

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 radiation	(iii)	10^{-2} m
(d)	X-rays	(iv)	10^{-4} m

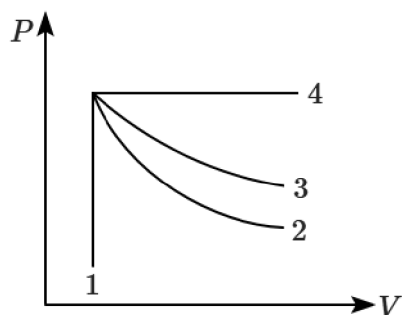
Choose the correct answer from the options given below:

	(a)	(b)	(c)	(d)
1.	(ii)	(iii)	(iv)	(i)
2.	(iv)	(iii)	(ii)	(i)
3.	(iii)	(ii)	(i)	(iv)
4.	(iii)	(iv)	(ii)	(i)

2 The energy that will be ideally radiated by a 100 kW transmitter in 1 hr is:

1.	1×10^5 J	2.	36×10^7 J
3.	36×10^4 J	4.	36×10^5 J

3 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.	4	2.	1
3.	2	4.	3

4 Plane angle and solid angle have:

1.	both units and dimensions
2.	units but no dimensions
3.	dimensions but no units
4.	no units and no dimensions

5 In half-wave rectification, if the input frequency is 60 Hz, the output frequency will be:

1.	120 Hz	2.	zero
3.	30 Hz	4.	60 Hz

6 When two monochromatic lights of frequency, ν and $\frac{\nu}{2}$ are incident on a photoelectric metal, their stopping potential becomes $\frac{V_s}{2}$ and V_s , respectively. The threshold frequency for this metal is:

1.	$\frac{3}{2}\nu$	2.	2ν
3.	3ν	4.	$\frac{2}{3}\nu$

7 The dimensions $[MLT^{-2}A^{-2}]$ belong to the:

1. electric permittivity
2. magnetic flux
3. self-inductance
4. magnetic permeability

8 The peak voltage of the AC source is equal to:

1.	$1/\sqrt{2}$ times the rms value of the AC source.
2.	the value of voltage supplied to the circuit.
3.	the rms value of the AC source.
4.	$\sqrt{2}$ times the rms value of the AC source.

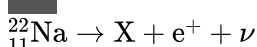
9 The ratio of the distances travelled by a freely falling body in the 1st, 2nd, 3rd and 4th second is:

1. 1 : 1 : 1 : 1
2. 1 : 2 : 3 : 4
3. 1 : 4 : 9 : 16
4. 1 : 3 : 5 : 7

10 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.	180 N/kg	2.	0.05 N/kg
3.	50 N/kg	4.	20 N/kg

11 In the given nuclear reaction, the element X is:



1.	${}_{12}^{22}\text{Mg}$	2.	${}_{11}^{23}\text{Na}$
3.	${}_{10}^{23}\text{Ne}$	4.	${}_{10}^{22}\text{Ne}$

12 If a soap bubble expands, the pressure inside the bubble:

1. is equal to the atmospheric pressure
2. decreases
3. increases
4. remains the same

13 Two resistors of resistance, $100\ \Omega$ and $200\ \Omega$ are connected in parallel in an electrical circuit. The ratio of the thermal energy developed in $100\ \Omega$ resistor to that in $200\ \Omega$ resistor in a given time is:

1. 4 : 1
2. 1 : 2
3. 2 : 1
4. 1 : 4

14 Two hollow conducting spheres of radii R_1 and R_2 ($R_1 \gg R_2$) are concentric and have equal charges. The potential would be:

1.	dependent on the material property of the sphere
2.	more on the bigger sphere
3.	more on the smaller sphere
4.	equal on both the spheres

15 The angular speed of a flywheel moving with uniform angular acceleration changes from 1200 rpm to 3120 rpm in 16 s. The angular acceleration in rad/s^2 is:

1.	104π	2.	2π
3.	4π	4.	12π

16 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. $v = \frac{c}{\sqrt{\epsilon_r \mu_r}}$
2. $v = c$
3. $v = \sqrt{\frac{\mu_r}{\epsilon_r}}$
4. $v = \sqrt{\frac{\epsilon_r}{\mu_r}}$

17 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.	$6.28 \times 10^{-4}\ \text{T}$	2.	$6.28 \times 10^{-2}\ \text{T}$
3.	$12.56 \times 10^{-2}\ \text{T}$	4.	$12.56 \times 10^{-4}\ \text{T}$

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

1.	$3\sqrt{2}v$	2.	v
3.	$\sqrt{2}v$	4.	$2\sqrt{2}v$

19 As the temperature increases, the electrical resistance:

1.	decreases for conductors but increases for semiconductors.
2.	increases for both conductors and semiconductors.
3.	decreases for both conductors and semiconductors.
4.	increases for conductors but decreases for semiconductors.

20 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.	infinity	2.	+2 D
3.	+20 D	4.	+5 D

21 A square loop of side 1 m and resistance $1\ \Omega$ is placed in a magnetic field of 0.5 T. If the plane of the loop is perpendicular to the direction of the magnetic field, the magnetic flux through the loop is:

1. zero
2. 2 weber
3. 0.5 weber
4. 1 weber

22 An electric lift with a maximum load of 2000 kg (lift+passengers) is moving up with a constant speed of $1.5\ \text{ms}^{-1}$. The frictional force opposing the motion is 3000 N. The minimum power delivered by the motor to the lift in watts is:

(Take $g = 10\ \text{ms}^{-2}$)

1. 23500
2. 23000
3. 20000
4. 34500

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

1.	120°	2.	30°
3.	60°	4.	90°

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

1. $10^5\ \text{A/m}^2$
2. $10^4\ \text{A/m}^2$
3. $10^6\ \text{A/m}^2$
4. $10^{-5}\ \text{A/m}^2$

25 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 : 2
2. 1 : 1
3. $\sqrt{2} : 1$
4. 1 : $\sqrt{2}$

26 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.	$1 : \sqrt{2}$	2.	$2 : 1$
3.	$\sqrt{2} : 1$	4.	$4 : 1$

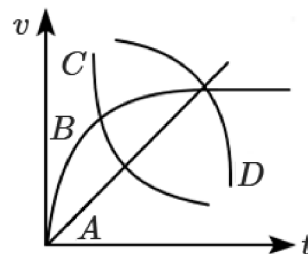
27 In Young's double-slit experiment, a student observes 8 fringes in a certain segment of the screen when a monochromatic light of 600 nm wavelength is used. If the wavelength of light is changed to 400 nm, then the number of fringes he would observe in the same region of the screen is:

