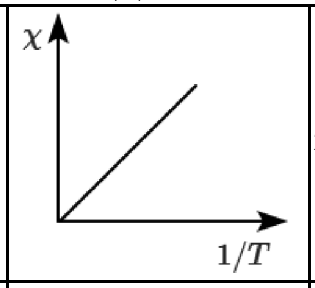
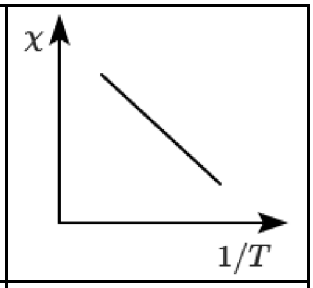
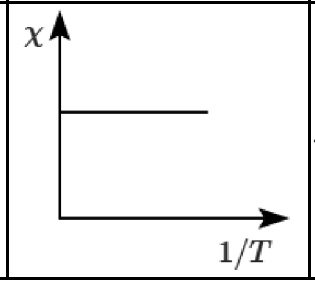
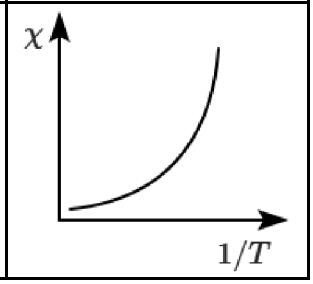
PHYSICS - SECTION A

1 The variation of susceptibility (χ) with absolute temperature (T) for a paramagnetic material is represented as:

1. 

2. 

3. 

4. 

2 A bullet of mass m hits a stationary block of mass M elastically. The transfer of energy is the maximum, when:

1. $M = m$
2. $M = 2m$
3. $M \ll m$
4. $M \gg m$

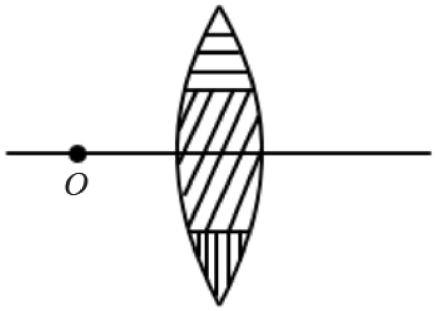
3 The ground state energy of a hydrogen atom is -13.6 eV. The energy needed to ionize the hydrogen atom from its second excited state will be:

1. 13.6 eV
2. 6.8 eV
3. 1.51 eV
4. 3.4 eV

4 The escape velocity of a body on the earth's surface is 11.2 km/s. If the same body is projected upward with a velocity 22.4 km/s, the velocity of this body at an infinite distance from the centre of the earth will be:

1.	$11.2\sqrt{2}$ km/s	2.	zero
3.	11.2 km/s	4.	$11.2\sqrt{3}$ km/s

5 A lens is made up of 3 different transparent media as shown in the figure. A point object O is placed on its axis beyond $2f$. How many real images will be obtained on the other side?



1. 2
2. 1
3. No image will be formed
4. 3

6 The diameter of a spherical bob, when measured with vernier callipers yielded the values: 3.33 cm, 3.32 cm, 3.34 cm, 3.33 cm and 3.32 cm. The mean diameter to appropriate significant figures is:

1. 3.328 cm
2. 3.3 cm
3. 3.33 cm
4. 3.32 cm

7 On the basis of electrical conductivity, which one of the following material has the smallest resistivity?

1. Germanium
2. Silver
3. Glass
4. Silicon

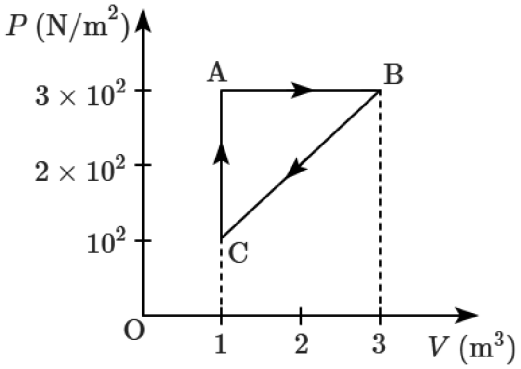
8 The mechanical quantity, which has dimensions of reciprocal of mass (M^{-1}), is:

1.	angular momentum
2.	coefficient of thermal conductivity
3.	torque
4.	gravitational constant

9 The position of a particle is given by; $\vec{r}(t) = 4t\hat{i} + 2t^2\hat{j} + 5\hat{k}$, where t is in seconds and r in metres. Find the magnitude and direction of the velocity $v(t)$, at $t = 1$ s, with respect to the x-axis.

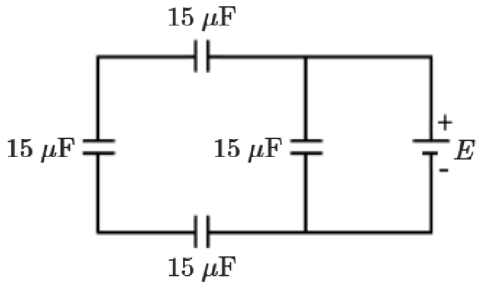
1. $4\sqrt{2}$ ms^{-1}, 45°
2. $4\sqrt{2}$ ms^{-1}, 60°
3. $3\sqrt{2}$ ms^{-1}, 30°
4. $3\sqrt{2}$ ms^{-1}, 45°

10 For the given cycle, the work done during the isobaric process is:



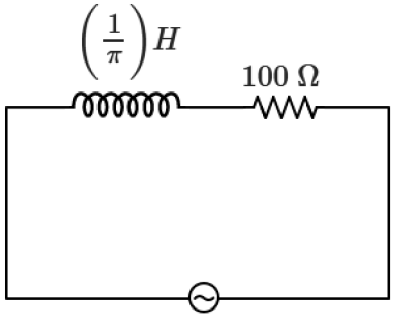
1. 200 J
2. zero
3. 400 J
4. 600 J

11 The equivalent capacitance of the arrangement shown in the figure is:



1. 30 μF
2. 15 μF
3. 25 μF
4. 20 μF

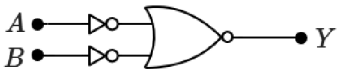
12 An AC source is connected to the given circuit. The value of ϕ will be:

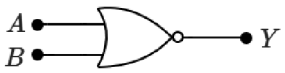
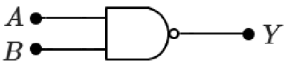


$V = 220\sin(100\,\pi t + \phi)$ volt

1.	60°	2.	90°
3.	30°	4.	45°

13 The given circuit is equivalent to:



1.	
2.	
3.	
4.	

14 A particle moves with a velocity $(5\hat{i} - 3\hat{j} + 6\hat{k})$ ms^{-1} horizontally under the action of a constant force $(10\hat{i} + 10\hat{j} + 20\hat{k})$ N. The instantaneous power supplied to the particle is:

1.	200 W	2.	zero
3.	100 W	4.	140 W

15 A certain wire A has resistance 81 Ω. The resistance of another wire B of the same material and equal length but of diameter thrice the diameter of A will be:

1.	81 Ω	2.	9 Ω
3.	729 Ω	4.	243 Ω

16 ε_0 and μ_0 are the electric permittivity and magnetic permeability of free space respectively. If the corresponding quantities of a medium are $2\varepsilon_0$ and $1.5\mu_0$ respectively, the refractive index of the medium will nearly be:

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

17 The amount of elastic potential energy per unit volume (in SI unit) of a steel wire of length 100 cm to stretch it by 1 mm is:

(given: Young's modulus of the wire = $Y = 2.0 \times 10^{11}$ N/m^2)

1. 10^{11} J/m^3
2. 10^{17} J/m^3
3. 10^{7} J/m^3
4. 10^{5} J/m^3

18 The 4^{th} overtone of a closed organ pipe is the same as that of the 3^{rd} overtone of an open pipe. The ratio of the length of the closed pipe to the length of the open pipe is:

1.	8 : 9	2.	9 : 7
3.	9 : 8	4.	7 : 9

19 A long straight wire of length 2 m and mass 250 g is suspended horizontally in a uniform horizontal magnetic field of 0.7 T. The amount of current flowing through the wire will be:

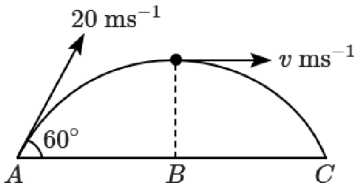
($g = 9.8\ \text{ms}^{-2}$)

1. 2.45 A
2. 2.25 A
3. 2.75 A
4. 1.75 A

20 According to Gauss's law in electrostatics, the electric flux through a closed surface depends on:

1.	the area of the surface
2.	the quantity of charges enclosed by the surface
3.	the shape of the surface
4.	the volume enclosed by the surface

21 A ball is projected from point A with velocity 20 ms^{-1} at an angle 60° to the horizontal direction. At the highest point B of the path (as shown in figure), the velocity v (in ms^{-1}) of the ball will be:



1.	20	2.	$10\sqrt{3}$
3.	zero	4.	10

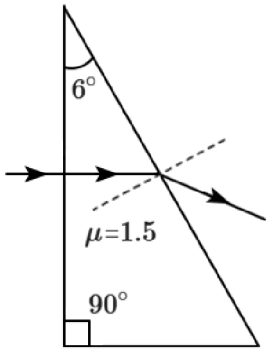
22 Which of the following statements is not true?

