PHYSICS - SECTION A

1 The magnetic potential energy when a magnetic bar with a magnetic moment $\vec{M}$ is placed perpendicular to the magnetic field $\vec{B}$ is:

1.	$\frac{-mB}{2}$	2.	zero
3.	$-mB$	4.	mB

2 A bob is whirled in a horizontal circle by means of a string at an initial speed of 10 rpm. If the tension in the string is quadrupled while keeping the radius constant, the new speed is:

1.	20 rpm	2.	40 rpm
3.	5 rpm	4.	10 rpm

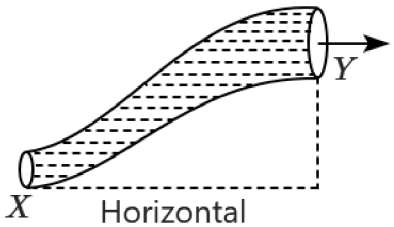
3 A metal cube of a side 5 cm, is charged with 6 μC. The surface charge density on the cube, is:

1.	0.125×10^{-3} C m^{-2}	2.	0.25×10^{-3} C m^{-2}
3.	4×10^{-3} C m^{-2}	4.	0.4×10^{-3} C m^{-2}

4 The incorrect relation for a diamagnetic material (all the symbols carry their usual meaning and ε is a small positive number) is:

1. $\mu < \mu_0$
2. $0 \leqslant \mu_r < 1$
3. $-1 \leqslant \chi < 0$
4. $1 < \mu_r < 1 + \varepsilon$

5 An ideal fluid is flowing in a non-uniform cross-sectional tube XY (as shown in the figure) from end X to end Y. If K_1 and K_2 are the kinetic energies per unit volume of the fluid at X and Y respectively, the correct relationship between K_1 and K_2 is:



1.	$K_1 = K_2$	2.	$2K_1 = K_2$
3.	$K_1 > K_2$	4.	$K_1 < K_2$

6 The escape velocity for Earth is v. A planet having 9 times the mass of Earth and a radius, 16 times that of Earth, has the escape velocity of:

1.	$\frac{v}{3}$	2.	$\frac{2v}{3}$
3.	$\frac{3v}{4}$	4.	$\frac{9v}{4}$

7 An electron and an alpha particle are accelerated by the same potential difference. Let λ_e and λ_α denote the de-Broglie wavelengths of the electron and the alpha particle, respectively, then:

1.	$\lambda_e > \lambda_\alpha$	2.	$\lambda_e = 4\lambda_\alpha$
3.	$\lambda_e = \lambda_\alpha$	4.	$\lambda_e < \lambda_\alpha$

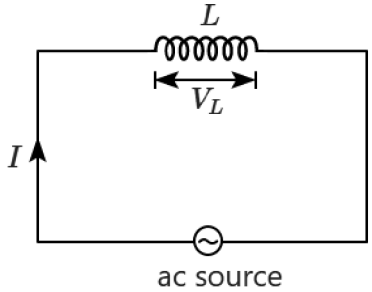
8 An object is moving along the horizontal x-direction with an initial kinetic energy of 10 J. It is displaced through $x = (3\hat{i})$ m under the influence of a force $\vec{F} = (-2\hat{i} + 3\hat{j})$ N. The kinetic energy of the object at the end of the displacement x is:

1.	10 J	2.	16 J
3.	4 J	4.	6 J

9 An object falls from a height of 10 m above the ground. After striking the ground it loses 50% of its kinetic energy. The height up to which the object can re-bounce from the ground is:

1.	7.5 m	2.	10 m
3.	2.5 m	4.	5 m

10 In the circuit shown below, the inductance L is connected to a source. The current flowing in the circuit is $I = I_0 \sin \omega t$. The voltage drop (V_L) across L is:



1.	$\omega L\, I_0 \sin \omega t$	2.	$\frac{I_0}{\omega L} \sin \omega t$
3.	$\frac{I_0}{\omega L} \cos \omega t$	4.	$\omega L\, I_0 \cos \omega t$

11 A 12 pF capacitor is connected to a 50 V battery. The electrostatic energy stored in the capacitor in nJ is:

1.	15	2.	7.5
3.	0.3	4.	150

12 A uniform wire of diameter d carries a current of 100 mA when the mean drift velocity of electrons in the wire is v. For a wire of diameter $\frac{d}{2}$ of the same material to carry a current of 200 mA, the mean drift velocity of electrons in the wire is:

1.	$4v$	2.	$8v$
3.	v	4.	$2v$

13 In an electrical circuit, the voltage is measured as $V = (200 \pm 4)$ volts and the current is measured as $I = (20 \pm 0.2)$ A. The value of the resistance is:

1. $(10 \pm 4.2)\ \Omega$
2. $(10 \pm 0.3)\ \Omega$
3. $(10 \pm 0.1)\ \Omega$
4. $(10 \pm 0.8)\ \Omega$

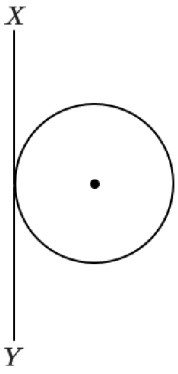
14 A step-up transformer is connected to an AC mains supply of 220 V to operate at 11000 V, 88 W. The current in the secondary circuit, ignoring the power loss in the transformer, is:

1. 8 mA
2. 4 mA
3. 0.4 A
4. 4 A

15 A particle is moving along the x-axis with its position (x) varying with time (t) as $x = \alpha t^4 + \beta t^2 + \gamma t + \delta$. The ratio of its initial velocity to its initial acceleration is:

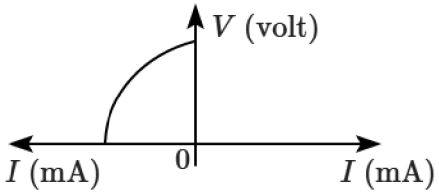
1. $2\alpha : \delta$
2. $\gamma : 2\delta$
3. $4\alpha : \beta$
4. $\gamma : 2\beta$

16 The radius of gyration of a solid sphere of mass 5 kg about XY-axis is 5 m as shown in the figure. If the radius of the sphere is $\frac{5x}{\sqrt{7}}$ m, then the value of x is:



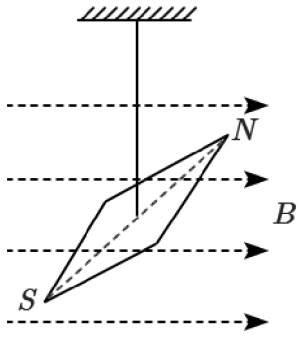
1.	5	2.	$\sqrt{2}$
3.	$\sqrt{3}$	4.	$\sqrt{5}$

17 The I-V characteristics shown below are exhibited by a:



1.	Light-emitting diode	2.	Zener diode
3.	Photodiode	4.	Solar cell

18 The magnetic moment and moment of inertia of a magnetic needle as shown are, respectively, 1.0×10^{-2} A m^2 and $\frac{10^{-6}}{\pi^2}$ kg m^2. If it completes 10 oscillations in 10 s, the magnitude of the magnetic field is:



1. 0.4 T
2. 4 T
3. 0.4 mT
4. 4 mT

19 The capacitance of a capacitor with charge q and a potential difference V depends on:

1.	both q and V
2.	the geometry of the capacitor
3.	q only
4.	V only

20 Given below are two statements:

Statement I:	Image formation needs regular reflection and/or refraction.
Statement II:	The variety in colour of objects we see around us is due to the constituent colours of the light incident on them.

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.

21 A uniform metal wire of length l has $10\ \Omega$ resistance. Now this wire is stretched to a length $2l$ and then bent to form a perfect circle. The equivalent resistance across any arbitrary diameter of that circle is:

1.	$10\ \Omega$	2.	$5\ \Omega$
3.	$40\ \Omega$	4.	$20\ \Omega$

22 The spectral series which corresponds to the electronic transition from the levels $n_2 = 5, 6, \ldots$ to the level $n_1 = 4$ is:

1.	Pfund series
2.	Brackett series
3.	Lyman series
4.	Balmer series

23 Given below are two statements: One is labeled as **Assertion (A)** and the other is labeled as **Reason (R)**.

Assertion (A):	Houses made of concrete roofs overlaid with foam keep the room hotter during summer.
Reason (R):	The layer of foam insulation prohibits heat transfer, as it contains air pockets.