1. 12
2. 6
3. 8
4. 9

28 The angle between the electric lines of force and the equipotential surface is:

1. 180°
2. 0°
3. 45°
4. 90°

29 A spherical ball is dropped into a long column of a highly viscous liquid. The graph that represents the speed of the ball (v) as a function of time (t) is:

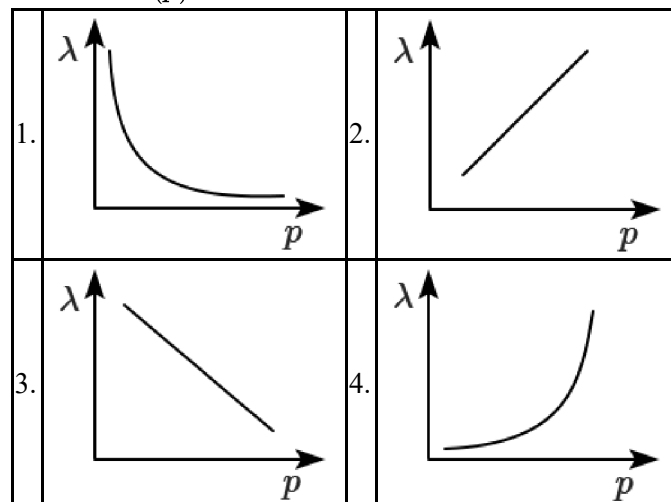


1.	D	2.	A
3.	B	4.	C

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

1. 9 : 4
2. 1 : 4
3. 4 : 1
4. 4 : 9

31 The graph that shows the variation of the de-Broglie wavelength (λ) of a particle and its associated momentum (p) is:



32 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.	8	2.	11
3.	9	4.	10

33 The volume occupied by the molecules contained in 4.5 kg water at STP, if the molecular forces vanish away, is:

1. 5.6 m^3
2. $5.6 \times 10^6 \text{ m}^3$
3. $5.6 \times 10^3 \text{ m}^3$
4. $5.6 \times 10^{-3} \text{ m}^3$

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

1.	25 : 16	2.	1 : 1
3.	4 : 5	4.	5 : 4

35 Given below are two statements:

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 the same dimensions.

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

36 A capacitor of capacitance $C = 900 \text{ pF}$ 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 $C = 900 \text{ pF}$ as shown in Figure (b). The electrostatic energy stored by the system (b) is:

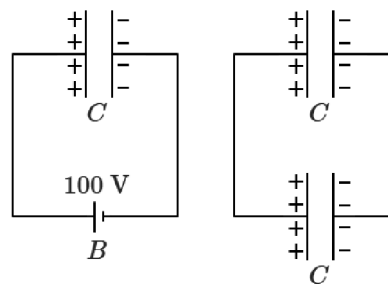


Figure (a)

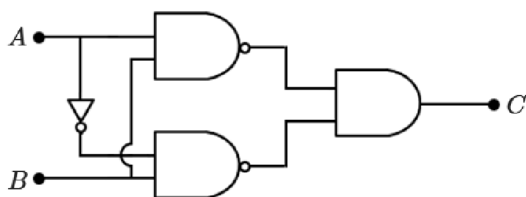
Figure (b)

1.	$1.5 \times 10^{-6} \text{ J}$	2.	$4.5 \times 10^{-6} \text{ J}$
3.	$3.25 \times 10^{-6} \text{ J}$	4.	$2.25 \times 10^{-6} \text{ J}$

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

1.	A linearly decreasing function of distance upto the boundary of the wire and then a linearly increasing one for the outside region.
2.	Uniform and remains constant for both regions.
3.	A linearly increasing function of distance upto the boundary of the wire and then a linearly decreasing one for the outside region.
4.	A linearly increasing function of distance r upto the boundary of the wire and then decreasing one with $1/r$ dependence for the outside region.

38 The truth table for the given logic circuit is:



1.	A	B	C
	0	0	0
	0	1	1
	1	0	0
	1	1	1
2.	A	B	C
	0	0	0
	0	1	1
	1	0	1
	1	1	0
3.	A	B	C
	0	0	1
	0	1	0
	1	0	0
	1	1	1
4.	A	B	C
	0	0	1
	0	1	0
	1	0	1
	1	1	0

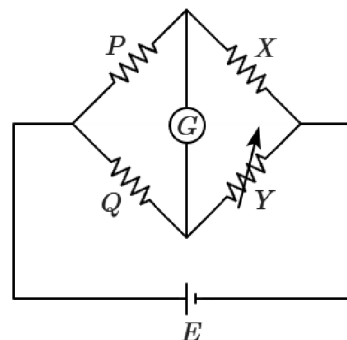
39 Two transparent media A and B are separated by a plane boundary. The speeds of light in those media are 1.5×10^8 m/s and 2.0×10^8 m/s, respectively. The critical angle for a ray of light for these two media is:

1.	$\tan^{-1}(0.750)$	2.	$\sin^{-1}(0.500)$
3.	$\sin^{-1}(0.750)$	4.	$\tan^{-1}(0.500)$

40 A big circular coil with 1000 turns and an average radius of 10 m is rotating about its horizontal diameter at a rate of 2 rad s^{-1} . The vertical component of the Earth's magnetic field at that location is $2 \times 10^{-5} \text{ T}$, and the electrical resistance of the coil is 12.56Ω , the maximum induced current in the coil will be:

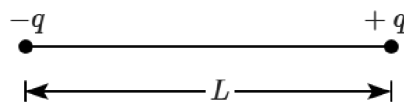
1. 2 A
2. 0.25 A
3. 1.5 A
4. 1 A

41 A Wheatstone bridge is used to determine the value of unknown resistance X by adjusting the variable resistance Y as shown in the figure. For the most precise measurement of X , the resistances P and Q :



1.	do not play any significant role.
2.	should be approximately equal to $2X$.
3.	should be approximately equal and are small.
4.	should be very large and unequal.