1.	The coefficient of viscosity is a scalar quantity.
2.	Surface tension is a scalar quantity.
3.	Pressure is a vector quantity.
4.	Relative density is a scalar quantity.

23 A uniform electric field and a uniform magnetic field are acting along the same direction in a certain region. If an electron is projected in the region such that its velocity is pointed along the direction of fields, then the electron:

1.	will turn towards right of direction of motion
2.	will turn towards left of direction of motion
3.	speed will decrease
4.	speed will increase

24 A horizontal ray of light is incident on the right-angled prism with prism angle 6°. If the refractive index of the material of the prism is 1.5, then the angle of emergence will be:

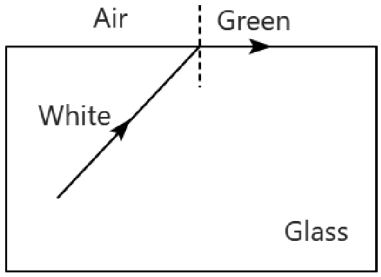


1.	9°	2.	10°
3.	4°	4.	6°

25 A p-type extrinsic semiconductor is obtained when Germanium is doped with:

1. antimony
2. phosphorous
3. arsenic
4. boron

26 Which set of colours would be observed in the air under the conditions depicted in the figure?



1.	yellow, orange, and red
2.	blue, green, and yellow
3.	orange, red, and violet
4.	all of the above

27 If Z_1 and Z_2 are the impedances of the given circuits (a) and (b) as shown in the figures, then choose the correct option:

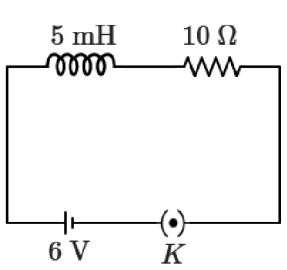


figure (a)

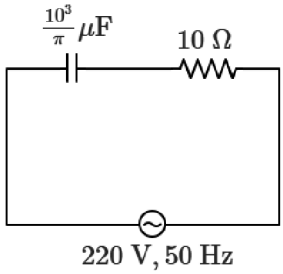


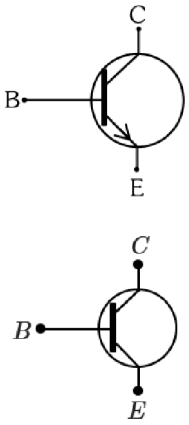
figure (b)

1.	$Z_1 < Z_2$	2.	$Z_1 + Z_2 = 20\ \Omega$
3.	$Z_1 = Z_2$	4.	$Z_1 > Z_2$

28 The wavelength of the Lyman series of hydrogen atom appears in:

1.	visible region
2.	far infrared region
3.	ultraviolet region
4.	infrared region

29



The above figure shows the circuit symbol of a transistor. Select the correct statements given below:

(A)	The transistor has two segments of p-type semiconductor separated by a segment of n-type semiconductor.
(B)	The emitter is of moderate size and heavily doped.
(C)	The central segment is thin and lightly doped.
(D)	The emitter base junction is reverse biased in common emitter amplifier circuit.

1.	**(C)** and **(D)**
2.	**(A)** and **(D)**
3.	**(A)** and **(B)**
4.	**(B)** and **(C)**

30 The de-Broglie wavelength associated with an electron, accelerated by a potential difference of 81 V is given by:

1. 13.6 nm
2. 136 nm
3. 1.36 nm
4. 0.136 nm

31 The maximum power is dissipated for an AC in a/an:

1.	resistive circuit	2.	LC circuit
3.	inductive circuit	4.	capacitive circuit

32 The maximum kinetic energy of the emitted photoelectrons in the photoelectric effect is independent of the:

1.	work function of material
2.	intensity of incident radiation
3.	frequency of incident radiation
4.	wavelength of incident radiation

33 Two particles A and B initially at rest, move toward each other under the mutual force of attraction. At an instance when the speed of A is v and speed of B is $3v$, the speed of the centre-of-mass will be:

1. $2v$
2. zero
3. v
4. $4v$

34 A charge $Q\ \mu$C is placed at the centre of a cube. The flux coming out from any one of its faces will be (in SI units):

1.	$\frac{Q}{\varepsilon_0} \times 10^{-6}$	2.	$\frac{2Q}{3\varepsilon_0} \times 10^{-3}$
3.	$\frac{Q}{6\varepsilon_0} \times 10^{-3}$	4.	$\frac{Q}{6\varepsilon_0} \times 10^{-6}$

35 The viscous drag acting on a metal sphere of diameter 1 mm, falling through a fluid of viscosity 0.8 Pa-s with a velocity of 2 m s^{-1} is nearly equal to:

1.	15×10^{-3} N	2.	30×10^{-3} N
3.	1.5×10^{-3} N	4.	20×10^{-3} N

PHYSICS - SECTION B

36 If R is the radius of the earth and g is the acceleration due to gravity on the earth surface. Then the mean density of the earth will be:

1.	$\frac{\pi RG}{12g}$	2.	$\frac{3\pi R}{4gG}$
3.	$\frac{3g}{4\pi RG}$	4.	$\frac{4\pi G}{3gR}$

37 A copper wire of radius 1 mm contains 10^{22} free electrons per cubic metre. The drift velocity for free electrons when 10 A current flows through the wire will be:
(Given, charge on electron = 1.6×10^{-19} C)

1.	$\frac{6.25 \times 10^4}{\pi}$ m/s	2.	$\frac{6.25}{\pi} \times 10^3$ m/s
3.	$\frac{6.25}{\pi}$ m/s	4.	$\frac{6.25 \times 10^5}{\pi}$ m/s

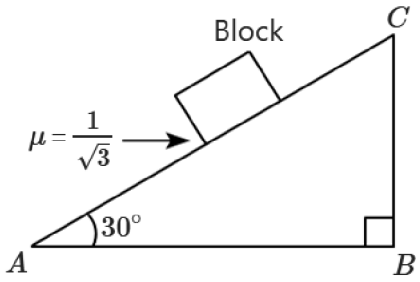
38 An object is mounted on a wall. Its image of equal size is to be obtained on a parallel wall with the help of a convex lens placed between these walls. The lens is kept at distance x in front of the second wall. The required focal length of the lens will be:

1.	less than $\frac{x}{4}$
2.	more than $\frac{x}{4}$ but less than $\frac{x}{2}$
3.	$\frac{x}{2}$
4.	$\frac{x}{4}$

39 If a conducting sphere of radius R is charged. Then the electric field at a distance $r(r > R)$ from the centre of the sphere would be, (V = potential on the surface of the sphere):

1.	$\frac{rV}{R^2}$	2.	$\frac{R^2V}{r^3}$
3.	$\frac{RV}{r^2}$	4.	$\frac{V}{r}$

40 A block of mass 2 kg is placed on inclined rough surface AC (as shown in the figure) of coefficient of friction μ. If $g = 10$ ms^{-1}, the net force (in N) on the block will be:



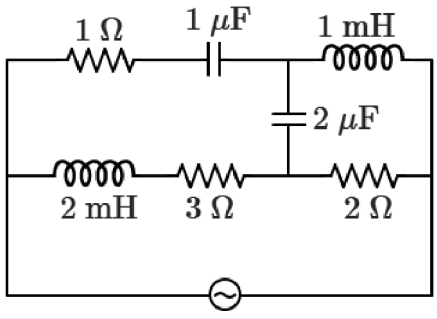
1. $10\sqrt{3}$
2. zero
3. 10
4. 20

41 A container of volume 200 cm^3 contains 0.2 mole of hydrogen gas and 0.3 mole of argon gas. The pressure of the system at temperature 200 K ($R = 8.3$ JK^{-1} mol^{-1}) will be:
1. 6.15×10^5 Pa
2. 6.15×10^4 Pa
3. 4.15×10^5 Pa
4. 4.15×10^6 Pa