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

24 A particle executing simple harmonic motion with amplitude A has the same potential and kinetic energies at the displacement:

1.	$2\sqrt{A}$	2.	$\frac{A}{2}$
3.	$\frac{\mathrm{A}}{\sqrt{2}}$	4.	$A\sqrt{2}$

25 Two slits in Young's double slit experiment are 1.5 mm apart and the screen is placed at a distance of 1 m from the slits. If the wavelength of light used is 600×10^{-9} m then the fringe separation is:
1. 4×10^{-5} m
2. 9×10^{-8} m
3. 4×10^{-7} m
4. 4×10^{-4} m

26 Water is used as a coolant in a nuclear reactor because of its:
1. high thermal expansion coefficient
2. high specific heat capacity
3. low density
4. low boiling point

27 The pitch of an error-free screw gauge is 1 mm, and there are 100 divisions on the circular scale. While measuring the diameter of a thick wire, the pitch scale reads 1 mm, and 63^{rd} division on the circular scale coincides with the reference line. The diameter of the wire is:

1.	1.63 cm	2.	0.163 cm
3.	0.163 m	4.	1.63 m

28 Let us consider two solenoids A and B, made from the same magnetic material of relative permeability μ_r and of equal area of cross-section. Length of A is twice that of B and the number of turns per unit length in A is half that of B. The ratio of self-inductances of the two solenoids, $L_A : L_B$ is:
1. 1 : 2
2. 2 : 1
3. 8 : 1
4. 1 : 8

29 When the output of an OR gate is applied as input to a NOT gate, then the combination acts as a:
1. NAND gate
2. NOR gate
3. AND gate
4. OR gate

30 An interference pattern can be observed due to the superposition of more than one of the following waves:
(A) $y = a\sin(\omega t)$
(B) $y = a\sin(2\omega t)$
(C) $y = a\sin(\omega t - \phi)$
(D) $y = a\sin(3\omega t)$
Identify the waves from the options given below:

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

31 If ϕ is the work function of photosensitive material in electron-volts and light of a wavelength of numerical value $\lambda = \frac{hc}{e}$ metres is incident on it with energy above its threshold value at an instant, then the maximum kinetic energy of the photo-electron ejected by it at that instant is (in SI units):
(take h as Plank's constant and c as the velocity of light in free space)
1. $e + 2\phi$
2. $2e - \phi$
3. $e - \phi$
4. $e + \phi$

32 Among the various types of electromagnetic radiation, the one with the smallest wavelength is:

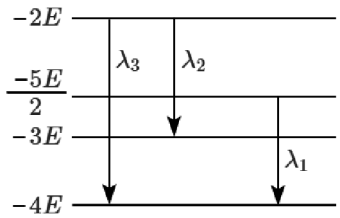
1.	X-rays	2.	Gamma rays
3.	Ultraviolet rays	4.	Microwaves

33 The equilibrium state of a thermodynamic system is described by:
A. Pressure
B. Total heat
C. Temperature
D. Volume
E. Work done

Choose the most appropriate answer from the options given below:

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

34 Some energy levels of a molecule are shown in the figure with their wavelengths of transitions.



Then:

1.	$\lambda_3 > \lambda_2, \lambda_1 = 2\lambda_2$	2.	$\lambda_3 > \lambda_2, \lambda_1 = 4\lambda_2$
3.	$\lambda_1 > \lambda_2, \lambda_2 = 2\lambda_3$	4.	$\lambda_2 > \lambda_1, \lambda_2 = 2\lambda_3$

35 A box of mass 5 kg is pulled by a cord, up along a frictionless plane inclined at 30° with the horizontal. The tension in the cord is 30 N. The acceleration of the box is:
(take $g = 10\ \text{ms}^{-2}$)
1. $2\ \text{ms}^{-2}$
2. zero
3. $0.1\ \text{ms}^{-2}$
4. $1\ \text{ms}^{-2}$

PHYSICS - SECTION B

36 If the ratio of relative permeability and relative permittivity of a uniform medium is 1 : 4. The ratio of the magnitudes of electric field intensity (E) to the magnetic field intensity (H) of an EM wave propagating in that medium is:
$\left(\text{Given that} \sqrt{\frac{\mu_0}{\varepsilon_0}} = 120\pi\right)$
1. 30π : 1
2. 1 : 120π
3. 60π : 1
4. 120π : 1

