×10^{-6} J

(4) 3.25×10^{-6} J

42.



The truth table for the given logic circuit is

(1)

A	B	C
0	0	1
0	1	0
1	0	1
1	1	0

(2)

A	B	C
0	0	0
0	1	1
1	0	0
1	1	1

(3)

A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

(4)

A	B	C
0	0	1
0	1	0
1	0	0
1	1	1

43. Match List-I with List-II

	List-I		**List-II**
(a)	Gravitational constant (G)	(i)	$[L^2T^{-2}]$
(b)	Gravitational potential energy	(ii)	$[M^{-1}L^3T^{-2}]$
(c)	Gravitational potential	(iii)	$[LT^{-2}]$
(d)	Gravitational intensity	(iv)	$[ML^2T^{-2}]$

Choose the correct answer from the options given below

(1) (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)

(2) (a) - (iv), (b) - (ii), (c) - (i), (d) - (iii)

(3) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

(4) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)

44. From Ampere's circuital law for a long straight wire of circular cross-section carrying a steady current, the variation of magnetic field in the inside and outside region of the wire is

(1) A linearly increasing function of distance r upto the boundary of the wire and then decreasing one with $\frac{1}{r}$ dependence for the outside region.

(2) A linearly decreasing function of distance upto the boundary of the wire and then a linearly increasing one for the outside region.

(3) Uniform and remains constant for both the regions.

(4) A linearly increasing function of distance upto the boundary of the wire and then linearly decreasing for the outside region.

45. A big circular coil of 1000 turns and average radius 10 m is rotating about its horizontal diameter at 2 rad s^{-1}. If the vertical component of earth's magnetic field at that place is 2×10^{-5} T and electrical resistance of the coil is 12.56 Ω, then the maximum induced current in the coil will be

(1) 1 A

(2) 2 A

(3) 0.25 A

(4) 1.5 A

CHEMISTRY

46. Which of the following statement is not correct about diborane?

(1) The four terminal Hydrogen atoms and the two Boron atoms lie in one plane.

(2) Both the Boron atoms are sp^2 hybridised.

(3) There are two 3-centre-2-electron bonds.

(4) The four terminal B-H bonds are two centre two electron bonds.

47. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A): ICl is more reactive than I_2.
Reason (R): I-Cl bond is weaker than I-I bond.
In the light of the above statements, choose the most **appropriate** answer from the options given below:

(1) (A) is correct but (R) is not correct

(2) (A) is not correct but (R) is correct

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

(4) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

48. In one molal solution that contains 0.5 mole of a solute, there is

(1) 100 mL of solvent

(2) 1000 g of solvent

(3) 500 mL of solvent

(4) 500 g of solvent

49. Given below are half cell reactions:

$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$

$E^\circ_{Mn^{2+}/MnO_4^-} = -1.510\ V$

$\frac{1}{2}O_2 + 2H^+ + 2e^- \rightarrow H_2O$

$E^\circ_{O_2/H_2O} = +1.223\ V$

Will the permanganate ion, MnO_4^- liberate O_2 from water in the presence of an acid?

(1) Yes, because $E^\circ_{cell} = +2.733\ V$

(2) No, because $E^\circ_{cell} = -2.733\ V$

(3) Yes, because $E^\circ_{cell} = +0.287\ V$

(4) No, because $E^\circ_{cell} = -0.287\ V$

50. Identify the **incorrect** statement from the following.

(1) In an atom, all the five 3*d* orbitals are equal in energy in free state.

(2) The shapes of d_{xy}, d_{yz} and d_{zx} orbitals are similar to each other; and $d_{x^2-y^2}$ and d_{z^2} are similar to each other.

(3) All the five 5*d* orbitals are different in size when compared to the respective 4*d* orbitals.

(4) All the five 4*d* orbitals have shapes similar to the respective 3*d* orbitals.

51. What mass of 95% pure $CaCO_3$ will be required to neutralise 50 mL of 0.5 M HCl solution according to the following reaction?

$CaCO_{3(s)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + CO_{2(g)} + H_2O_{(i)}$

[Calculate upto second place of decimal point]

(1) 3.65 g

(2) 9.50 g

(3) 1.25 g

(4) 1.32 g

52.

$$RMgX + CO_2 \xrightarrow[\text{ether}]{\text{dry}} Y \xrightarrow{H_3O^+} RCOOH$$

What is Y in the above reaction?

(1) $RCOO^-X^+$

(2) $(RCOO)_2Mg$

(3) $RCOO^-Mg^+X$

(4) $R_3CO^-Mg^+X$

53. Consider the following statements

(a) Methanal is liquid at room temperature.

(b) The boiling point of acetone is more than propanal.

(c) The boiling points of aldehydes and ketones are higher than hydrocarbons and ethers of comparable molecular masses.

The **correct** statements are

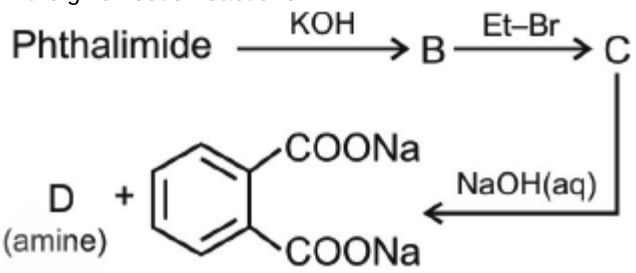
(1) (a) and (b) only

(2) (b) and (c) only

(3) (a) and (c) only

(4) (a), (b) and (c)

54. In the given set of reactions



D is

(1) CH_3NH_2

(2) $CH_3CH_2NH_2$

(3) $CH_3CH_2NHCH_3$

(4) $(CH_3)_2NH$

55. Match List-I with List-II

	List-I Coordination compounds		**List-II Metal present**
a.	Chlorophyll	(i)	Iron
b.	Vitamin B_{12}	(ii)	Rhodium
c.	Wilkinson catalyst	(iii)	Cobalt
d.	Haemoglobin	(iv)	Magnesium