42 To produce an instantaneous displacement current of 2 mA in the space between the parallel plates of a capacitor of capacitance 4 μF, the rate of change of applied variable potential difference $\left(\frac{dV}{dt}\right)$ must be:
1. 800 V/s
2. 500 V/s
3. 200 V/s
4. 400 V/s

43 An emf is generated by an ac generator having 100 turn coil, of loop area 1 m^2. The coil rotates at a speed of one revolution per second and placed in a uniform magnetic field of 0.05 T perpendicular to the axis of rotation of the coil. The maximum value of emf is:
1. 3.14 V
2. 31.4 V
3. 62.8 V
4. 6.28 V

44 For very high frequencies, the effective impedance of the circuit (shown in the figure) will be:



1.	4 Ω	2.	6 Ω
3.	1 Ω	4.	3 Ω

45 A constant torque of 100 N-m turns a wheel of moment of inertia 300 kg-m^2 about an axis passing through its centre. Starting from rest, its angular velocity after 3 s is:

1. 1 rad/s
2. 5 rad/s
3. 10 rad/s
4. 15 rad/s

46 The emf of a cell having internal resistance 1 Ω is balanced against a length of 330 cm on a potentiometer wire. When an external resistance of 2 Ω is connected across the cell, the balancing length will be:

1.	220 cm	2.	330 cm
3.	115 cm	4.	332 cm

47 A 1 kg object strikes a wall with velocity 1 ms^{-1} at an angle of 60° with the wall and reflects at the same angle. If it remains in contact with the wall for 0.1 s, then the force exerted on the wall is:

1. $30\sqrt{3}$ N
2. zero
3. $10\sqrt{3}$ N
4. $20\sqrt{3}$ N

48 The angular momentum of an electron moving in an orbit of a hydrogen atom is $1.5\left(\frac{h}{\pi}\right)$. The energy in the same orbit is nearly:

1.	−1.5 eV	2.	−1.6 eV
3.	−1.3 eV	4.	−1.4 eV

49 A particle is executing uniform circular motion with velocity $\vec{v}$ and acceleration $\vec{a}$. Which of the following is true?

1.	$\vec{v}$ is a constant; $\vec{a}$ is not a constant.
2.	$\vec{v}$ is not a constant; $\vec{a}$ is not a constant.
3.	$\vec{v}$ is a constant; $\vec{a}$ is a constant.
4.	$\vec{v}$ is not a constant; $\vec{a}$ is a constant.

50 A simple pendulum oscillating in air has a period of $\sqrt{3}$ s. If it is completely immersed in non-viscous liquid, having density $\left(\frac{1}{4}\right)^{th}$ of the material of the bob, the new period will be:

1.	$2\sqrt{3}$ s	2.	$\frac{2}{\sqrt{3}}$ s
3.	2 s	4.	$\frac{\sqrt{3}}{2}$ s

CHEMISTRY - SECTION A

51 Incorrect set of quantum numbers from the following is :

1. n=4,l=3, m_l =-3, -2, -1, 0, +1, +2, +3, m_s=-1/2
2. n=5, l=2, m_l =-2, -1, +1, +2, m_s=+1/2
3. n=4, l=2, m_l = -2, -1, 0, +1, +2, m_s=-1/2
4. n=5,l=3, m_l =-3, -2, -1, 0, +1, +2, +3, m_s=+1/2

52

Assertion (A):	Ionization enthalpy increases along each series of transition elements from left to right. However, small variations occur.
Reason (R):	There is a corresponding increase in nuclear charge which accompanies the filling of electrons in the inner d-orbitals.

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)**

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

Assertion (A):	Lithium and beryllium unlike their other respective group members form compounds with pronounced ionic character
Reason (R):	Lithium and Magnesium have similar properties due to a diagonal relationship

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 but **(R)** is not the correct explanation of **(A)**

54 For a weak acid HA, the percentage of dissociation is nearly 1% at equilibrium. If the concentration of acid is 0.1 mol L^{-1}, then the correct option for its K_a at the same temperature will be:

1.	1×10^{-4}
2.	1×10^{-6}
3.	1×10^{-5}
4.	1×10^{-3}

55 A 1 M solution of a compound 'X' has a density of 1.25 g/mL. If the molar mass of compound X is 85 g, what is the molality (m) of the solution?

1.	0.705 m	2.	1.208 m
3.	1.165 m	4.	0.858 m

56 Consider the given reaction:

$CH_3COCH_3 \xrightarrow{\text{dil. } Ba(OH)_2}$ " X "

The functional groups present in the compound "X" are:

1. Ketone and double bond
2. Double bond and aldehyde
3. Alcohol and aldehyde
4. Alcohol and ketone

57 The $E^{\ominus}$ values for

$Al^{+}/Al = +0.55$ V and $Tl^{+}/Tl = -0.34$ V

$Al^{3+}/Al = -1.66$ V and $Tl^{3+}/Tl = +1.26$ V

The incorrect statement among the following is:

1. Al is more electropositive than TI.
2. Tl^{3+} is a good reducing agent than Tl^{1+}.
3. Al^{+} is unstable in solution.
4. Tl can be easily oxidized to Tl^{+} as compared to Tl^{3+}.

58 The correct order of dipole moments for molecules NH_3, H_2S, CH_4 and HF is :

1.	$CH_4 > H_2S > NH_3 > HF$
2.	$H_2S > NH_3 > HF > CH_4$
3.	$NH_3 > HF > CH_4 > H_2\ S$
4.	$HF > NH_3 > H_2S > CH_4$

59 The molar conductance of an electrolyte increases with dilution according to the equation:

$\Lambda_m = \Lambda_m^{\circ} - A\sqrt{c}$

Consider the following four statements:

A:	This equation applies to both strong and weak electrolytes.
B:	The value of the constant A depends upon the nature of the solvent.
C:	The value of constant A is the same for both $BaCl_2$ and $MgSO_4$
D:	The value of constant A is the same for both $BaCl_2$ and $Mg(OH)_2$

Which of the above statements are correct?

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

60 Cheilosis occurs due to the deficiency of:

1.	Thiamine	2.	Nicotinamide
3.	Pyridoxamine	4.	Riboflavin

61 The correct value of cell potential in volts for the reaction that occurs when the following two half cells are connected, is:

$Fe^{2+}_{(aq)} + 2e^- \rightarrow Fe(s), E^\circ = -0.44$ V

$Cr_2O_7^{2-}{}_{(aq)} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$,

$E^\circ = +1.33$ V

1. +1.77 V
2. +2.65 V
3. +0.01 V
4. +0.89 V

62 Consider the following reactions:

$$R - COOH \xrightarrow[(ii)\ H_2O/HCl]{(i)\ X} R - CH_2OH$$

$$R - CH = CH_2 \xrightarrow[(ii)\ H_2O,NaOH,H_2O_2]{(i)\ X} R - CH_2 - CH_2 - OH$$

Identify 'X' in above reactions:

1.	B_2H_6	2.	$LiAlH_4$
3.	$NaBH_4$	4.	H_2/Pd

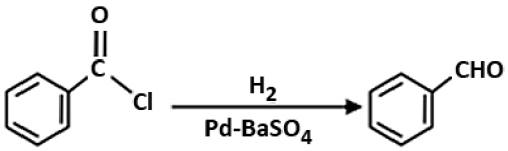
63 For a reaction $3A \rightarrow 2B$

The average rate of appearance of B is given by $\frac{\Delta[B]}{\Delta t}$.