42 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 ($R \gg L$) varies as:

1.	$\frac{1}{R^6}$	2.	$\frac{1}{R^2}$
3.	$\frac{1}{R^3}$	4.	$\frac{1}{R^4}$

43 Match List-I with List-II.

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

Choose the correct answer from the options given below:

	(a)	(b)	(c)	(d)
1.	(iv)	(ii)	(i)	(iii)
2.	(ii)	(i)	(iv)	(iii)
3.	(ii)	(iv)	(i)	(iii)
4.	(ii)	(iv)	(iii)	(i)

44 A series LCR circuit with inductance 10 H , capacitance $10\text{ }\mu\text{F}$, resistance $50\text{ }\Omega$ 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.	$\nu = 100\text{ Hz}; \nu_0 = \frac{100}{\pi}\text{ Hz}$
2.	$\nu_0 = \nu = 50\text{ Hz}$
3.	$\nu_0 = \nu = \frac{50}{\pi}\text{ Hz}$
4.	$\nu_0 = \frac{50}{\pi}\text{ Hz}, \nu = 50\text{ Hz}$

45 A ball is projected with a velocity of 10 m/s at an angle of 60° with the vertical direction. Its speed at the highest point of its trajectory will be:

1. 10 m/s
2. zero
3. $5\sqrt{3}\text{ m/s}$
4. 5 m/s

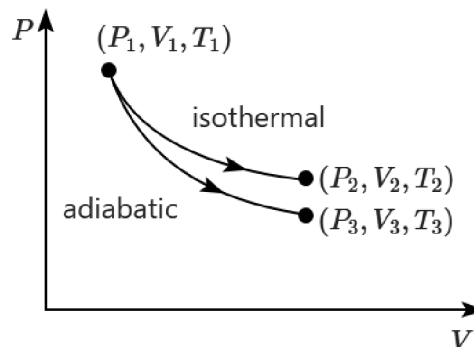
CHEMISTRY

46 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 $\text{CH}_3\text{COOH} = 4.57$]

1. 2.57
2. 5.57
3. 3.57
4. 4.57

47 The reversible expansion of an ideal gas under adiabatic and isothermal conditions is shown in the figure.

Which of the following statement(s) is(are) correct?



- $T_1 = T_2$
- $T_3 > T_1$
- $w_{\text{isothermal}} > w_{\text{adiabatic}}$
- $\Delta U_{\text{isothermal}} > \Delta U_{\text{adiabatic}}$

1.	a, c, d	2.	b, c
3.	d, a	4.	None of the above

48 A solution contains 25% water, 25% ethanol ($\text{C}_2\text{H}_5\text{OH}$) and 50% acetic acid (CH_3COOH) by mass. The mole fraction of:

- (a) Water = 0.502
- (b) Ethanol = 0.302
- (c) Acetic acid = 0.196
- (d) Ethanol + Acid = 0.497

Choose the correct option:

1. (a), (b)
2. (c), (d)
3. (a), (d)
4. None of the above

49 The correct decreasing order of ion sizes is:

1. $\text{Li}^+ > \text{H}^+ > \text{H}^-$
2. $\text{H}^+ > \text{H}^- > \text{Li}^+$
3. $\text{H}^- > \text{Li}^+ > \text{H}^+$
4. $\text{H}^- > \text{H}^+ > \text{Li}^+$

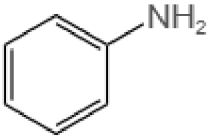
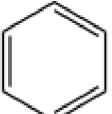
50 Given below are two statements:

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

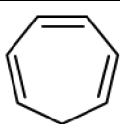



51 Which of the following is suitable to synthesize chlorobenzene?

1.	 , HCl, Heating
2.	Benzene, Cl_2 , anhydrous FeCl_3
3.	Phenol, NaNO_2 , HCl , CuCl
4.	 , HCl

52 Identify the incorrect statement from the following:

1.	Lithium is the strongest reducing agent among the alkali metals.
2.	Alkali metals react with water to form their hydroxides.
3.	The oxidation number of K in KO_2 is +4.
4.	Ionisation enthalpy of alkali metals decreases from top to bottom in the group.

53 Which of the following compounds does not exhibit aromaticity?

1.		2.	
3.		4.	

54 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 potentials, predict which of the following reaction can not occur?

1.	$2\text{CuSO}_4(\text{aq}) + 2\text{Ag}(\text{s}) \rightarrow 2\text{Cu}(\text{s}) + \text{Ag}_2\text{SO}_4(\text{aq})$
2.	$\text{CuSO}_4(\text{aq}) + \text{Zn}(\text{s}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{Cu}(\text{s})$
3.	$\text{CuSO}_4(\text{aq}) + \text{Fe}(\text{s}) \rightarrow \text{FeSO}_4(\text{aq}) + \text{Cu}(\text{s})$
4.	$\text{FeSO}_4(\text{aq}) + \text{Zn}(\text{s}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{Fe}(\text{s})$

55 Given below are two statements:

I:	The acidic strength of monosubstituted nitrophenol is higher than phenol because of electron withdrawing nitro group.
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.	I is incorrect but II is correct.
2.	Both I and II are correct.
3.	Both I and II are incorrect.
4.	I is correct but II is incorrect.

56 Which of the following statements is not correct about diborane?

1.	Both the boron atoms are sp^2 hybridised.
2.	There are two 3-centre-2-electron bonds.
3.	The four terminal B-H bonds are 2-centre-2-electron bonds.
4.	The four terminal hydrogen atoms and the two boron atoms lie in one plane.

57 Elevation in the boiling point for 1 molal solution of glucose is 2 K. The depression in the freezing point for 2 molal solution of glucose in the same solvent is 2 K. The relation between K_b and K_f is:

1. $K_b = 1.5 K_f$
2. $K_b = K_f$
3. $K_b = 0.5 K_f$
4. $K_b = 2 K_f$

58 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 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.

59 Select the correct option based on the statements below:

Assertion (A):	ICl is more reactive than I ₂ .
Reason (R):	I-Cl bond is weaker than I-I bond.

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

60 Match List - I with List - II.

List-I (Products formed)	List - II (Reaction of carbonyl compound with)
(A) Cyanohydrin	(I) NH ₂ OH
(B) Acetal	(II) RNH ₂
(C) Schiff's base	(III) Alcohol
(D) Oxime	(IV) HCN

Choose the correct answer from the options given below:

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

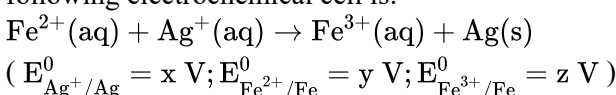
61 Which molecule has a Lewis structure that does not obey the octet rule?