Choose the correct answer from the options given below

(1) a(iv), b(iii), c(i), d(ii)

(2) a(iv), b(iii), c(ii), d(i)

(3) a(iii), b(iv), c(ii), d(i)

(4) a(ii), b(iii), c(iv), d(i)

56. Consider the following statements.
(i) The solutions which show a large positive deviation from Raoult's law form minimum boiling azeotrope.
(ii) Two solutions having same osmotic pressure at a given temperature are called isotonic solutions.
(iii) K_f is independent of solute concentration.
The correct statement(s) is/are

(1) (i) and (ii) only

(2) (ii) and (iii) only

(3) (i), (ii) and (iii)

(4) (ii) only

57. Given below are two statements :
Statement I : The boiling points of aldehydes and ketones are higher than hydrocarbons of comparable molecular masses because of weak molecular association in aldehydes and ketones due to dipole - dipole interactions.
Statement II : The boiling points of aldehydes and ketones are lower than the alcohols of similar molecular masses due to the absence of H-bonding.
In the light of the above statements, choose the **most appropriate** answer from the given below

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

58. The IUPAC name of an element with atomic number 119 is

(1) unununnium

(2) ununoctium

(3) ununennium

(4) unnilennium

59. At 298 K, the standard electrode potentials of Cu^{2+} / Cu, Zn^{2+} / Zn, Fe^{2+} / Fe and Ag^{+} / Ag are 0.34 V, –0.76 V, –0.44 V and 0.80 V, respectively.
On the basis of standard electrode potential, predict which of the following reaction cannot occur?

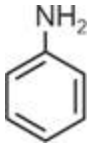
(1) $FeSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Fe(s)$

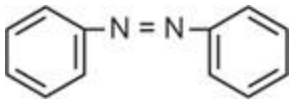
(2) $2CuSO_4(aq) + 2Ag(s) \rightarrow 2Cu(s) + Ag_2SO_4(aq)$

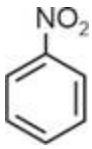
(3) $CuSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Cu(s)$

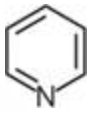
(4) $CuSO_4(aq) + Fe(s) \rightarrow FeSO_4(aq) + Cu(s)$

60. The Kjeldahl's method for the estimation of nitrogen can be used to estimate the amount of nitrogen in which one of the following compounds?

(1) 

(2) 

(3) 

(4) 

61. The given graph is a representation of kinetics of a reaction.

The y and x axes for zero and first order reactions, respectively are

(1) zero order (y = rate and x = concentration), first order (y = $t_{1/2}$ and x = concentration)

(2) zero order (y = rate and x = concentration), first order (y = rate and x = $t_{1/2}$)

(3) zero order (y = concentration and x = time), first order (y = $t_{1/2}$ and x = concentration)

(4) zero order (y = concentration and x = time), first order (y = rate constant and x = concentration)

62. Platinum on reaction with aqua regia gives

(1) $[PtCl_4]^{2-}$ and N_2O

(2) $[PtCl_4]^{2-}$ and NO

(3) $[PtCl_6]^{2-}$ and NO

(4) $[PtCl_6]^{2-}$ and NO_2

63. The slope of line plotted between ln k versus $\bullet\frac{1}{T}\bullet$ for Arrhenius equation is given by

(1) $\frac{-E_a}{2.303R}$

(2) $-\frac{E_a}{R}$

(3) $\frac{-2.303E_a}{R}$

(4) $\frac{-R}{E_a}$

64. The IUPAC name of the complex- $[Ag(H_2O)_2][Ag(CN)_2]$ is:

(1) dicyanidosilver(I) diaquaargentate(I)

(2) diaquasilver(I) dicyanidoargentate(I)

(3) dicyanidosilver(II) diaquaargentate(II)

(4) diaquasilver(II) dicyanidoargentate(II)

65. Choose the correct statement:

(1) Diamond is sp^3 hybridised and graphite is sp^2 hybridised.

(2) Both diamond and graphite are used as dry lubricants.

(3) Diamond and graphite have two dimensional network.

(4) Diamond is covalent and graphite is ionic.

66. The total number of structural isomers of C_4H_9Br which are primary halides, is

(1) 1

(2) 2

(3) 3

(4) 4

67. Given below are two statements
Statement I: Primary aliphatic amines react with HNO_2 to give unstable diazonium salts.
Statement II: Primary aromatic amines react with HNO_2 to form diazonium salts which are stable even above 300 K. In the light of the above statements, choose the most **appropriate** answer from the options given below

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

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

(3) Both Statement I and Statement II are correct.

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

68. Gadolinium has a low value of third ionisation enthalpy because of

(1) high electronegativity

(2) high basic character

(3) small size

(4) high exchange enthalpy

69. Match List-I with List-II.

List – I (Products formed)		**List – II (Reaction of carbonyl compound with)**	
(a)	Cyanohydrin	(i)	NH_2OH
(b)	Acetal	(ii)	RNH_2
(c)	Schiff's base	(iii)	alcohol
(d)	Oxime	(iv)	HCN

Choose the correct answer from the options given below

(1) (a) – (i), (b) – (iii), (c) – (ii), (d) – (iv)

(2) (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

(3) (a) – (iii), (b) – (iv), (c) – (ii), (d) – (i)

(4) (a) – (ii), (b) – (iii), (c) – (iv), (d) – (i)

70. Given below are two statements
Statement I: The boiling points of the following hydrides of group 16 elements increases in the order –
$H_2O < H_2S < H_2Se < H_2Te$
Statement II: The boiling points of these hydrides increase with increase in molar mass.
In the light of the above statements, choose the most appropriate answer from the options given below :

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

71. The pH of the solution containing 50 mL each of 0.10 M sodium acetate and 0.01 M acetic acid is
[Given pK_a of CH_3COOH = 4.57]