The correct relation between the average rate of appearance of B with the average rate of disappearance of A is:

1.	$\frac{-\Delta[A]}{\Delta t}$	2.	$\frac{-3\Delta[A]}{2\Delta t}$
3.	$\frac{-2\Delta[A]}{3\Delta t}$	4.	$\frac{\Delta[A]}{\Delta t}$

64 Mark the name of the reaction associated with the following conversion



1. Stephen reaction
2. Gattermann-Koch reaction
3. Etard reaction
4. Rosenmund reaction

65 Which amongst the following is used in controlling depression and hypertension?

1.	Seldane	2.	Valium
3.	Equanil	4.	Prontosil

66 Which one of the following represents all isoelectronic species?

1. Na^+, Cl^-, O^-, NO^+
2. N_2O, N_2O_4, NO^+, NO
3. Na^+, Mg^{2+}, O^-, F^-
4. Ca^{2+}, Ar, K^+, Cl^-

67 Given below are two statements:

Statement I:	The value of wave function, Ψ depends upon the coordinates of the electron in the atom.
Statement II:	The probability of finding an electron at a point within an atom is proportional to the orbital wave function.

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

1.	**Statement I** is True but **Statement II** is False.
2.	**Statement I** is False but **Statement II** is True.
3.	Both **Statement I** and **Statement II** are True.
4.	Both **Statement I** and **Statement II** are False.

68 The correct van der Waals equation for 1 mole of a real gas is:

1. $(P + \frac{a}{V^2})(V - b) = RT$
2. $(P + \frac{V^2}{a})(V - b) = RT$
3. $(P + \frac{an^2}{V^2})(V^2 - nb) = RT$
4. $(P + \frac{an^2}{V})(V - nb) = nRT$

69 The correct option in which the density of argon (Atomic mass =40) is highest:

1.	STP	2.	0°C, 2 atm
3.	0°C, 4 atm	4.	273°C, 4 atm

70 Which of the following pair is correctly matched?

1. Basic oxides - In_2O_3, K_2O, SnO_2
2. Neutral oxides - CO, NO_2, N_2O
3. Acidic oxides - Mn_2O_7, SO_2, TeO_3
4. Amphoteric oxides -BeO, Ga_2O_3, GeO

71 Which of the following is a positively charged sol?

1. Methylene blue sol
2. Congo red sol
3. Siver sol
4. Sb_2S_3 *sol*

72 Match List -I with List-II

	List-I (Mixtures/Sample)		**List-II (Technique used for purification)**
A.	Glycerol from spent lye	(I)	Steam distillation
B.	Chloroform + Aniline	(II)	Fractional distillation
C.	Fractions of crude oil	(III)	Distillation under reduced pressure
D.	Aniline+water	(IV)	Distillation

Choose the correct answer from the options given below

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

73 A reaction among the following can generate isonitriles as a major product.

A. $R-X+HCN \rightarrow$

B. $R-X+AgCN \rightarrow$

C. $R-X+KCN \rightarrow$

D. $R-X+NaCN \xrightarrow[C_2H_5OH]{H_2O}$

Choose the most appropriate answer from the options given below:

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

74 The **List-I** with **List-II**

	List-I (Hydride)		**List-II (Type of Hydride)**
A.	NaH	(I)	Electron precise
B.	PH_3	(II)	Saline
C.	GeH_4	(III)	Metallic
D.	$LaH_{2.87}$	(IV)	Electron rich

Choose the correct answer from the options given below:

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

75 Which one of the following statements is incorrect related to Molecular Orbital Theory?

1.	The π^* antibonding molecular orbital has a node between the nuclei.
2.	In the formation of a bonding molecular orbital, the two electron waves of the bonding atoms reinforce each other.
3.	Molecular orbitals obtained from $2P_x$ and $2P_y$ orbitals are symmetrical around the bond axis.
4.	A $\pi-$bonding molecular orbital has larger electron density above and below the internuclear axis.

76 Which combination of the following substances will result in the formation of an acidic buffer when mixed?

1.	Weak acid and it's salt with a strong base.
2.	Equal volumes of equimolar solutions of weak acid and weak base.
3.	Strong acid and its salt with a strong base.
4.	Strong acid and its salt with a weak base. (The pK_a of acid = pK_b of the base)

77 Reagents that can be used to convert alcohols to carboxylic acids are:

(A) CrO_3 - H_2SO_4

(B) $K_2Cr_2O_7$ + H_2SO_4

(C) $KMnO_4$ + KOH/H_3O^+

(D) Cu, 573 K

(E) CrO_{3+} $(CH_3CO)_2O$

Choose the most appropriate answer from the options given below:

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

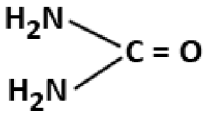
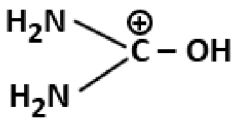
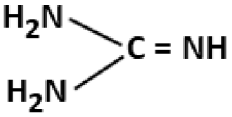
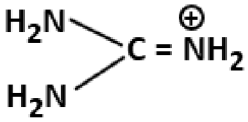
78 Select the element (M) whose trihalides cannot be hydrolysed to form $[M(H_2O)_6]^{3+}$.

1.	Ga	2.	In
3.	Al	4.	B

79 The correct options for the rate law that corresponds to overall first order reaction is:

1.	$Rate = k[A]^0[B]^2$	2.	$Rate = k[A][B]$
3.	$Rate = k[A]^{1/2}[B]^2$	4.	$Rate = k[A]^{-1/2}[B]^{3/2}$

80 The least basic compounds/species among the following is:

1.		2.	
3.		4.	

81 Which of the following sets represents a complex and a double salt, respectively?

1. $CuSO_4.5H_2O$ and $CuCl_2,4NH_3$
2. $PtCl_2.2NH_3$ and $PtCl_4.2HCl$
3. $K_2PtCl_2.2NH_3$ and $KAl(SO_4)_2.12H_2O$
4. $NiCl_2.6H_2O$ and $NiCl_2(H_2O)_4$

82 Given below are two statements:

Statement I:	High density polythene is formed in the presence of catalyst triethylaluminium and titanium tetrachloride.
Statement II:	High density polymers are chemically inert.

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.

83 Which amongst the following compounds will show geometrical isomerism?

1. Pent-1-ene
2. 2,3-Dimethylbut-2-ene
3. 2-Methylprop-1-ene
4. 3,4-Dimethylhex-3-ene

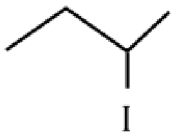
84 Given below are two statements:

Statement I:	Hydrated chlorides and bromides of Ca, Sr and Ba on heating undergo hydrolysis.
Statement II:	Hydrated chlorides and bromides of Be and Mg on heating dehydration.

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.

85 The correct order for the rate of α , β-dehydrohalogenation for the following compounds is:

(i) 	(ii) 
(iii) 	

1.	(i) < (ii) < (iii)	2.	(ii) < (i) < (iii)
3.	(iii) < (ii) < (i)	4.	(ii) < (iii) < (i)

CHEMISTRY - SECTION B

86 How many number of tetrahedral voids are formed in 5 mol of a compound having cubic close packed structure? (Choose the correct option)

1.	1.550×10^{24}	2.	3.011×10^{25}
3.	3.011×10^{24}	4.	6.022×10^{24}

87 Type of isomerism exhibited by compounds $[Cr(H_2O)_6]Cl_3$, $[Cr(H_2O)_5Cl]Cl_2.H_2O$, $[Cr(H_2O)_4Cl_2]Cl.2H_2O$ and the value of coordination number (CN) of central metal ion in all these compounds, respectively, is:

1. Geometrical isomerism, CN = 2
2. Optical isomerism, CN = 4
3. Ionisation isomerism, CN = 4
4. Solvate isomerism, CN = 6

88 The correct sequence given below contains neutral, acidic, basic, and amphoteric oxide each, respectively is:

1.	NO, ZnO, CO_2, CaO	2.	ZnO, NO, CaO, CO_2
3.	NO, CO_2, ZnO, CaO	4.	NO, CO_2, CaO, ZnO

89 Read the following statement and choose the set of correct statements:

A.	Chrome steel is used for cutting tools and crushing machines.
B.	The fine dust of aluminium is used in paints and lacquers.
C.	Copper is used for the reduction of alcohol.
D.	Zinc dust is used as a reducing agent in the manufacturing of paints.
E.	Iron is used for galvanising zinc.

choose the most appropriate answer from the options given below:

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

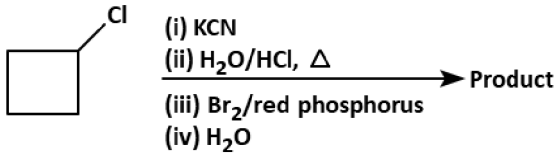
90 Which of the following is the correct sequence of reagents for converting 4-nitrotoluene to 2-bromotoluene?