1. NO
2. CS₂
3. PF₃
4. HCN

62 Gadolinium has a low value of third ionisation enthalpy because of:

1. High basic character	2. Small size
3. High exchange enthalpy	4. High electronegativity

63 The standard cell potential (in volts) of the following electrochemical cell is:



1.	$x - z$
2.	$x - y$
3.	$x + 2y - 3z$
4.	$x + y - z$

64 The octahedral complex of a metal ion M^{3+} with four monodentate ligands L_1 , L_2 , L_3 and L_4 absorbs wavelengths in the region of red, green, yellow, and blue, respectively. The increasing order of ligand strength of the four ligands is:

1. $L_4 < L_3 < L_2 < L_1$
2. $L_1 < L_3 < L_2 < L_4$
3. $L_3 < L_2 < L_4 < L_1$
4. $L_1 < L_2 < L_4 < L_3$

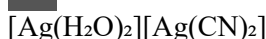
65 The Kjeldahl's method for the estimation of nitrogen can be used to estimate the amount of nitrogen in which one of the following compounds?

1.		2.	
3.		4.	

66 Choose the correct statement:

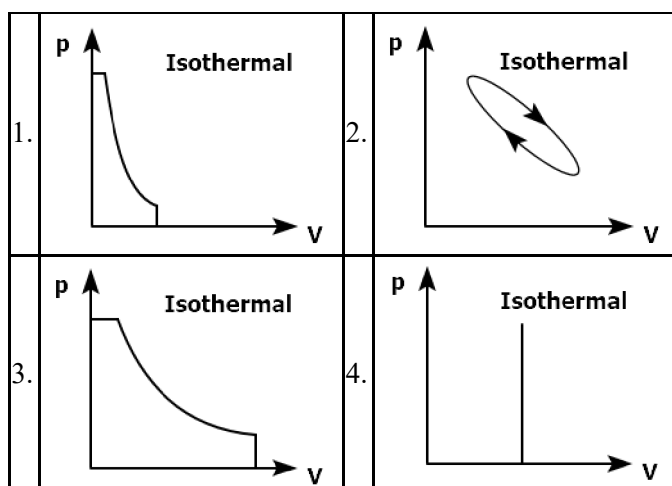
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|----|---|
| 1. | Both diamond and graphite are used as dry lubricants. |
| 2. | Diamond and graphite have a two-dimensional network. |
| 3. | Diamond is covalent and graphite is ionic. |
| 4. | Diamond is sp^3 hybridised and graphite is sp^2 hybridized. |

67 The IUPAC name of the following complex is:



1. Diaquasilver(I) dicyanidoargentate (I)
2. Dicyanidosilver(II) diaquaargentate(II)
3. Diaquasilver(II) dicyanidoargentate(II)
4. Dicyanidosilver(I) diaquaargentate(I)

68 Which p-V curve among the following depicts the highest amount of work done?



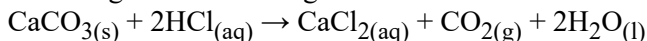
69 One molal solution contains 0.5 moles of a solute in:

- | | | | |
|----|-------------------|----|-------------------|
| 1. | 1000 g of solvent | 2. | 500 mL of solvent |
| 3. | 500 g of solvent | 4. | 100 mL of solvent |

70 Identify the incorrect statement from the following:

- | | |
|----|---|
| 1. | 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. |
| 2. | All the five 5d orbitals are different in size when compared to the respective 4d orbitals. |
| 3. | All the five 4d orbitals have shapes similar to the respective 3d orbitals. |
| 4. | In an atom, all the five 3d orbitals are equal in energy in free state. |

71 Calculate the mass of 95% pure $CaCO_3$ that will be required to neutralize 50 mL of 0.5 M HCl solution according to the following reaction.

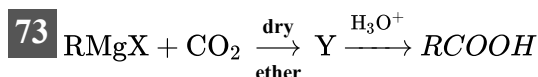


[Calculate up to the second place of decimal point]

- | | | | |
|----|--------|----|--------|
| 1. | 9.50 g | 2. | 1.25 g |
| 3. | 1.32 g | 4. | 3.65 g |

72 Identify the incorrect statement among the following options:

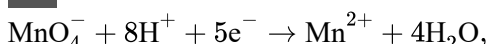
- | | |
|----|---|
| 1. | O_2^+ ion is diamagnetic. |
| 2. | The bond orders of O_2^+ , O_2 , O_2^- and O_2^{2-} are 2.5, 2, 1.5, and 1, respectively. |
| 3. | C_2 molecule has four electrons in its two degenerate π molecular orbitals. |
| 4. | H_2^+ ion has one electron. |



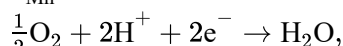
What is Y in the above reaction?

1. $(RCOO)_2Mg$
2. $RCOO^-Mg^+X$
3. $R_3CO^-Mg^+X$
4. $RCOO^-X^+$

74 Given below are half-cell reactions:



$$E_{Mn^{2+}/MnO_4^-}^\circ = -1.510 \text{ V}$$

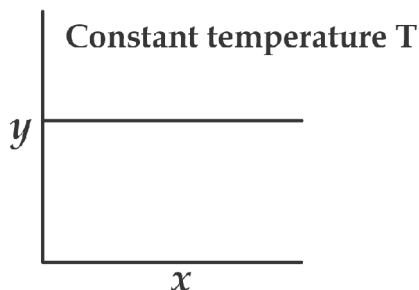


$$E_{O_2/H_2O}^\circ = +1.223 \text{ V}$$

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

1. No, because $E_{cell}^\circ = -2.733 \text{ V}$
2. Yes, because $E_{cell}^\circ = +0.287 \text{ V}$
3. No, because $E_{cell}^\circ = -0.287 \text{ V}$
4. Yes, because $E_{cell}^\circ = +2.733 \text{ V}$

75 The given graph is a representation of the 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=rate and x= $t_{1/2}$)
2.	zero order (y=concentration and x=time), first order (y= $t_{1/2}$ and x = concentration)
3.	zero order (y=concentration and x= time), first order (y=rate constant and x= concentration)
4.	zero order (y=rate and x=concentration), first order (y= $t_{1/2}$ and x = concentration)

76 Identify the statement that is incorrect regarding chirality:

1.	A racemic mixture shows zero optical rotation
2.	S_N1 reaction yields a 1:1 mixture of both enantiomers
3.	The product obtained by S_N2 reaction of haloalkane having chirality at the reactive site shows the inversion of configuration
4.	Enantiomers are superimposable mirror images on each other

77 The IUPAC name of an element with atomic number 119 is:

1. Ununoctium
2. Ununennium
3. Unnilennium
4. Unununnium

78 Given below are two statements:

Statement I:	The boiling points of the following hydrides of group 16 elements increase in the order $H_2O < H_2S < H_2Se < H_2Te$
Statement II:	The boiling points of these hydrides increase with the 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 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

79 Amongst the following, which one will have maximum 'lone pair - lone pair' electron repulsions?

1. XeF_2
2. ClF_3
3. IF_5
4. SF_4

80 For a first-order reaction $A \rightarrow \text{Products}$, 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.	0.2303	2.	1.3818
3.	0.9212	4.	0.4606

81 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.	