(1) 4.57

(2) 2.57

(3) 5.57

(4) 3.57

72. Amongst the following which one will have maximum 'lone pair - lone pair' electron repulsions?

(1) SF_4

(2) XeF_2

(3) ClF_3

(4) IF_5

73. The **incorrect** statement regarding chirality is

(1) Enantiomers are superimposable mirror images on each other

(2) A racemic mixture shows zero optical rotation

(3) S_N1 reaction yields mixture of both enantiomers

(4) The product obtained by S_N2 reaction of haloalkane having chirality at the reactive site shows inversion of configuration

74. Which amongst the following is **incorrect** statement?

(1) H_2^+ ion has one electron

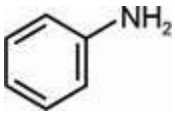
(2) O_2^+ ion is diamagnetic

(3) The bond orders of O_2^+, O_2, O_2^- and O_2^{2-} are 2.5, 2, 1.5 and 1, respectively

(4) C_2 molecule has four electrons in its two degenerate π molecular orbitals

75. Which of the following sequence of reactions is suitable to synthesize chlorobenzene?

(1)  , HCl

(2)  , HCl, Heating

(3) Benzene, Cl_2, anhydrous $FeCl_3$

(4) Phenol, $NaNO_2$, HCl, CuCl

76. Which compound amongst the following is **not** an aromatic compound?

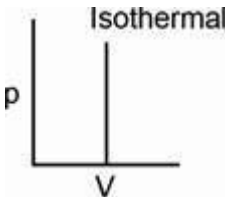
(1) 

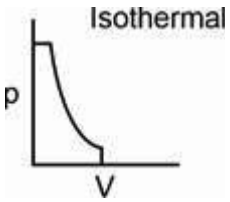
(2) 

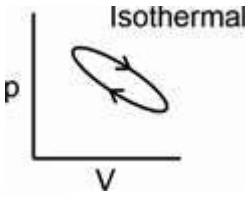
(3) 

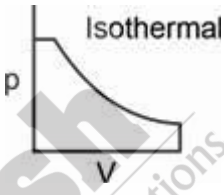
(4) 

77. Which of the following p-V curve represents maximum work done?

(1) 

(2) 

(3) 

(4) 

78. Given below are two statements

Statement I: The acidic strength of monosubstituted nitrophenol is higher than phenol because of electron withdrawing nitro group.

Statement II: *o*-nitrophenol, *m*-nitrophenol and *p*-nitrophenol will have same acidic strength as they have one nitro group attached to the phenolic ring.

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

(1) **Statement I** is correct but **Statement II** is incorrect.

(2) **Statement I** is incorrect but **Statement II** is correct.

(3) Both **Statement I** and **Statement II** are correct.

(4) Both **Statement I** and **Statement II** are incorrect.

79. Compound X on reaction with O_3 followed by Zn/H_2O gives formaldehyde and 2-methyl propanal as products. The compound X is

(1) 2-Methylbut-2-ene

(2) Pent-2-ene

(3) 3-Methylbut-1-ene

(4) 2-Methylbut-1-ene

80. $3O_2(g) \rightleftharpoons 2O_3(g)$

for the above reaction at 298 K, K_C is found to be 3.0×10^{-59}. If the concentration of O_2 at equilibrium is 0.040 M then concentration of O_3 in M is

(1) 2.4×10^{31}

(2) 1.2×10^{21}

(3) 4.38×10^{-32}

(4) 1.9×10^{-63}

81. The vapour pressure of pure liquids A and B are 400 and 600 mmHg, respectively at 300 K. Calculate the mole fraction of A and B in liquid mixture if total vapour pressure is 450 mmHg.

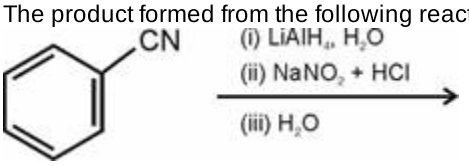
(1) $X_A = 0.75, X_B = 0.25$

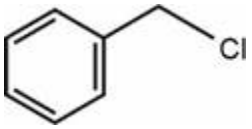
(2) $X_A = 0.25, X_B = 0.75$

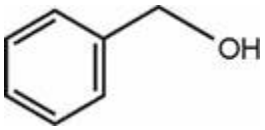
(3) $X_A = 0.60, X_B = 0.40$

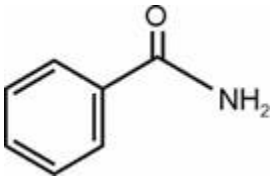
(4) $X_A = 0.40, X_B = 0.60$

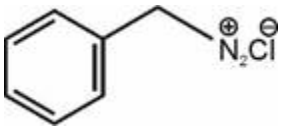
82. The product formed from the following reaction sequence is



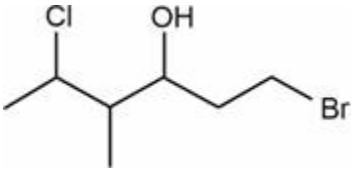
(1) 

(2) 

(3) 

(4) 

83. The correct IUPAC name of the following compound is



(1) 1-bromo-4-methyl-5-chlorohexan-3-ol

(2) 6-bromo-4-methyl-2-chlorohexan-4-ol

(3) 1-bromo-5-chloro-4-methylhexan-3-ol

(4) 6-bromo-2-chloro-4-methythexan-4-ol

84. The order of energy absorbed which is responsible for the color of complexes

(A) $[Ni(H_2O)_2(en)_2]^{2+}$

(B) $[Ni(H_2O)_4(en)]^{2+}$ and

(C) $[Ni(en)_3]^{2+}$

is

(1) (C) > (A) > (B)

(2) (B) > (A) > (C)

(3) (A) > (B) > (C)

(4) (C) > (B) > (A)

85. For a first order reaction A → Products, initial concentration of A is 0.1 M, which becomes 0.001 M after 5 minutes. Rate constant for the reaction in min^{-1} is