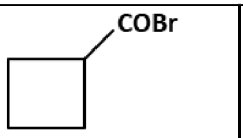
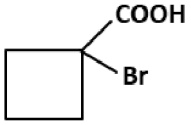
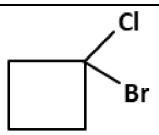
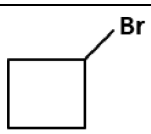
1. $NaNO_2$/HCl; Sn/HCl; Br_2; H_2O/H_3PO_2
2. Sn/HCl; $NaNO_2$/HCl; Br_2; H_2O/H_3PO_2
3. Br_2; Sn/HCl; $NaNO_2$/HCl; H_2O/H_3PO_2
4. Sn/HCl; Br_2; $NaNO_2$/HCl; H_2O/H_3PO_2

91 How are edge length 'a' of the unit cell and radius 'r' of the sphere related to each other in ccp structure?
(Choose correct option for your answer)

1.	$a = 2r$	2.	$a = r/2\sqrt{2}$
3.	$a = 4r/\sqrt{3}$	4.	$a = 2\sqrt{2}r$

92 Identify the product in the following reaction:



1.		2.	
3.		4.	

93 Given below are two statements:

Statement I:	In an organic compound, when inductive and electromeric effects operate in opposite directions, the inductive effect predominates.
Statement II:	Hyperconjugation is observed in o-xylene.

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

1. **Statement I** is true but **Statement II** is false.
2. **Statement I** is false but **Statement II** is true
3. Both **Statement I** and **Statement II** are true.
4. Both **Statement I** and **Statement II** are false.

94 The molar conductance of a solution, given its conductivity (0.248 S m^{-1}) and concentration (0.2 mol m^{-3}) is:

1. 0.124 S cm^2 mol^{-1}
2. 1.24 S m^2 mol^{-1}
3. 124 S cm^2 mol^{-1}
4. 124 S m^2 mol^{-1}

95 Given below are two statements:

Assertion (A):	Ionisation enthalpies of early actinoids are lower than for early lanthanoids.
Reason (R):	Electrons are entering 5f orbitals in actinoids which experience greater shielding from nuclear charge.

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

96 Consider the following reaction:

$2H_2(g) + O_2(g) \rightarrow 2H_2O(g) \Delta_r H^\circ = -483.64 kJ.$

What is the enthalpy change for the decomposition of one mole of water?

1.	120.9 kJ	2.	241.82 kJ
3.	18 kJ	4.	100 kJ

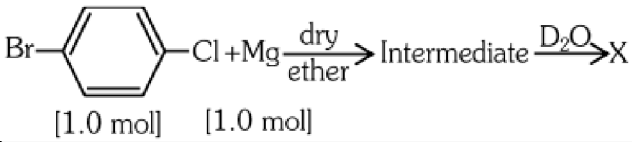
97 Which statement is not true about photochemical smog?

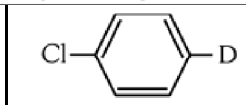
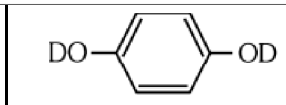
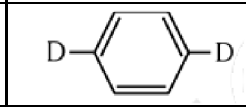
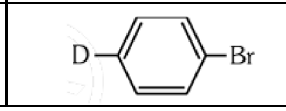
1.	Photochemical smog is harmful to humans but has no effect on plants.
2.	Plants like Pinus, Juniparus can help in reducing the photochemical smog.
3.	Photochemical smog occurs in warm, dry, and sunny climates.
4.	Common components of photochemical smog are ozone, nitric oxide, acrolein, formaldehyde, and peroxyacetyl nitrate.

98 Which of the following aqueous solutions of electrolytes will exhibit the least elevation in boiling point?

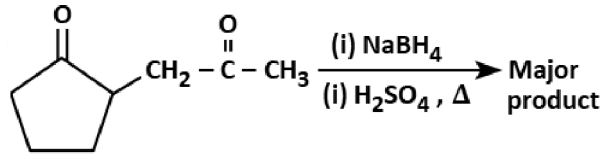
1.	0.05 M NaCl	2.	0.1 M KCl
3.	0.1 M $MgSO_4$	4.	1 M NaCl

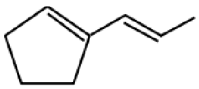
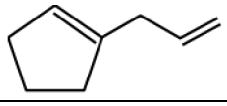
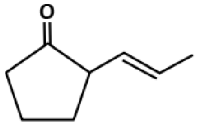
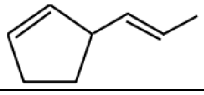
99 Identify 'X' in the following reaction.



1.		2.	
3.		4.	

100 The major product formed in the following conversion is:



1.	
2.	
3.	
4.	

BIOLOGY - I - SECTION A

101 Match List - I with List - II

	List-I		**List-II**
(A)	Protein	(I)	C=C double bonds
(B)	Unsaturated fatty acid	(II)	Phosphodiester bond
(C)	Nucleic acid	(III)	Glycosidic bonds
(D)	Polysaccharide	(IV)	Peptide bonds

Choose the correct answer from the options given below:

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

102 Match List - I with List - II

	List - I		**List - II**
(A)	Hydrarch succession	(I)	Gradual change in the species composition
(B)	Xerarch succession	(II)	Faster and climax reached quickly
(C)	Ecological succession	(III)	Lichens to mesic conditions
(D)	Secondary succession	(IV)	Phytoplankton to mesic conditions

Choose the correct answer from the options given below:

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

103 In *Calotropis*, aestivation is:

1.	Valvate	2.	Vexillary
3.	Imbricate	4.	Twisted

104 Match **List-I** with **List-II**

	List-I		List-II
(A)	Chlorophyll a	(I)	Yellow to yellow orange
(B)	Chlorophyll b	(II)	Yellow green
(C)	Xanthophyll	(III)	Blue green
(D)	Carotenoids	(IV)	Yellow

Choose the correct answer from the options given below:

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

105 Nitrates and phosphates flowing from agricultural farms into water bodies are a significant cause of:

1.	Eutrophication	2.	Humification
3.	Mineralisation	4.	Stratification

106 Match List - I with List - II

	List - I		**List - II**
	(Type of cross)		(Phenotypic ratio)
(A)	Monohybrid cross	(I)	1:1
(B)	Dihybrid cross	(II)	1:2:1
(C)	Incomplete dominance	(III)	3:1
(D)	Test cross	(IV)	9:3:3:1

Choose the correct answer from the options given below:

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

107 How many times decarboxylation occurs during each TCA cycle?

1.	Thrice	2.	Many
3.	Once	4.	Twice

108 The dissolution of synaptonemal complex occurs during:

1.	Pachytene	2.	Diplotene
3.	Diakinesis	4.	Leptotene

109 Identify the correct statements regarding Mass flow hypothesis.

A:	Mass flow is faster than diffusion.
B:	Mass flow is the result of pressure difference between the end points.
C:	Different substances involved in mass flow move at different paces.
D:	Mass flow can result through either a positive or a negative hydrostatic pressure gradient.

Choose the correct answer from the options given below:

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

110 Doubling of the number of chromosomes can be achieved by disrupting mitotic cell division soon after:

1.	Anaphase	2.	Telophase
3.	Prophase	4.	Metaphase

111 Given below are two statements :

Statement I:	RuBisCO is the most abundant enzyme in the world.
Statement II:	Photorespiration does not occur in C_4 plants.

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

112 In 'rivet popper hypothesis', Paul Ehrlich compared the rivets in an airplane to

1.	species within a genus	2.	genetic diversity
3.	ecosystem	4.	genera within a family

113 In a pea flower, five petals are arranged in a specialized manner with one posterior, two lateral and two anterior. These are named as_____, _____ and _____ respectively.

1. Keel, Wings and standard
2. Vexillum, Keel and standard
3. Keel, Standard and Carina
4. Standard, Wings and Keel

114 In which of the following sets of families, the pollen grain are viable for months?

1. Solanaceae, Poaceae and Liliaceae
2. Brassicaceae, Liliaceae and Poaceae
3. Rosaceae, Liliaceae and Poaceae
4. Leguminosae, Solanaceae and Rosaceae

115 Transfer of pollen grains from anther to stigma of another flower of same plant is known as:

1.	Geitonogamy	2.	Xenogamy
3.	Autogamy	4.	Cleistogamy

116 The phenomenon which is influenced by auxin and also played a major role in its discovery is:

1.	Phototropism	2.	Root initiation
3.	Gravitropism	4.	Apical Dominance

117 The transverse section of plant part showed polyarch, radial and exarch xylem, with endodermis and pericycle. The plant part is identified as:

1.	Monocot root	2.	Dicot root
3.	Dicot stem	4.	Monocot stem

118 What will happen if fresh water lake gets contaminated by the addition of polluted water with high BOD?

1.	Amount of dissolved oxygen in the lake will decrease.
2.	The lake will remain unaffected
3.	Number of submerged aquatic plants in the lake will increase
4.	Number of aquatic animals in the lake will increase.