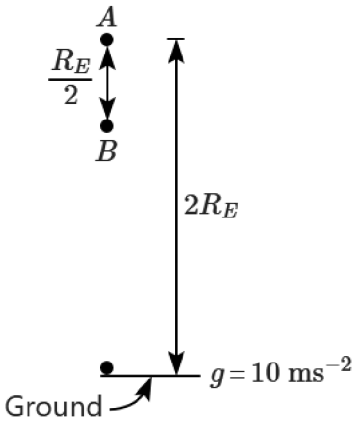
37 The value of the electric potential at a distance of 9 cm from the point charge 4×10^{-7} C is:
$\left[\text{Given} \frac{1}{4\pi\varepsilon_0} = 9 \times 10^9\ \text{N m}^2\ \text{C}^{-2}\right]$

1.	4×10^2 V	2.	44.4 V
3.	4.4×10^5 V	4.	4×10^4 V

38 The displacement of a traveling wave is given by $y = C \sin \frac{2\pi}{\lambda}(at - x)$ where t is time, x is distance and λ is the wavelength, all in SI units. The frequency of the wave is:

1.	$\frac{2\pi\lambda}{a}$	2.	$\frac{2\pi a}{\lambda}$
3.	$\frac{\lambda}{a}$	4.	$\frac{a}{\lambda}$

39 An object of mass 100 kg falls from point A to B as shown in the figure. The change in its weight, corrected to the nearest integer (R_E is the radius of the Earth), is:



1. 49 N
2. 89 N
3. 5 N
4. 10 N

40 The potential energy of a particle moving along the x-direction varies as $V = \frac{Ax^2}{\sqrt{x} + B}$. The dimensions of $\frac{A^2}{B}$ are:

1. $[M^{3/2}L^{1/2}T^{-3}]$
2. $[M^{1/2}LT^{-3}]$
3. $[M^2L^{1/2}T^{-4}]$
4. $[ML^2T^{-4}]$

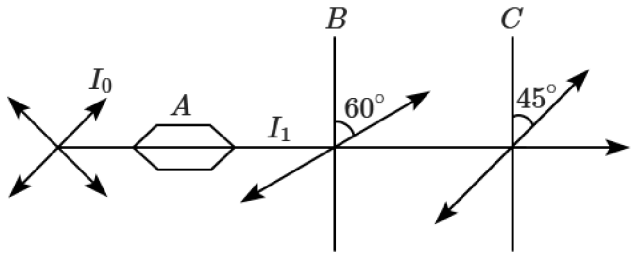
41 The two-dimensional motion of a particle, described by $\vec{r} = (\hat{i} + 2\hat{j})A\cos(\omega t)$ is a/an:

(A)	parabolic path
(B)	elliptical path
(C)	periodic motion
(D)	simple harmonic motion

Choose the correct answer from the options given below:

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

42 A beam of unpolarised light of intensity I_0 is passed through a polaroid A, through another polaroid B, oriented at 60° and finally through another polaroid C, oriented at 45° relative to B as shown in the figure. The intensity of the emergent light is:



1.	$\frac{I_0}{16}$	2.	$\frac{I_0}{4}$
3.	$\frac{I_0}{2}$	4.	$\frac{I_0}{32}$

43 Select the correct statements among the following:

A.	slow neutrons can cause fission in U_{92}^{235} than fast neutrons.
B.	α-rays are helium nuclei.
C.	β-rays are fast-moving electrons or positrons.
D.	γ-rays are electromagnetic radiations of wavelengths larger than X-rays.

Choose the most appropriate answer from the options given below:

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

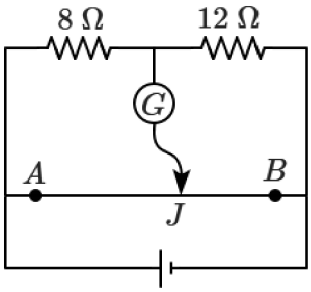
44 Let ω_1, ω_2 and ω_3 be the angular speeds of the second hand, minute hand, and hour hand of a smoothly running analog clock, respectively. If x_1, x_2 and x_3 are their respective angular distance in 1 minute then the factor that remains constant (k) is:

1. $\frac{\omega_1}{x_1} = \frac{\omega_2}{x_2} = \frac{\omega_3}{x_3} = k$
2. $\omega_1 x_1 = \omega_2 x_2 = \omega_3 x_3 = k$
3. $\omega_1 x_1^2 = \omega_2 x_2^2 = \omega_3 x_3^2 = k$
4. $\omega_1^2 x_1 = \omega_2^2 x_2 = \omega_3^2 x_3 = k$