(1) 0.4606

(2) 0.2303

(3) 1.3818

(4) 0.9212

86. If radius of second Bohr orbit of the He^+ ion is 105.8 pm, what is the radius of third Bohr orbit of Li^{2+} ion?

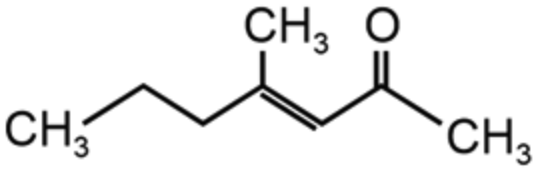
(1) 1.587 pm

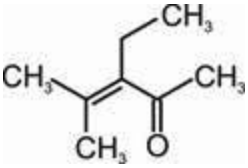
(2) 158.7 Å

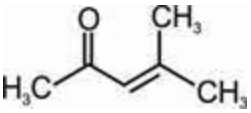
(3) 158.7 pm

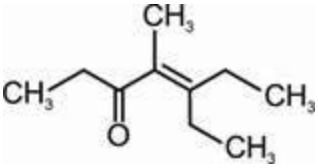
(4) 15.87 pm

87. Which one of the following is not formed when acetone reacts with 2-pentanone in the presence of dilute NaOH followed by heating?

(1) 

(2) 

(3) 

(4) 

88. Find the emf of the cell in which the following reaction takes place at 298 K

$\mathrm{Ni(s) + 2\,Ag^{+}\,(0.001\ M) \rightarrow Ni^{2+}\,(0.001\ M) + 2\,Ag(s)}$

$\left(\text{Given that } \mathrm{E^{\circ}_{cell}} = 1.05\ \mathrm{V}, \frac{2.303\ \mathrm{RT}}{\mathrm{F}} = 0.059 \text{ at } 298\ \mathrm{K}\right)$

(1) 0.96 V

(2) 1.05 V

(3) 1.0385 V

(4) 1.385 V

89. Given below are two statements:

Statement I: In Lucas test, primary, secondary and tertiary alcohols are distinguished on the basis of their reactivity with conc. HCl + $ZnCl_2$, known as Lucas Reagent.

Statement II: Primary alcohols are most reactive and immediately produce turbidity at room temperature on reaction with Lucas Reagent.

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

(1) Statement I is correct but Statement II is incorrect

(2) Statement I is incorrect but Statement II is correct

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

90. In the neutral or faintly alkaline medium, $KMnO_4$ oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from

(1) +7 to +3

(2) +6 to +5

(3) +7 to +4

(4) +6 to +4

BIOLOGY

91. Given below are two statements :

Statement I : Sickle cell anaemia and Haemophilia are autosomal dominant traits.

Statement II : Sickle cell anaemia and Haemophilia are disorders of the blood.

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

(1) **Statement I** is incorrect but **Statement II** is correct

(2) Both **Statement I** and **Statement II** are correct

(3) Both **Statement I** and **Statement II** are incorrect

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

92. Which stage of meiosis can last for months or years in the oocytes of some vertebrates?

(1) Diakinesis

(2) Leptotene

(3) Pachytene

(4) Diplotene

93. Give the **correct** descending order of organisms with reference to their estimated number of species found in Amazon forest.
(a) Plants
(b) Invertebrates
(c) Fishes
(d) Mammals
(e) Birds
Choose the **correct** answer from the options given below :

(1) (b) > (a) > (c) > (e) > (d)

(2) (a) > (b) > (e) > (d) > (c)

(3) (a) > (c) > (d) > (b) > (e)

(4) (b) > (a) > (e) > (d) > (c)

94. The process of translation of mRNA to proteins begins as soon as :

(1) Both the subunits join together to bind with mRNA

(2) The tRNA is activated and the larger subunit of ribosome encounters mRNA

(3) The small subunit of ribosome encounters mRNA

(4) The larger subunit of ribosome encounters mRNA

95. In meiosis, crossing over and exchange of genetic material between homologous chromosomes are catalyzed by the enzyme

(1) Polymerase

(2) Phosphorylase

(3) Recombinase

(4) Transferase

96. When one CO_2 molecule is fixed as one molecule of triose phosphate, which of the following photochemically made, high energy chemical intermediates are used in the reduction phase?

(1) 2 ATP + 2 NADPH

(2) 1 ATP + 1 NADPH

(3) 1 ATP + 2 NADPH

(4) 2 ATP + 1 NADPH

97. The ability of plants to follow different pathways in response to environment leading to formation of different kinds of structures is called

(1) Differentiation

(2) Redifferentiation

(3) Development

(4) Plasticity

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

List-I		**List-II**	
(a)	*Chlamydomonas*	(i)	Moss
(b)	*Cycas*	(ii)	Pteridophyte
(c)	*Selaginella*	(iii)	Alga
(d)	*Sphagnum*	(iv)	Gymnosperm

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

(1) (a) - (ii), (b) - (iii), (c) - (i), (d) - (iv)

(2) (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv)

(3) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

(4) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)

99. Match List-I with List-II.

	List-I		**List-II**
(a)	Metacentric chromosome	(i)	Centromere situated close to the end forming one extremely short and one very long arms
(b)	Acrocentric chromosome	(ii)	Centromere at the terminal end
(c)	Submetacentric	(iii)	Centromere in the middle forming two equal arms of chromosomes
(d)	Telocentric chromosome	(iv)	Centromere slightly away from the middle forming one shorter arm and one longer arm

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

(1) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

(2) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

(3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

(4) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

100. Which of the following growth regulators is an adenine derivative?

(1) Abscisic acid

(2) Auxin

(3) Cytokinin

(4) Ethylene

101. The chromosomal theory of inheritance was proposed by

(1) Robert Brown

(2) Thomas Morgan

(3) Sutton and Boveri

(4) Gregor Mendel

102. Which of the following statements is **not** correct?

(1) The rhizome is thick, prostrate and branched

(2) Rhizome is a condensed form of stem

(3) The apical bud in rhizome always remains above the ground

(4) The rhizome is aerial with no distinct nodes and internodes

103. The phenomenon by which the undividing parenchyma cells start to divide mitotically during plant tissue culture is called as

(1) Secondary growth

(2) Differentiation

(3) Dedifferentiation

(4) Redifferentiation

104. The residual persistent part which forms the perisperm in the seeds of beet is

(1) Integument

(2) Calyx

(3) Endosperm

(4) Nucellus

105. The World Summit on sustainable development held in 2002 in Johannesburg, South Africa pledged for:

(1) Collection and preservation of seeds of different genetic strains of commercially important plants.