119 The last chromosome sequenced in Human Genome project was:

1.	Chromosome 6	2.	Chromosome 1
3.	Chromosome 22	4.	Chromosome 14

120 The amount of nutrients such as carbon, nitrogen, potassium and calcium present in the soil at any given time is referred to as:

1.	Standing state	2.	Standing crop
3.	Humus	4.	Detritus

121 Plants offer rewards to animals in the form of pollen and nectar and the animals facilitate the pollination process. This is an example of:

1.	Amensalism	2.	Competition
3.	Commensalism	4.	Mutualism

122 The species of plants that plays a vital role in controlling the relative abundance of other species in a community is called _____.
1. alien species
2. endemic species
3. exotic species
4. keystone species

123 Match List - I with List - II

	List-I		**List-II**
(A)	Pteropsida	(I)	*Psilotum*
(B)	Lycopsida	(II)	*Equisetum*
(C)	Psilopsida	(III)	*Adiantum*
(D)	Sphenopsida	(IV)	*Selaginella*

Choose the correct answer from the options given below:

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

124 Inulin is a polymer of:

1.	Fructose	2.	Galactose
3.	Amino Acids	4.	Glucose

125 Thermostable DNA polymerase used in PCR was isolated from:
1. *Thermus aquaticus*
2. *Escherichia coli*
3. *Agrobacterium tumefaciens*
4. *Bacillus thuringiensis*

126 Name the component that binds to the operator region of an operon and prevents RNA polymerase from transcribing the operon.

1.	Promotor	2.	Regulator protein
3.	Repressor protein	4.	Inducer

127 A heterozygous pea plant with violet flowers was crossed with a homozygous pea plant with white flowers. Violet is dominant over white. Which one of the following represents the expected combinations among 40 progenies formed?
1. 30 produced violet and 10 produced white flowers
2. 20 produced violet and 20 produced white flowers.
3. All 40 produced violet flowers
4. All 40 produced white flowers

128 Fatty acids are connected with the respiratory pathway through:
1. Acetyl CoA
2. α - Ketoglutaric acid
3. Dihydroxy acetone phosphate
4. Pyruvic acid

129 Ligation of foreign DNA at which of the following site will result in loss of tetracycline resistance of pBR322?

1.	PsT I	2.	Pvu I
3.	*EcoR I*	4.	*BamH I*

130 Match **List-I** with **List-II**

	List-I		**List-II**
(A)	Auxin	(I)	Promotes female flower formation in cucumber
(B)	Gibberellin	(II)	Overcoming apical dominance
(C)	Cytokinin	(III)	Increase in the length of grape stalks
(D)	Ethylene	(IV)	Promotes flowering in pineapple

Choose the correct answer from the options given below:

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

131 During symport, two different molecules move across the membrane:

1.	in same direction with the help of different carriers located at a common site
2.	in same direction with the help of different carriers located at different sites in the same cell
3.	in same direction with the help of same carrier
4.	in opposite direction with the help of same carrier

132 Which classes of algae possess pigment fucoxanthin and pigment phycoerythrin, respectively?
1. Phaeophyceae and Chlorophyceae
2. Phaeophyceae and Rhodophyceae
3. Chlorophyceae and Rhodophyceae
4. Rhodophyceae and Phaeophyceae

133 In which disorder, change of single base pair in the gene for beta globin chain results in change of glutamic acid to valine?

1.	Thalassemia	2.	Sickle cell anemia
3.	Haemophilia	4.	Phenylketonuria

134 For chemical defense against herbivores, *Calotropis* has

1.	Cardiac glycosides	2.	strychnine
3.	toxic ricin	4.	distasteful quinine

135 Consider the following tissues in the stellar region of a stem showing secondary growth.
(A) Primary xylem
(B) Secondary xylem
(C) Primary phloem
(D) Secondary phloem
Arrange these in the correct sequence of their position from pith towards cortex.

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

BIOLOGY - I - SECTION B

136 Which of the following mineral ion is not remobilized in plants?

1.	Potassium	2.	Calcium
3.	Nitrogen	4.	Phosphorus

137 Which out of the following statements is incorrect?

1.	Grana lamellae have both PS I and PS II
2.	Cyclic photophosphorylation involved both PS I and PS II
3.	Both ATP and NADPH + H^+ are synthesised during non-cyclic photophosphorylation
4.	Stroma lamellae lack PS II and NAP reductase

138 Match List - I with List - II

	List - I		**List - II**
(A)	*Nitrococcus*	(I)	Denitrification
(B)	*Rhizobium*	(II)	Conversion of ammonia to nitrite
(C)	*Thiobacillus*	(III)	Conversion of nitrite to nitrate
(D)	*Nitrobacter*	(IV)	Conversion of atmospheric nitrogen to ammonia

Choose the correct answer from the options given below:

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

139 In angiosperms, the correct sequence of events leading to the formation of female gametophyte in the ovule is:

A.	3 successive free nuclear divisions in functional megaspore.
B.	Degeneration of 3 megaspores
C.	Meiotic division in megaspore mother cell
D.	Migration of 3 nuclei towards each pole.
E.	Formation of a wall resulting in seven celled embryosac.

Choose the correct answer from the options given below:

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

140 Which of the following statements is true?

1.	All pteridophytes exhibit haplo-diplontic pattern.
2.	Seed bearing plants follow haplontic pattern.
3.	Most algal genera are diplontic.
4.	Most bryophytes do not have haplo-diplontic life cycle.

141 Which of the following statement is incorrect about *Agrobacterium tumefaciens* ?

1.	It is used to deliver gene of interest in both prokaryotic as well as eukaryotic host cells.
2.	'Ti' plasmid from *Agrobacterium tumefaciens* used for gene transfer is not pathogenic to plant cells.
3.	It transforms normal plant cells into tumor cells.
4..	It delivers 'T-DNA' into plant cell.

142 Consider the following plant tissues:

(A) Axillary buds
(B) Fascicular vascular cambium
(C) Interfascicular cambium
(D) Cork cambium
(E) Intercalary meristem

Identify the lateral meristems among the above:

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

143 Match **List-I** with **List-II**

	List-I		**List-II**
(A)	Kanamycin	(I)	Delivers genes into animal cells
(B)	ClaI	(II)	Selectable marker
(C)	Disarmed retroviruses	(III)	Restriction site
(D)	Kanamycin ^{R}gene	(IV)	Antibiotic resistance

Choose the correct answer from the options given below:

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

144 Given below are two statements:

I:	The process of copying genetic information from one strand of the DNA into RNA is termed as transcription
II:	A transcription unit in DNA is defined primarily by the three regions in the DNA i.e. a promoter, the structural gene and a terminator.

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

1. **Statement I** is true but **Statement II** is false
2. **Statement I** is false but **Statement II** is true
3. Both **Statement I** and **Statement II** are true
4. Both **Statement I** and **Statement II** are false

145 Which scientist conducted an experiment with ^{32}p and ^{35}s labelled phages for demonstrating that DNA is the genetic material?

1. James D. Watson and F.H.C Crick
2. A.D. Hershey and M.J. Chase
3. F. Griffith
4. O.T. Avery, C.M. MacLeod and M. McCarty

146 A certain plant homozygous for yellow seeds and red flowers was crossed with a plant homozygous for green seeds and white flowers. The F_1 plants had yellow seeds and pink flowers. The F_1 plants were selfed to get F_2 progeny. Assuming independent assortment of the two characters, how many phenotypic categories are expected for these characters in the F_2 generation?