82 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.	+6 to +5	2.	+7 to +4
3.	+6 to +4	4.	+7 to +3

83 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. Pent-2-ene
2. 3-Methylbut-1-ene
3. 2-Methylbut-1-ene
4. 2-Methylbut-2-ene

84 $3O_2(g) \rightleftharpoons 2O_3(g)$

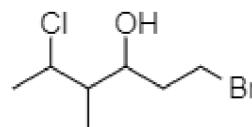
For the above reaction at 298 K, K_c is found to be 3.0×10^{-59} . If the concentration of O_2 at equilibrium is 0.040 M, then the concentration of O_3 in M is:

1. 1.2×10^{21}
2. 4.38×10^{-32}
3. 1.9×10^{-63}
4. 2.4×10^{31}

85 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.	158.7 Å	2.	158.7 pm
3.	15.87 pm	4.	1.587 pm

86 The correct IUPAC name of the following compound is :



1. 6-Bromo-4-methyl-2-chlorohexan-4-ol
2. 1-Bromo-5-chloro-4-methylhexan-3-ol
3. 6-Bromo-2-chloro-4-methylhexan-4-ol
4. 1-Bromo-4-methyl-5-chlorohexan-3-ol

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

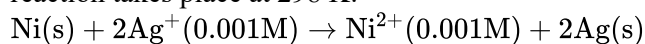
1.	I is incorrect but II is correct
2.	Both I and II correct
3.	Both I and II are incorrect
4.	I is correct but II is incorrect

88 The order of energy absorbed which is responsible for the color of complexes is:

- (A) $[Ni(H_2O)_2(en)_2]^{2+}$
 (B) $[Ni(H_2O)_4(en)]^{2+}$ and (C) $[Ni(en)_3]^{2+}$

1.	$B > A > C$	2.	$A > B > C$
3.	$C > B > A$	4.	$C > A > B$

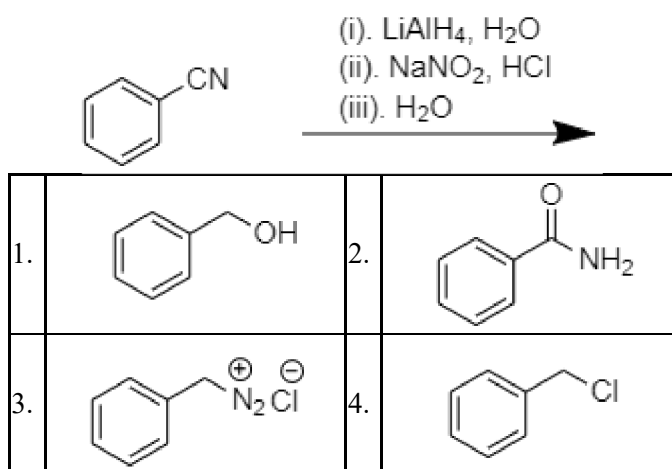
89 Find the emf of the cell in which the following reaction takes place at 298 K:



(Given that $E_{\text{cell}}^{\circ} = 10.5 \text{ V}$, $\frac{2.303RT}{F} = 0.059$ at 298 K)

1. 1.05 V
2. 1.0385 V
3. 1.385 V
4. 0.9615 V

90 The product formed from the following reaction sequence is



BIOLOGY

91 Which one of the following never occurs during mitotic cell division?

- | | |
|----|--|
| 1. | Coiling and condensation of chromatids |
| 2. | Spindle fibres attach to Kinetochores of chromosomes |
| 3. | Movement of centrioles towards opposite poles |
| 4. | Pairing of homologous chromosomes |

92 Which one of the following statements cannot be connected to Predation?

- | | |
|----|---|
| 1. | It is necessitated by nature to maintain the ecological balance . |
| 2. | It helps in maintaining species diversity in a community. |
| 3. | It might lead to the extinction of a species. |
| 4. | Both the interacting species are negatively impacted. |

93 Which one of the following plants does not show plasticity?

1. Maize
2. Cotton
3. Coriander
4. Buttercup

94 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. c, d, e only
2. a, b, c only
3. b, c only
4. d, e only

95 Which one of the following is not true regarding the release of energy during ATP synthesis through chemiosmosis?

It involves:

- | | |
|----|--|
| 1. | Reduction of NADP to NADPH ₂ on the stroma side of the membrane |
| 2. | Breakdown of proton gradient |
| 3. | Breakdown of electron gradient |
| 4. | Movement of protons across the membrane to the stroma |

96 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 in DNA amplification.
Reason (R):	The ampicillin resistant gene is used as a selectable marker to check transformation.

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

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

97 Habitat loss and fragmentation, over-exploitation, alien species invasion and co-extinction are causes for :

1. Natality
2. Population explosion
3. Competition
4. Biodiversity loss

98 Given below are two statements:

Statement I:	The primary CO_2 acceptor in C_4 plants is phosphoenolpyruvate and is found in the mesophyll cells.
Statement II:	Mesophyll cells in C_4 plants lack RuBisCO enzyme.

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.