(2) A significant reduction in the current rate of biodiversity loss.

(3) Declaration of more biodiversity hotspots.

(4) Increase in agricultural production.

106. Which one of the following statement is **not true** regarding gel electrophoresis technique?

(1) The presence of chromogenic substrate gives blue coloured DNA bands on the gel.

(2) Bright orange coloured bands of DNA can be observed in the gel when exposed to UV light.

(3) The process of extraction of separated DNA strands from gel is called elution.

(4) The separated DNA fragments are stained by using ethidium bromide.

107. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**
Assertion (A) : Polymerase chain reaction is used for DNA amplification.
Reason (R) : The ampicillin resistant gene is used as a selectable marker to check transformation.
In the light of above statements, choose the **correct** answer from the options given below:

(1) **(A)** is correct but **(R)** is not correct

(2) **(A)** is not correct but **(R)** is correct

(3) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(4) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

108. Exoskeleton of arthropods is composed of :

(1) Chitin

(2) Glucosamine

(3) Cutin

(4) Cellulose

109. Read the following statements on lipids and find out correct set of statements:
(a) Lecithin found in the plasma membrane is a glycolipid.
(b) Saturated fatty acids possess one or more C = C bonds.
(c) Gingelly oil has lower melting point, hence remains as oil in winter.
(d) Lipids are generally insoluble in water but soluble in some organic solvents.
(e) When a fatty acid is esterified with glycerol, monoglycerides are formed.
Choose the correct answer from the options given below:

(1) (c), (d) and (e) only

(2) (a), (b) and (d) only

(3) (a), (b) and (c) only

(4) (a), (d) and (e) only

110. In the following palindromic base sequences of DNA, which one can be cut easily by a particular restriction enzyme?

(1) 5′CTCAGT3′; 3′GAGTCA5′

(2) 5′GTATTC3′; 3′CATAAG5′

(3) 5′GATACT3′; 3′CTATGA5′

(4) 5′GAATTC3′; 3′CTTAAG5′

111. Transposons can be used during which one of the following?

(1) Autoradiography

(2) Gene sequencing

(3) Polymerase Chain Reaction

(4) Gene Silencing

112. Natural selection where more individuals acquire specific character value other than the mean character value, leads to

(1) Disruptive change

(2) Random change

(3) Stabilising change

(4) Directional change

113. A dehydration reaction links two glucose molecules to produce maltose. If the formula for glucose is $C_6H_{12}O_6$, then what is the formula of maltose?

(1) $C_{12}H_{22}O_{11}$

(2) $C_{12}H_{24}O_{11}$

(3) $C_{12}H_{20}O_{10}$

(4) $C_{12}H_{24}O_{12}$

114. Tegmina in cockroach, arises from

(1) Metathorax

(2) Prothorax and Mesothorax

(3) Prothorax

(4) Mesothorax

115. Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A) : All vertebrates are chordates but all chordates are not vertebrates.
Reason (R) : Notochord is replaced by vertebral column in the adult vertebrates.
In the light of the above statements, choose the **most appropriate** answer from the option given below :

(1) **(A)** is correct but **(R)** is not correct

(2) **(A)** is not correct but **(R)** is correct

(3) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(4) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

116. The type of tissue commonly found in the fruit wall of nuts is :

(1) Sclereid

(2) Parenchyma

(3) Collenchyma

(4) Sclerenchyma

117. Given below are two statements
Statement I: DNA polymerases catalyse polymerisation only in one direction, that is 5′ → 3′.
Statement II: During replication of DNA, on one strand the replication is continuous while on other strand it is discontinuous.
In the light of the above statements, choose the **correct** answer from the options given below:

(1) Statement I is incorrect but Statement II is correct

(2) Both Statement I and Statement II are correct

(3) Both Statement I and Statement II are incorrect

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

118. Initiation of lateral roots and vascular cambium during secondary growth takes place in cells of

(1) Pericycle

(2) Epiblema

(3) Cortex

(4) Endodermis

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

List - I		**List – II**
(a) In *lac* operon *i* gene codes for	(i)	transacetylase
(b) In *lac* operon *z* gene codes for	(ii)	permease
(c) In *lac* operon *y* gene codes for	(iii)	β-galactosidase
(d) In *lac* operon *a* gene codes for	(iv)	Repressor

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

(1) (a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)

(2) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)

(3) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

(4) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)

120. The 5-C compound formed during TCA cycle is

(1) Fumaric acid

(2) α-ketoglutaric acid

(3) Oxalo succinic acid

(4) Succinic acid

121. To ensure that only the desired pollens fall on the stigma in artificial hybridization process
(a) the female flower buds of plant producing unisexual flowers need not be bagged.
(b) there is no need to emasculate unisexual flowers of selected female parent
(c) emasculated flowers are to be bagged immediately after cross pollination
(d) emasculated flowers are to be bagged after removal of anthers
(e) bisexual flowers, showing protogyny are never selected for cross
Choose the **correct answer** from the options given below:

(1) (a), (d) and (e) only

(2) (a), (b) and (c) only

(3) (b), (c) and (d) only

(4) (b), (c) and (e) only

122. Match **List - I** with **List – II.**

List - I		**List - II**
(a) Imbricate	(i)	*Calotropis*
(b) Valvate	(ii)	*Cassia*
(c) Vexillary	(iii)	Cotton
(d) Twisted	(iv)	Bean

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

(1) (a) - (i), (b) - (iii), (c) - (iv), (d) - (ii)

(2) (a) - (ii), (b) - (i), (c) - (iii), (d) - (iv)

(3) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

(4) (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)