1.	9	2.	16
3.	4	4.	6

147 During which stages of mitosis and meiosis, respectively, does the centromere of each chromosome split?

1.	Metaphase, Metaphase II	2.	Prophase, Telophase I
3.	Telophase, Anaphase I	4.	Anaphase, Anaphase II

148 Which of the following statements is not correct?

1.	Phase of cell elongation of plant cells is characterized by increased vacuolation.
2.	Cells in the meristematic phase of growth exhibit abundant plasmodesmatal connections
3.	Plant growth is generally determinate
4.	Plant growth is measurable

149 Match List - I with List - II

	Type of flower		**Example**
(A)	Zygomorphic	(I)	Mustard
(B)	Hypogynous	(II)	Plum
(C)	Perigynous	(III)	*Cassia*
(D)	Epigynous	(IV)	Cucumber

Choose the correct answer from the options given below:

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

150 Given below are two statements:

I:	The process of translocation through phloem is unidirectional but through xylem, it is bidirectional
II:	The most readily mobilized elements are phosphorus, sulphur, nitrogen and potassium.

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

1. **Statement I** is correct but **Statement II** is correct
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

BIOLOGY - II - SECTION A

151 Which of the following sexually transmitted infections are completely curable?

1. HIV infection and Trichomoniasis
2. Syphilis and Trichomoniasis
3. Hepatitis-B and Genital herpes
4. Genital Herpes and Genital warts

152 Match **List-I** with **List-II**

	List-I		**List-II**
(A)	Typhoid	(I)	Protozoan
(B)	Elephantiasis	(II)	*Salmonella*
(C)	Ringworm	(III)	Aschelminthes
(D)	Malaria	(IV)	*Microsporum*

Choose the correct answer from the options given below:

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

153 Which of the following is not a secondary metabolite?

1.	Curcumin	2.	Morphine
3.	Anthocyanin	4.	Lecithin

154 Arrange the sequence of different hormones for their role during gametogenesis:

A.	Gonadotropin LH stimulates synthesis and secretion of Androgen
B.	Gonadotropin releasing hormone from hypothalamus
C.	Androgen stimulates spermatogenesis
D.	Gonadotropin FSH helps in the process of spermiogenesis
E.	Gonadotropins from anterior pituitary gland

Choose the correct answer from the options given below:

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

155 House fly belongs to _____ family.

1.	Cyprinidae	2.	Hominidae
3.	Calliphoridae	4.	Muscidae

156 Select incorrect statement, regarding chemical structure of insulin:

1.	Mature insulin molecule consists of three polypeptide chains - A, B and C.
2.	Insulin is synthesized as prohormone which contains extra stretch of C-peptide.
3.	C-peptide is not present in mature insulin molecule.
4.	Polypeptide chains A and B are linked to disulphide bridges.

157 Which one of the following is the quiescent stage of cell cycle?

1.	M	2.	G_2
3.	G_1	4.	G_0

158 Given below are two statements:

Statement I:	RNA being unstable, it mutates at a faster rate
Statement II:	RNA can directly code for synthesis of proteins hence can easily express the characters.

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

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

Assertion (A):	Ascending limb of the loop of Henle is impermeable to water and allows transport of electrolytes actively or passively.
Reason (R):	Dilution of filtrate takes place due to efflux of electrolytes in the medullary fluid

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

1.	**(A)** is True, **(R)** is False
2.	**(A)** is False, **(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 but **(R)** is not the correct explanation of **(A)**

160 The Cockroach is:
1. Ammonotelic only
2. Uricotelic only
3. Ureotelic only
4. Ureotelic and Uricotelic

161 Which of the following statements are correct with respect to the hormone and its function?

A:	Thyrocalcitonin (TCT) regulates the blood calcium level
B:	In males, FSH and androgens regulate spermatogenesis
C:	Hyperthyroidism can lead to goitre
D:	Glucocorticoids are secreted in Adrenal Medulla
E:	Parathyroid hormone is regulated by circulated levels of sodium ions

Choose the most appropriate answer from the options given below:

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

162 Select the sequence of steps in respiration.

(A)	Diffusion of gases (O_2 and CO_2) across alveolar membrane.
(B)	Diffusion of O_2 and CO_2 between blood and tissues
(C)	Transport of gases by the blood
(D)	Pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out.
(E)	Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2

Choose the correct answer from the options given below:

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

163 Which of the following is/are cause(s) of biodiversity losses?
1. Over-exploitation, habitat loss and fragmentation
2. Climate change only
3. Over-exploitation only
4. Habitat loss and fragmentation only

164 Match List - I with List - II

	List-I		**List-II**
(A)	Contractile vacuole	(I)	*Asterias*
(B)	Water vascular system	(II)	*Amoeba*
(C)	Canal system	(III)	*Spongilla*
(D)	Flame cells	(IV)	*Taenia*

Choose the correct answer from the options given below:

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

165 Match List - I with List - II

	List-I		**List-II**
(A)	Palm bones	(I)	Phalanges
(B)	Wrist bones	(II)	Metacarpals
(C)	Ankle bones	(III)	Carpals
(D)	Digit bones	(IV)	Tarsals

Choose the correct answer from the options given below:

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

166 Match List - I with List - II

	List-I		**List-II**
(A)	Non-medicated IUDs	(I)	Multiload 375
(B)	Copper releasing IUDs	(II)	Rubber barrier
(C)	Hormone releasing IUDs	(III)	Lippes loop
(D)	Vaults	(IV)	LNG-20

Choose the correct answer from the options given below:

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

167 Which of the following can act as molecular scissors?

1. Restriction enzymes
2. DNA ligase
3. RNA polymerase
4. DNA polymerase

168 Select the correct statements about sickle cell anemia:

A:	There is a change in the gene for beta-globin
B:	In beta-globin, there is a valine in place of Lysine
C:	It is an example of point mutation
D:	In the normal gene, U is replaced by A

Choose the correct answer from the options given below:

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

169 Given below are two statements:

I:	Intra Cytoplasmic sperm injection (ICSI) is another specialized procedure of *in-vivo* fertilization.
II:	Infertility cases due to the inability of the male partner to inseminate the female can be corrected by artificial insemination (AI)

In 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.

170 Match List - I with List - II

	List-I (ECG)		**List-II (Electrical activity of heart)**
(A)	P-wave	(I)	Depolarisation of ventricles
(B)	QRS complex	(II)	End of systole
(C)	T wave	(III)	Depolarisation of atria
(D)	End of T wave	(IV)	Repolarisation of ventricles

Choose the correct answer from the options given below:

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

171 Match List - I with List - II

	List-I		**List-II**
(A)	Eosinophils	(I)	6-8%
(B)	Lymphocytes	(II)	2-3%
(C)	Neutrophils	(III)	20-25%
(D)	Monocytes	(IV)	60-65%

Choose the correct answer from the options given below:

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

172 Given below are two statements:

I:	Goblet cells are unicellular glands
II:	Earwax is the secretion of exocrine gland

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

1. **Statement I** is True but **Statement II** is False
2. **Statement I** is False but **Statement II** is True
3. Both **Statement I** and **Statement II** are True
4. Both **Statement I** and **Statement II** are False

173 Given below are two statements regarding oogenesis.

I:	The primary follicles get surrounded by more layers of granulosa cells, a theca and shows fluid filled cavity antrum. Now it is called secondary follicle.
II:	Graafian follicle ruptures to release the secondary oocyte from the ovary by the process called ovulation.

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 false
2. **Statement I** is incorrect but **Statement II** is true
3. Both **Statement I** and **Statement II** are true
4. Both **Statement I** and **Statement II** are false

174 There are 250 snails in a pond and within a year their number increases to 2500 by reproduction. What should be their birth rate (in per snail per year)?
1. 10
2. 9
3. 25
4. 15

175 Given below are two statements:

I:	The nose contains mucus-coated receptors which are specialised for receiving the sense of smell are called olfactory receptors.
II:	Wall of the eyeball has three layers. The external layer is called choroid (dense connective tissue), middle layer is sclera (thin pigmented layer) and internal layer is retina (ganglion cells, bipolar cells and photoreceptor cells)

In the light of the above statements, choose the correct answer from the options given below:
1. **Statement I** is True but **Statement II** is False
2. **Statement I** is False but **Statement II** is True
3. Both **Statement I** and **Statement II** are True
4. Both **Statement I** and **Statement II** are False

176 Which one of the following acts as an inducer for lac operon?

1.	Sucrose	2.	Lactose
3.	Glucose	4.	Galactose

177 Match List - I with List - II

	List-I		**List-II**
(A)	Deforestation	(I)	Responsible for heating of Earth's surface and atmosphere
(B)	Reforesation	(II)	Conversion of forested areas to non-forested areas
(C)	Green-house effect	(III)	Natural ageing of lake by nutrient enrichment of its water
(D)	Eutrophication	(IV)	Process of restoring a forest that once existed but was removed

Choose the correct answer from the options given below:

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

178 Diacetyl morphine is also called as:

1.	Amphetamine	2.	Barbiturate
3.	Crack	4.	Smack

179 'X' and 'Y' are the components of Binomial nomenclature. This naming system was proposed by 'Z':

1.	X - Generic name, Y - Specific epithet, Z - Carolus Linnaeus
2.	X - Specific epithet, Y - Generic name, Z - R.H. Whittaker
3.	X - Specific epithet, Y - Generic name, Z - Carolus Linnaeus
4.	X - Generic name, Y - Specific epithet, Z - R.H. Whittaker

180 Which of the following statements are correct?

A:	Reproductive health refers to total well-being in all aspects of reproduction
B:	Amniocentesis is legally banned for sex determination in India
C:	"Saheli" - an oral contraceptive for females was developed in collaboration with ICMR (New Delhi).
D:	Amniocentesis is used to determine genetic disorders and survivability of foetus.