99 Identify the incorrect statement related to Pollination:

1.	Moths and butterflies are the most dominant pollinating agents among insects
2.	Pollination by water is quite rare in flowering plants
3.	Pollination by wind is more common amongst abiotic pollination
4.	Flowers produce foul odours to attract flies and beetles to get pollinated

100 Hydrocolloid carrageen is obtained from:

1. Phaeophyceae only
2. Chlorophyceae and Phaeophyceae
3. Phaeophyceae and Rhodophyceae
4. Rhodophyceae only

101 The appearance of recombination nodules on homologous chromosomes during meiosis characterizes:

1. Terminalization
2. Synaptonemal complex
3. Bivalent
4. Sites at which crossing over occurs

102 Which one of the following statement is not true regarding gel electrophoresis technique?

1.	Bright orange coloured bands of DNA can be observed in the gel when exposed to UV light.
2.	The process of extraction of separated DNA strands from gel is called elution.
3.	The separated DNA fragments are stained by using ethidium bromide.
4.	The presence of chromogenic substrate gives blue coloured DNA bands on the gel.

103 The gaseous plant growth regulator is used in plants to:

1.	kill dicotyledonous weeds in the fields
2.	speed up the malting process
3.	promote root growth and root hair formation to increase the absorption surface
4.	help overcome apical dominance

104 Read the following statements about the vascular bundles:

a.	In roots, xylem and phloem in a vascular bundle are arranged in an alternate manner along the different radii.
b.	Conjoint closed vascular bundles do not possess cambium.
c.	In open vascular bundles, cambium is present in between xylem and phloem.
d.	The vascular bundles of dicotyledonous stem possess endarch protoxylem.
e.	In monocotyledonous root, usually there are more than six xylem bundles present.

Choose the correct answer from the options given below:

1. (a), (c), (d) and (e) only
2. (a), (b) and (d) only
3. (b), (c), (d) and (e) only
4. all statements are correct

105 Which of the following is incorrectly matched?

1. *Volvox* - Starch
2. *Ectocarpus* - Fucoxanthin
3. *Ulothrix* - Mannitol
4. *Porphyra* - Floridian starch

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

1. Less than 7%
2. Approximately 15%
3. More than 18%
4. About 10%

107 XO type of sex determination can be found in:

1. Monkeys
2. *Drosophila*
3. Birds
4. Grasshoppers

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

1.	Eight	2.	Four
3.	Six	4.	Two

109 "Girdling Experiment" was performed by Plant Physiologists to identify the plant tissue through which:

1. osmosis is observed
2. water is transported
3. food is transported
4. for both water and food transportation

110 Which of the following is not a method of ex situ conservation?

1.	Cryopreservation	2.	In vitro fertilization
3.	National Parks	4.	Micropropagation

111 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 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.

112 Read the following statements and choose the set of correct statements:

(a)	Euchromatin is loosely packed chromatin.
(b)	Heterochromatin is transcriptionally active.
(c)	Histone octamer 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. (a), (c), (e) only
2. (b), (d), (e) only
3. (a), (c), (d) only
4. (b), (e) only

113 Identify the correct set of statements:

(a)	The leaflets are modified into pointed hard thorns in <i>Citrus</i> and <i>Bougainvillea</i> .
(b)	Axillary buds form slender and spirally coiled tendrils in cucumber and pumpkin.
(c)	Stem is flattened and fleshy in <i>Opuntia</i> and modified to perform the function of leaves.
(d)	<i>Rhizophora</i> shows vertically upward growing roots that help to get oxygen for respiration.
(e)	Subaerially growing stems in grasses and strawberry help in vegetative propagation.

Choose the correct answer from the options given below:

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

114 Which one of the following plants shows vexillary aestivation and diadelphous stamens?

1. *Solanum nigrum*
2. *Colchicum autumnale*
3. *Pisum sativum*
4. *Allium cepa*

115 Given below are two statements:

Statement I:	Cleistogamous flowers are invariably autogamous.
Statement II:	Cleistogamy is disadvantageous as there is no chance for cross pollination.

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.

116 The process of translation of mRNA to proteins begins as soon as:

1.	The tRNA is activated and the larger subunit of ribosome encounters mRNA
2.	The smaller subunit of ribosome encounters mRNA
3.	The larger subunit of ribosome encounters mRNA
4.	Both the subunits join together to bind with mRNA

117 Exoskeleton of arthropods is composed of :

1. Glucosamine
2. Cutin
3. Cellulose
4. Chitin

118 DNA polymorphism forms the basis of

1. Translation
2. Genetic mapping
3. DNA finger printing
4. Both genetic mapping and DNA fingerprinting

119 The cambial ring in the dicot stem cuts:

1.	cells that mature into secondary xylem towards pith and into secondary phloem towards periphery
2.	cells that mature into secondary xylem towards periphery and into secondary phloem towards pith
3.	cells that mature into primary xylem towards pith and into primary phloem towards periphery
4.	cells that mature into primary xylem towards periphery and into primary phloem towards pith

120 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 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.

121 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 plants?

1.	Cytokinin	2.	ABA
3.	Gibberellin	4.	Ethylene

122 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.	Competition	2.	Predation
3.	Amensalism	4.	Commensalism

123 If a geneticist uses the blind approach for sequencing the whole genome of an organism, followed by assignment of function to different segments, the methodology adopted by him is called as:

1. Bioinformatics
2. Sequence annotation
3. Gene mapping
4. Expressed sequence tags

124 Which of the following occurs due to the presence of autosome linked dominant trait?

1.	Thalassemia	2.	Sickle cell anaemia
3.	Myotonic dystrophy	4.	Haemophilia

125 Consider the given two statements:

Assertion (A):	In an ecosystem, organisms are linked through food chains and food webs.
Reason (R):	No energy that is trapped into an organism remains in it forever.

- Both (A) and (R) are True and (R) correctly explains (A).
- (A) is True but (R) is False
- (A) is False but (R) is True
- Both (A) and (R) are True but (R) does not correctly explain (A).

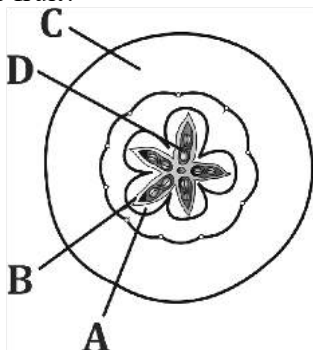
126 Read the following statements on lipids and find out correct set of statements:

a:	Lecithin found in the plasma membrane is a glycolipid.
b:	Saturated fatty acids possess one or more c=c bonds.
c:	Gingely 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 fatty acid is esterified with glycerol, monoglycerides are formed.