123. What is the net gain of ATP when each molecule of glucose is converted to two molecules of pyruvic acid?

(1) Two

(2) Eight

(3) Four

(4) Six

124. The Floral Diagram represents which one of the following families?

(1) Liliaceae

(2) Fabaceae

(3) Brassicaceae

(4) Solanaceae

125. Match List-I with List-II:

	List-I		List-II
(a)	Bacteriophage $\phi \times 174$	(i)	48502 base pairs
(b)	Bacteriophage lambda	(ii)	5386 nucleotides
(c)	*Escherichia coli*	(iii)	3.3×10^9 base pairs
(d)	Haploid content of human DNA	(iv)	4.6×10^6 base pairs

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

(1) (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

(2) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

(3) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

(4) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

126. Which type of substance would face difficulty to pass through the cell membrane?

(1) Substance soluble in lipids

(2) Substance with hydrophobic moiety

(3) Substance with hydrophilic moiety

(4) All substance irrespective of hydrophobic and hydrophilic moiety

127. What is the expected percentage of F_2 progeny with yellow and inflated pod in dihybrid cross experiment involving pea plants with green coloured, inflated pod and yellow coloured constricted pod?

(1) 9%

(2) 100%

(3) 56.25%

(4) 18.75%

128. Given below are two statements:

Statement I: Decomposition is a process in which the detritus is degraded into simpler substances by microbes.

Statement II: Decomposition is faster if the detritus is rich in lignin and chitin.

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

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

129. If a female individual is with small round head, furrowed tongue, partially open mouth and broad palm with characteristic palm crease. Also the physical, psychomotor and mental development is retarded. The karyotype analysis of such an individual will show :

(1) Trisomy of chromosome 21

(2) 47 chromosomes with XXY sex chromosomes

(3) 45 chromosomes with XO sex chromosomes

(4) 47 chromosomes with XYY sex chromosomes

130. While explaining interspecific interaction of population, (+) sign is assigned for beneficial interaction, (–) sign is assigned for detrimental interaction and (0) for neutral interaction. Which of the following interactions can be assigned (+) for one species and (–) for another species involved in the interaction ?

(1) Commensalism

(2) Competition

(3) Predation

(4) Amensalism

131. Match the following columns and select the correct option:

Column I		Column II	
(a)	Ovary	(i)	Human chorionic gonadotropin
(b)	Placenta	(ii)	Estrogen and progesterone
(c)	Corpus luteum	(iii)	Androgens
(d)	Leydig cells	(iv)	Progesterone only

(1) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

(2) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

(3) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

(4) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

132. Under normal physiological conditions in human beings, every 100 mL of oxygenated blood can deliver _____ mL of O_2 to the tissues. Select the correct option to fill in the blank.

(1) 4 mL

(2) 10 mL

(3) 2 mL

(4) 5 mL

133. In which of the following animals, digestive tract has additional chambers like crop and gizzard?

(1) *Catla*, *Columba*, *Crocodilus*

(2) *Pavo*, *Psittacula*, *Corvus*

(3) *Corvus*, *Columba*, *Chameleon*

(4) *Bufo*, *Balaenoptera*, *Bangarus*

134. In human beings, at the end of 12 weeks(first trimester) of pregnancy, which of the following is observed?

(1) Movement of the foetus

(2) Eyelids and eyelashes are formed

(3) Most of the major organ systems are formed

(4) The head is covered with fine hair

135. Nitrogenous waste is excreted in the form of pellet or paste by :

(1) *Hippocampus*

(2) *Pavo*

(3) *Ornithorhynchus*

(4) *Salamandra*

136. Which of the following is present between the adjacent bones of the vertebral column?

(1) Areolar tissue

(2) Smooth muscle

(3) Intercalated discs

(4) Cartilage

137. Match the following columns and select the correct option:

Column I		Column II	
(a)	Pituitary hormone	(i)	Steroid
(b)	Epinephrine	(ii)	Neuropeptides
(c)	Endorphins	(iii)	Peptides, proteins
(d)	Cortisol	(iv)	Biogenic amines

(1) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

(2) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

(3) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

(4) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

138. Given below are two statements:

Statement I : The release of sperms into the seminiferous tubules is called spermiation.

Statement II : Spermiogenesis is the process of formation of sperms from spermatogonia.

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

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

139. Given below are two statements:

Statement I : The coagulum is formed of network of threads called thrombins.

Statement II : Spleen is the graveyard of erythrocytes.

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

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

140. Which of the following statements are true for spermatogenesis but do not hold true for Oogenesis?

(a) It results in the formation of haploid gametes

(b) Differentiation of gamete occurs after the completion of meiosis

(c) Meiosis occurs continuously in a mitotically dividing stem cell population

(d) It is controlled by the Luteinising hormone (LH) and Follicle Stimulating Hormone (FSH) secreted by the anterior pituitary

(e) It is initiated at puberty

Choose the most appropriate answer from the options given below:

(1) (b), (d) and (e) only

(2) (b), (c) and (e) only

(3) (c) and (e) only

(4) (b) and (c) only

141. Lippes loop is a type of contraceptive used as:

(1) Non-Medicated IUD

(2) Copper releasing IUD

(3) Cervical barrier

(4) Vault barrier

142. Which of the following is a correct match for disease and its symptoms?

(1) Myasthenia gravis – Genetic disorder resulting in weakening and paralysis of skeletal muscle

(2) Muscular dystrophy – An auto immune disorder causing progressive degeneration of skeletal muscle

(3) Arthritis – Inflammed joints

(4) Tetany – High Ca^{2+} level causing rapid spasms.

143. Which of the following is not the function of conducting part of respiratory system?

(1) Temperature of inhaled air is brought to body temperature

(2) Provides surface for diffusion of O_2 and CO_2

(3) It clears inhaled air from foreign particles

(4) Inhaled air is humidified

144. Which of the following is **not** a connective tissue?

(1) Cartilage

(2) Neuroglia

(3) Blood

(4) Adipose tissue

145. Given below are two statements:
Statement I: Restriction endonucleases recognise specific sequence to cut DNA known as palindromic nucleotide sequence.
Statement II: Restriction endonucleases cut the DNA strand a little away from the centre of the palindromic site.
In the light of the above statements, choose the **most appropriate** answer from the options given below:

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

146. In gene therapy of Adenosine Deaminase (ADA) deficiency, the patient requires periodic infusion of genetically engineered lymphocytes because :

(1) Lymphocytes from patient's blood are grown in culture, outside the body.