Choose the most appropriate answer from the options given below:

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

181 Match List - I with List - II

	List-I		List-II
(A)	Terpenoids	(I)	Codeine
(B)	Unsaturated fatty acid	(II)	Diterpenes
(C)	Nucleic acid	(III)	Ricin
(D)	Polysaccharide	(IV)	Concanavalin A

Choose the correct answer from the options given below:

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

182 Given below are two statements:

I:	In bacteria, the mesosomes are formed by the extensions of the plasma membrane.
II:	The mesosomes, in bacteria, help in DNA replication and cell wall formation.

In 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

183 Select the correct sequence of substages of Prophase - I of Meiotic division

(A) Zygotene
(B) Pachytene
(C) Diakinesis
(D) Leptotene
(E) Diplotene

Choose the correct answer from the options given below:

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

184 Brain stem of the human brain consists of:

1. Mid-brain, Pons and Medulla Oblongata
2. Forebrain, Cerebellum and Pons
3. Thalamus, Hypothalamus and Corpora quadrigemina
4. Amygdala, Hippocampus and Corpus Callosum

185 Identify the fossil of a man who showed the following characteristics:

(A) Brain capacity of 1400 cc
(B) Used hides to protect their body
(C) Buried their dead bodies

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

1.	*Homo erectus*	2.	Neanderthal man
3.	*Homo habilis*	4.	*Australopithecus*

BIOLOGY - II - SECTION B

186 With reference to Hershey and Chase experiments, select the correct statements:

A:	Viruses grown in the presence of radioactive phosphorus contained radioactive DNA.
B:	Viruses grown on radioactive sulphur contained radioactive proteins.
C:	Viruses grown on radioactive phosphorus contained radioactive protein
D:	Viruses grown on radioactive sulphur contained radioactive DNA
E:	Viruses grown on radioactive protein contained radioactive DNA

Choose the most appropriate answer from the options given below:

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

187 Select the correct sequential steps regarding the absorption of fatty acids and glycerol, in the intestine:

A.	Micelles are reformed into small protein-coated fat globules called chylomicrons.
B.	Micelles move into intestinal mucosa.
C.	Fatty acids and glycerol are incorporated into small droplets called micelles.
D.	Lacteals release the absorbed substances into the bloodstream.
E.	Chylomicrons are transported into lacteals.

Choose the correct answer from the options given below:

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

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

Assertion (A):	A person goes to high altitude and experiences "Altitude Sickness" with symptoms like breathing difficulty and heart palpitations.
Reason (R):	Due to low atmospheric pressure at high altitude, the body does not get sufficient oxygen

In the light of the above statements, choose the correct 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 but **(R)** is not the correct explanation of **(A)**

189 The salient features of genetic code are:

(A) The code is palindromic
(B) UGA act as initiator codon
(C) The code is unambiguous and specific
(D) The code is nearly universal

Choose the most appropriate answer from the options given below:

1.	**(A)** and **(D)** only	2.	**(B)** and **(C)** only
3.	**(A)** and **(B)** only	4.	**(C)** and **(D)** only

190 Arrange the events of Renin-Angiotensin mechanism in correct sequence

(A)	Activation of JG cells and release of renin
(B)	Angiotensin II activated release of aldosterone
(C)	Fall in glomerular blood pressure
(D)	Reabsorption of Na^+ and water from distal convoluted tubule
(E)	Angiotensinogen is converted to Angiotensin I and then to Angiotensin II

Choose the correct answer from the options given below:

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

191 Select the correct statements regarding dissolved Oxygen and Biochemical Oxygen demand.

A:	BOD is inversely related to dissolved oxygen
B:	Low dissolved oxygen and high BOD lead to loss of aquatic life.
C:	High BOD leads to high dissolved oxygen
D:	Both BOD and dissolved oxygen are indicator of health of a water body
E:	Both BOD and dissolved oxygen are affected by amount of organic matter in the water body.

Choose the most appropriate answer from the options given below:

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

192 Given below are two statements:

Statement I:	Parathyroid hormone acts on bones and stimulates the process of bone resorption
Statement II:	Parathyroid hormone along with Thyrocalcitonin plays a significant role in carbohydrate metabolism.

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 false
2. **Statement I** is incorrect but **Statement II** is true
3. Both **Statement I** and **Statement II** are true
4. Both **Statement I** and **Statement II** are false

193 Select the correct statements:

A:	Platyhelminthes are triploblastic, pseudocoelomate and bilaterally symmetrical organisms.
B:	Ctenophores reproduce only sexually and fertilization is external.
C:	In tapeworm, fertilization is internal but sexes are not separate.
D:	Ctenophores are exclusively marine, diploblastic and bioluminescent organisms.
E:	In sponges, fertilization is external and development is direct.

Choose the correct answer from the options given below:

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

194 Match List - I with List - II

	List-I		List-II
(A)	Gene therapy	(I)	Separation of DNA fragments
(B)	RNA interference	(II)	Diagnostic test for AIDS
(C)	ELISA	(III)	Cellular defense
(D)	Gel Electrophoresis	(IV)	Allows correction of a gene defect

Choose the correct answer from the options given below:

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

195 Which of the following statements are correct in the context of Golgi apparatus?

A:	It is the important site for the formation of glycoprotein and glycolipids
B:	It produces cellular energy in the form of ATP
C:	It modifies the protein synthesized by ribosomes on ER
D:	It facilitates the transport of ions
E:	It provides mechanical support

Choose the most appropriate answer from the options given below:

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

196 Select the incorrect statement with respect to Multiple Ovulation Embryo Transfer (MOET) technology.

1.	Fertilised eggs at 4 to 6 cells - stages are recovered non-surgically from a super-ovulating cow and transferred to a surrogate mother.
2.	It is used to increase herd size in a short time
3.	Cow is administered with hormones to induce super-ovulation.
4.	Super-ovulating cow is either mated with an elite bull or is artificially inseminated

197 Given below are two statements:

I:	In cockroaches, the forewings are transparent and prothoracic in origin.
II:	In cockroaches, the hind wings are opaque, leathery and mesothoracic in origin.

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

1. **Statement I** is correct but **Statement II** is false
2. **Statement I** is incorrect but **Statement II** is true
3. Both **Statement I** and **Statement II** are true
4. Both **Statement I** and **Statement II** are false

198 Match List - I with List - II

	List-I		List-II
(A)	Columnar epithelium	(I)	Ducts of glands
(B)	Ciliated epithelium	(II)	Inner lining of stomach and intestine
(C)	Squamous epithelium	(III)	Inner lining of bronchioles
(D)	Cuboidal epithelium	(IV)	Endothelium

Choose the correct answer from the options given below:

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

199 Match **List-I** with **List-II**

	List-I		List-II
(A)	Cytokine barriers	(I)	Mucus coating of respiratory tract
(B)	Cellular barriers	(II)	Interferons
(C)	Physiological barriers	(III)	Neutrophils and Macrophages
(D)	Physical barriers	(IV)	Tears and Saliva

Choose the correct answer from the options given below:

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

200 Select the correct statement/s with respect to mechanism of sex determination in Grasshopper.

A:	It is an example of female heterogamety
B:	Male produces two different types of gametes either with or without X chromosomes.
C:	Total number of chromosomes (autosomes and sex chromosomes) is same in both males and females.
D:	All eggs bear an additional X chromosome besides the autosomes.

Choose the correct answer from the options given below:

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