Choose the correct answer from the options given below:

- (a), (b) and (d) only
- (a), (b) and (c) only
- (a), (d) and (e) only
- (c), (d) and (e) only

127 Which part of the fruit, labelled in the given figure makes it a false fruit?



- D-Seed
- A-Mesocarp
- B-Endocarp
- C-Thalamus

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

- 5'GTATTC3' ; 3'CATAAG5'
- 5'GATACT3' ; 3'CTATGA5'
- 5'GAATTC3' ; 3'CTTAAG5'
- 5'CTCAGT3' ; 3'GAGTCA5'

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

Assertion (A):	Mendel's law of Independent assortment does not hold good for the genes that are located closely on the same chromosome.
Reason (R):	Closely located genes assort independently.

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

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

130 What is the role of large bundle sheath cells found around the vascular bundles in C₄ plants?

- To protect the vascular tissue from high light intensity.
- To provide the site for photorespiratory pathway.
- To increase the number of chloroplast for the operation of Calvin cycle.
- To enable the plant to tolerate high temperature.

131 ds RNA can be used during which one of the following ?

- Gene sequencing
- Polymerase Chain Reaction
- Gene silencing
- Autoradiography

132 Match the plant with the kind of life cycle it exhibits:

	List-I		List-II
(a)	<i>Spirogyra</i>	(i)	Dominant diploid sporophyte vascular plant, with highly reduced male or female gametophyte
(b)	Fern	(ii)	Dominant haploid free-living gametophyte
(c)	<i>Funaria</i>	(iii)	Dominant diploid sporophyte alternating with reduced gametophyte called prothallus
(d)	<i>Cycas</i>	(iv)	Dominant haploid leafy gametophyte alternating with partially dependent multicellular sporophyte

Choose the correct answer from the options given below:

	(a)	(b)	(c)	(d)
1.	(ii)	(iv)	(i)	(iii)
2.	(iv)	(i)	(ii)	(iii)
3.	(ii)	(iii)	(iv)	(i)
4.	(iii)	(iv)	(i)	(ii)

133 Palisade parenchyma:

1.	are prominent in isobilateral leaf
2.	is abaxially placed in dorsio-ventral leaf
3.	are loosely arranged oval or round cells extending to the lower epidermis in dorsio-ventral leaf
4.	is made of elongated cells vertically arranged parallel to each other in dorsio-ventral leaf

134 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)	Sub-metacentric	(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:

	(a)	(b)	(c)	(d)
1.	(i)	(ii)	(iii)	(iv)
2.	(iii)	(i)	(iv)	(ii)
3.	(i)	(iii)	(ii)	(iv)
4.	(ii)	(iii)	(iv)	(i)

135 Under normal physiological conditions in human being every 100 ml of oxygenated blood can deliver _____ ml of O₂ to the tissues.

- 10 ml
- 2 ml
- 5 ml
- 4 ml

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

1.	<i>Pavo</i>	2.	<i>Ornithorhynchus</i>
3.	<i>Salamandra</i>	4.	<i>Hippocampus</i>

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

1. Smooth muscle
2. Intercalated discs
3. Cartilage
4. Areolar tissue

138 *In-situ* conservation refers to:

1. Conserve only extinct species
2. Protect and conserve the whole ecosystem
3. Conserve only high risk species
4. Conserve only endangered species

139 Given below are two statements:

Statement I:	Autoimmune disorder is a condition where body defense mechanism recognized 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 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.

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

1.	Provides surface for diffusion of O ₂ and CO ₂
2.	It clears inhaled air from foreign particles
3.	Inhaled air is humidified
4.	Temperature of inhaled air is brought to body temperature

141 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 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.

142 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 options given below:

1.	(A) is False but (R) is True.
2.	Both (A) and (R) are True and (R) correctly explains (A).
3.	Both (A) and (R) are True and (R) does not correctly explain (A).
4.	(A) is True but (R) is False.

143 Given below are two statements:

Assertion (A):	Osteoporosis is characterised by decreased bone mass and increased chances 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 not correct but (R) is correct.
2.	Both (A) and (R) are correct and (R) is the correct explanation of (A).
3.	Both (A) and (R) are correct but (R) is not the correct explanation of (A).
4.	(A) is correct but (R) is not correct.

144 Given below are two statements:

Statement I:	Mycoplasma can pass through less than 1 micron filter size.
Statement II:	Mycoplasma are bacteria with cell walls.

In the light of the above statements, choose the most appropriate 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.

145 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 for maltose ?

1. $C_{12}H_{24}O_{11}$
2. $C_{12}H_{20}O_{10}$
3. $C_{12}H_{24}O_{12}$
4. $C_{12}H_{22}O_{11}$

146 Regarding Meiosis, which of the statement is incorrect ?

1.	Four haploid cells are formed at the end of Meiosis-II.
2.	There are two stages in Meiosis, Meiosis-I and II.
3.	DNA replication occurs in S phase of Meiosis-II.
4.	Pairing of homologous chromosomes and recombination occurs in Meiosis-I.

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

1. Random change
2. Stabilising change
3. Directional change
4. Disruptive change

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

1.	Genetically engineered lymphocytes are not immortal cells.
2.	Retroviral vector is introduced into these lymphocytes.
3.	Gene isolated from marrow cells producing ADA is introduced into cells at embryonic stages
4.	Lymphocytes from patient's blood are grown in culture, outside the body.

149 If '8' *Drosophila* in a laboratory population of '80' died during a week, the death rate in the population is _____ individuals per *Drosophila* per week.

1. zero
2. 0.1
3. 10
4. 1.0

150 In the taxonomic categories, which hierarchical arrangement in ascending order is correct in the case of animals?

1.	Kingdom, Order, Phylum, Class, Family, Genus, Species
2.	Kingdom, Phylum, Class, Order, Family, Genus, Species
3.	Kingdom, Class, Phylum, Family, Order, Genus, Species
4.	Kingdom, Order, Class, Phylum, Family, Genus, Species

151 Give 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 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.

152 How many of the given pairs are correctly matched?

I:	Fungi: Saprotrophs
II:	Lichens: Mutualism
III:	Malarial parasite in human RBC-commensal

1. 0
2. 1
3. 2
4. 3

153 Identify the microorganism which is responsible for the production of an immunosuppressive molecule cyclosporin A :

1. *Streptococcus cerevisiae*
2. *Trichoderma polysporum*
3. *Clostridium butylicum*
4. *Aspergillus niger*

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

1.	Muscular dystrophy	An auto immune disorder causing progressive degeneration of skeletal muscle
2.	Arthritis	Inflamed joints
3.	Tetany	high Ca^{2+} level causing rapid spasms.
4.	Myasthenia gravis	Genetic disorder resulting in weakening and paralysis of skeletal muscle

155 Which of the following statements concerning the Endoplasmic Reticulum is incorrect?

- SER are the sites for lipid synthesis
- RER has ribosomes attached to ER
- SER is devoid of ribosomes
- In prokaryotes, only RER is present

156 Given below are two statements:

Statement I:	The release of sperms from 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 option given below :

- Statement I** is incorrect but **Statement II** is correct.
- Both **Statement I** and **Statement II** are correct.
- Both **Statement I** and **Statement II** are incorrect.
- Statement I** is correct but **Statement II** is incorrect.