(2) Genetically engineered lymphocytes are not immortal cells.

(3) Retroviral vector is introduced into these lymphocytes.

(4) Gene isolated from marrow cells producing ADA is introduced into cells at embryonic stages

147. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A): Osteoporosis is characterised by decreased bone mass and increased chance of fractures.
Reason (R): Common cause of osteoporosis is increased levels of estrogen.
In the light of the above statements, choose the **most appropriate** answer from the options given below.

(1) **(A)** is correct but **(R)** is not correct

(2) **(A)** is not correct but **(R)** is correct

(3) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**

(4) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**

148. At which stage of life the oogenesis process is initiated?

(1) Birth

(2) Adult

(3) Puberty

(4) Embryonic development stage

149. Given below are two statements:
Statement I: Auto-immune disorder is a condition where body defense mechanism recognizes its own cells as foreign bodies.
Statement II: Rheumatoid arthritis is a condition where body does not attack self-cells.
In the light of the above statements, choose the **most appropriate** answer from the options given below:

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

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

	List-I (Biological molecules)		**List-II (Biological functions)**
(a)	Glycogen	(i)	Hormone
(b)	Globulin	(ii)	Biocatalyst
(c)	Steroids	(iii)	Antibody
(d)	Trypsin	(iv)	Storage product

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

(1) (a) - (ii), (b) - (iv), (c) - (iii), (d) - (i)

(2) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)

(3) (a) - (iii), (b) - (ii), (c) - (iv), (d) - (i)

(4) (a) - (iv), (b) - (ii), (c) - (i), (d) - (iii)

151. Which of the following are **not** the effects of parathyroid hormone?

(a) Stimulates the process of bone resorption

(b) Decreases Ca^{2+} levels in blood

(c) Reabsorption of Ca^{2+} by renal tubules

(d) Decreases the absorption of Ca^{2+} from digested food

(e) Increases metabolism of carbohydrates

Choose the **most appropriate** answer from the options given below:

(1) (a) and (e) only

(2) (b) and (c) only

(3) (a) and (c) only

(4) (b), (d) and (e) only

152. Which of the following is **not** a desirable feature of a cloning vector?

(1) Presence of single restriction enzyme site

(2) Presence of two or more recognition sites

(3) Presence of origin of replication

(4) Presence of a marker gene

153. Match **List I** with **List II** with respect to methods of Contraception and their respective actions

	List I		**List II**
(a)	Diaphragms	(i)	Inhibit ovulation and implantation
(b)	Contraceptive pills	(ii)	Increase phagocytosis of sperms within uterus
(c)	Intra uterine devices	(iii)	Absence of menstrual cycle and ovulation following parturition
(d)	Lactational amenorrhea	(iv)	They cover the cervix blocking the entry of sperms

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

(1) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)

(2) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)

(3) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)

(4) (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)

154. Which of the following statements **is not** true?

(1) Homology indicates common ancestry

(2) Flippers of penguins and dolphins are a pair of homologous organs

(3) Analogous structures are a result of convergent evolution

(4) Sweet potato and potato is an example of analogy

155. Select the **incorrect** statement with respect to acquired immunity.

(1) Anamnestic response is due to memory of first encounter.

(2) Acquired immunity is non-specific type of defense present at the time of birth.

(3) Primary response is produced when our body encounters a pathogen for the first time.

(4) Anamnestic response is elicited on subsequent encounters with the same pathogen.

156. Match the **List-I** with **List-II** :

	List-I		**List-II**
(a)	Sacred groves	(i)	Alien species
(b)	Zoological park	(ii)	Release of large quantity of oxygen
(c)	Nile perch	(iii)	*Ex-situ* conservation
(d)	Amazon forest	(iv)	Khasi Hills in Meghalaya

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

(1) (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

(2) (a) – (iv), (b) – (iii), (c) – (i), (d) – (ii)

(3) (a) – (ii), (b) – (iv), (c) – (i), (d) – (iii)

(4) (a) – (iv), (b) – (i), (c) – (ii), (d) – (iii)

157. Identify the **correct** sequence of events during Prophase I of meiosis:

(a) Synapsis of homologous chromosomes

(b) Chromosomes become gradually visible under microscope

(c) Crossing over between non-sister chromatids of homologous chromosomes

(d) Terminalisation of chiasmata

(e) Dissolution of synaptonemal complex

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

(1) (a), (c), (d), (e), (b)

(2) (a), (b), (c), (d), (e)

(3) (b), (c), (d), (e), (a)

(4) b), (a), (c), (e), (d)

158. Frugivorous birds are found in large numbers in tropical forests mainly because of :

(1) Temperature conducive for their breeding

(2) Lack of niche specialisation

(3) Higher annual rainfall

(4) Availability of fruits throughout the year

159. Identify the **correct** statements regarding chemiosmotic hypothesis:
(a) Splitting of the water molecule takes place on the inner side of the membrane.
(b) Protons accumulate within the lumen of the thylakoids.
(c) Primary acceptor of electron transfers the electrons to an electron carrier.
(d) NADP reductase enzyme is located on the stroma side of the membrane.
(e) Protons increase in number in stroma.
Choose the **correct answer** from the options given below:

(1) (b), (c) and (e)

(2) (a), (b) and (e)

(3) (a), (b) and (d)

(4) (b), (c) and (d)

160. Which of the following can be expected if scientists succeed in introducing apomictic gene into hybrid varieties of crops?