157 In an E.coli strain i gene gets mutated and its product cannot bind the inducer molecule. If growth medium is provided with lactose, what will be the outcome ?

- RNA polymerase will bind the promoter region
- Only z gene will get transcribed
- z, y, a genes will be transcribed
- z, y, a genes will not be translated

158 Tegmina in cockroach, arises from :

1. Prothorax and Mesothorax	2. Prothorax
3. Mesothorax	4. Metathorax

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

- Pavo, Psittacula, Corvus*
- Corvus, Columba, Chameleon*
- Bufo, Balaenoptera, Bangarus*
- Catla, Columba, Crocodilus*

160 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 option given below:

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

161 Lippe's loop is a type of contraceptive used as:

- Copper releasing IUD
- Cervical barrier
- Vault barrier
- Non-Medicated IUD

162 Which of the following is not a connective tissue?

1. Neuroglia	2. Blood
3. Adipose tissue	4. Cartilage

163 Detritivores breakdown detritus into smaller particles. This process is called:

1. Decomposition	2. Catabolism
3. Fragmentation	4. Humification

164 Select the incorrect statement with reference to mitosis.

- Splitting of centromere occurs at anaphase.
- All the chromosomes lie at the equator at metaphase.
- Spindle fibres attach to centromere of chromosomes.
- Chromosomes decondense at telophase

165 If the length of a DNA molecules is 1.1 metres, what will be the approximate number of base pairs?

1. 6.6×10^6 bp
2. 3.3×10^9 bp
3. 6.6×10^9 bp
4. 3.3×10^6 bp

166 At which state of life the oogenesis process is initiated?

1. Adult
2. Puberty
3. Embryonic development stage
4. Birth

167 Which of the following is not a desirable feature of a cloning vector?

1. Presence of two or more recognition sites
2. Presence of origin of replication
3. Presence of a marker gene
4. Presence of single restriction enzyme site

168 Select the incorrect statement regarding synapses:

1.	Impulse Transmission across a chemical synapse is always faster than that across an electrical synapse.
2.	The membranes of presynaptic and postsynaptic neurons are in close proximity in an electrical synapse.
3.	Electrical current can flow directly from one neuron into the other across the electrical synapse.
4.	Chemical synapses use neurotransmitters.

169 Statements related to human Insulin are given below.

Which statement(s) is/are correct about genetically engineered Insulin?

(a)	Pro-hormone insulin contain 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 bond 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), (d) and (e) only
2. (a), (b) and (d) only
3. (b) only
4. (c) and (d) only

170 Which of the following are not the effects of Parathyroid hormone?

(a)	Stimulates the process of bone resorption.
(b)	Decreases Ca^{2+} level 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. (b) and (c) only
2. (a) and (c) only
3. (b), (d) and (e) only
4. (a) and (e) only

171 Which of the following statements is not true?

1.	Flippers of penguins and dolphins are a pair of homologous organs.
2.	Analogous structures are a result of convergent evolution.
3.	Sweet potato and potato is an example of analogy.
4.	Homology indicates common ancestry.

172 Which one of the following statements is correct?

1.	Increased ventricular pressure causes closing of the semilunar valves.
2.	The atrio-ventricular node (AVN) generates an action potential to stimulate atrial contraction.
3.	The tricuspid and the bicuspid valves open due to the pressure exerted by the simultaneous contraction of the atria.
4.	Blood moves freely from atrium to the ventricle during joint diastole.

173 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) Thrombin	(iv) Storage product

Choose the correct answer from the options given below:

	(a)	(b)	(c)	(d)
1.	(iv)	(iii)	(i)	(ii)
2.	(iii)	(ii)	(iv)	(i)
3.	(iv)	(ii)	(i)	(iii)
4.	(ii)	(iv)	(iii)	(i)

174 Select the incorrect statement with respect to acquired immunity.

1.	Acquired immunity is non-specific type of defense present at the time of birth.
2.	Primary response is produced when our body encounters a pathogen for the first time.
3.	Anamnestic response is elicited on subsequent encounters with the same pathogen.
4.	Anamnestic response is due to memory of first encounter.

175 Ten E.coli cells with ^{15}N - ds DNA are incubated in medium containing ^{14}N nucleotide. After 60 minutes, how many E.coli cells will have DNA totally free from ^{15}N ?

- 80 cells
- 20 cells
- 40 cells
- 60 cells

176 Which of the following is a correct statement?

1.	Mycoplasma have DNA, Ribosome and cell wall.
2.	Cyanobacteria are a group of autotrophic organisms classified under Kingdom Monera.
3.	Bacteria are exclusively heterotrophic organisms.
4.	Slime moulds are saprophytic organisms classified under Kingdom Monera.

177 The recombination frequency between the genes a & c is 5%, b & c is 15%, b & d is 9%, a & b is 20%, c & d is 24% and a & d is 29%. What will be the sequence of these genes on a linear chromosome?

- a, c, b, d
- a, d, b, c
- d, b, a, c
- a, b, c, d

178 Match List - I with List - II with respective 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 sperm 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:

	(a)	(b)	(c)	(d)
1.	(iii)	(ii)	(i)	(iv)
2.	(iv)	(i)	(iii)	(ii)
3.	(iv)	(i)	(ii)	(iii)
4.	(ii)	(iv)	(i)	(iii)

179 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:

	(a)	(b)	(c)	(d)
1.	(iii)	(iv)	(ii)	(i)
2.	(iv)	(iii)	(i)	(ii)
3.	(i)	(ii)	(iii)	(iv)
4.	(ii)	(i)	(iv)	(iii)

180 If a colour blind female marries a man whose mother was also colour blind, what are the chances of her progeny having colour blindness

1. 100%
2. 25%
3. 50%
4. 75%