(1) There will be segregation of the desired characters only in the progeny

(2) Polyembryony will be seen and each seed will produce many plantlets

(3) Seeds of hybrid plants will show longer dormancy

(4) Farmers can keep on using the seeds produced by the hybrids to raise new crop year after year

161. Which one of the following plants does **not** show plasticity?

(1) Buttercup

(2) Maize

(3) Cotton

(4) Coriander

162. Given below are two statements :
Statement I : Mendel studied seven pairs of contrasting traits in pea plants and proposed the Laws of Inheritance.
Statement II : Seven characters examined by Mendel in his experiment on pea plants were seed shape and colour, flower colour, pod shape and colour, flower position and stem height.
In the light of the above statements, choose the correct answer from the options given below :

(1) **Statement I** is correct but **Statement II** is incorrect

(2) **Statement I** is incorrect but **Statement II** is correct

(3) Both **Statement I** and **Statement II** are correct

(4) Both **Statement I** and **Statement II** are incorrect

163. Hydrocolloid carrageen is obtained from:

(1) Rhodophyceae only

(2) Phaeophyceae only

(3) Chlorophyceae and Phaeophyceae

(4) Phaeophyceae and Rhodophyceae

164. The flowers are zygomorphic in:
(a) Mustard
(b) Gulmohar
(c) *Cassia*
(d) *Datura*
(e) Chilly
Choose the **correct answer** from the options given below:

(1) (d), (e) Only

(2) (c), (d), (e) Only

(3) (a), (b), (c) Only

(4) (b), (c) Only

165. Which of the following is **not** a method of *ex situ* conservation?

(1) Micropropagation

(2) Cryopreservation

(3) *In vitro* fertilization

(4) National Parks

166. What amount of energy is released from glucose during lactic acid fermentation?

(1) About 10%

(2) Less than 7%

(3) Approximately 15%

(4) More than 18%

167. Read the following statements and choose the set of **correct** statements :
(a) Euchromatin is loosely packed chromatin
(b) Heterochromatin is transcriptionally active
(c) Histone octomer is wrapped by negatively charged DNA in nucleosome
(d) Histones are rich in lysine and arginine
(e) A typical nucleosome contains 400 bp of DNA helix
Choose the **correct** answer from the options given below :

(1) (b), (e) Only

(2) (a), (c), (e) Only

(3) (b), (d), (e) Only

(4) (a), (c), (d) Only

168. The gaseous plant growth regulator is used in plants to :

(1) help overcome apical dominance

(2) kill dicotyledonous weeds in the fields

(3) speed up the malting process

(4) promote root growth and root hair formation to increase the absorption surface

169. XO type of sex determination can be found in :

(1) Grasshoppers

(2) Monkeys

(3) *Drosophila*

(4) Birds

170. Production of Cucumber has increased manifold in recent years. Application of which of the following phytohormones has resulted in this increased yield as the hormone is known to produce female flowers in the plants :

(1) Ethylene

(2) Cytokinin

(3) ABA

(4) Gibberellin

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

	List-I		**List-II**
(a)	Bronchioles	(i)	Dense Regular Connective Tissue
(b)	Goblet Cell	(ii)	Loose Connective Tissue
(c)	Tendons	(iii)	Glandular Tissue
(d)	Adipose Tissue	(iv)	Ciliated Epithelium

Choose the correct answer from the options given below:

(1) (a)-(ii), (b)-(i), (c)-(iv), (d)–(iii)

(2) (a)-(iii), (b)-(iv), (c)-(ii), (d)–(i)

(3) (a)-(iv), (b)-(iii), (c)-(i), (d)–(ii)

(4) (a)-(i), (b)-(ii), (c)-(iii), (d)–(iv)

172. Statements related to human Insulin are given below.
Which statement(s) is/are **correct** about genetically engineered Insulin?
(a) Pro-hormone insulin contains extra stretch of C-peptide
(b) A-peptide and B-peptide chains of insulin were produced separately in *E.coli*, extracted and combined by creating disulphide bonds between them.
(c) Insulin used for treating Diabetes was extracted from cattles and pigs.
(d) Pro-hormone Insulin needs to be processed for converting into a mature and functional hormone.
(e) Some patients develop allergic reactions to the foreign insulin.
Choose **the most appropriate** answer from the options given below:

(1) (c) and (d) only

(2) (c), (d) and (e) only

(3) (a), (b) and (d) only

(4) (b) only

173. Select the **incorrect** statement regarding synapses :

(1) Chemical synapses use neurotransmitters

(2) Impulse transmission across a chemical synapse is always faster than that across an electrical synapse.

(3) The membranes of presynaptic and postsynaptic neurons are in close proximity in an electrical synapse.

(4) Electrical current can flow directly from one neuron into the other across the electrical synapse.

174. Which one of the following statements is **correct**?

(1) Blood moves freely from atrium to the ventricle during joint diastole.

(2) Increased ventricular pressure causes closing of the semilunar valves.

(3) The atrio-ventricular node (AVN) generates an action potential to stimulate atrial contraction

(4) The tricuspid and the bicuspid valves open due to the pressure exerted by the simultaneous contraction of the atria

175. Use of bioresources by multinational companies and organisations without authorisation from the concerned country and its people is called

(1) Biodegradation

(2) Biopiracy

(3) Bio-infringement

(4) Bioexploitation

176. The correct order of steps in Polymerase Chain Reaction (PCR) is

(1) Denaturation, Extension, Annealing

(2) Annealing, Extension, Denaturation

(3) Extension, Denaturation, Annealing

(4) Denaturation, Annealing, Extension

177. Which of the following is an amino acid derived hormone?

(1) Estradiol

(2) Ecdysone

(3) Epinephrine

(4) Estriol

178. Which part of poppy plant is used to obtain the drug "Smack"?

(1) Roots

(2) Latex

(3) Flowers

(4) Leaves

179. According to Hugo de Vries, the mechanism of evolution is

(1) Phenotypic variations

(2) Saltation

(3) Multiple step mutations

(4) Minor mutations

180. Nissl bodies are mainly composed of

(1) Nucleic acids and SER

(2) DNA and RNA

(3) Proteins and lipids

(4) Free ribosomes and RER

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