45 The magnetic moment of an iron bar is M. It is now bent in such a way that it forms an arc section of a circle subtending an angle of 60° at the centre. The magnetic moment of this arc section is:

1.	$\frac{3M}{\pi}$	2.	$\frac{4M}{\pi}$
3.	$\frac{M}{\pi}$	4.	$\frac{2M}{\pi}$

46 The given circuit shows a uniform straight wire AB of 40 cm length fixed at both ends. In order to get zero reading in the galvanometer G, the free end of J is to be placed from the end B at:

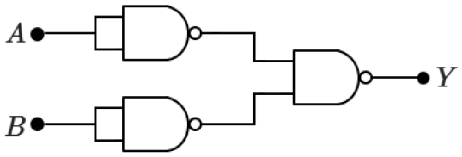


1.	32 cm	2.	8 cm
3.	16 cm	4.	24 cm

47 According to the law of equipartition of energy, the number of vibrational modes of a polyatomic gas of constant $\gamma = \frac{C_p}{C_v}$ is (where C_p and C_v are the specific heat capacities of the gas at constant pressure and constant volume, respectively):

1.	$\frac{4+3\gamma}{\gamma-1}$	2.	$\frac{3+4\gamma}{\gamma-1}$
3.	$\frac{4-3\gamma}{\gamma-1}$	4.	$\frac{3-4\gamma}{\gamma-1}$

48 The output Y for the inputs A and B of the given logic circuit is:

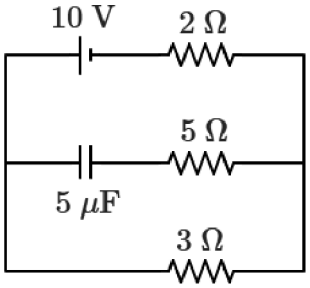


1.	$A \cdot B$	2.	$\overline{A} \cdot \overline{B}$
3.	$A + B$	4.	$\overline{A} + \overline{B}$

49 The amplitude of the charge oscillating in a circuit decreases exponentially as $Q = Q_0 e^{-Rt/2L}$ where Q_0 is the charge at $t = 0$ s.The time at which charge amplitude decreases to $0.50\ Q_0$ is nearly:
(Given that $R = 1.5\ \Omega,\ L = 12$ mH, $\ln(2) = 0.693$)

1. 19.01 ms
2. 11.09 ms
3. 19.01 s
4. 11.09 s

50 The steady-state current in the circuit shown below is:



1. 0.67 A
2. 1.5 A
3. 2 A
4. 1 A

CHEMISTRY - SECTION A

51 The correct decreasing order of atomic radii (pm) of Li, Be, B and C is:

1. Be > Li > B > C
2. Li > Be > B > C
3. C > B > Be > Li
4. Li > C > Be > B

52 The following data is for a reaction between reactants A and B:

Rate mol $L^{-1}s^{-1}$	[A]	[B]
2×10^{-3}	0.1 M	0.1 M
4×10^{-3}	0.2 M	0.1 M
1.6×10^{-2}	0.2 M	0.2 M

The order of the reaction with respect to A and B, respectively are:
1. 1, 0
2. 0, 1
3. 1, 2
4. 2, 1

53 Given below are two statements:

Statement I :	Propene on treatment with diborane gives an addition product with the formula $(CH_3)_2 - CH)_3 - B$
Statement II :	Oxidation of $(CH_3)_2 - CH)_3 - B$ with hydrogen peroxide in presence of $NaOH$ gives propan-2-ol.

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

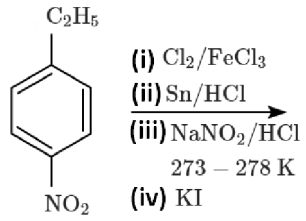
54 Baeyer's reagent is:

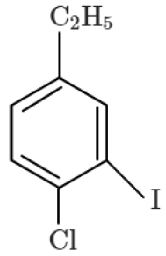
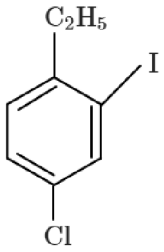
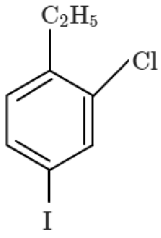
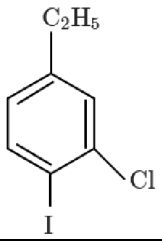
1.	Acidic potassium permanganate solution
2.	Acidic potassium dichromate solution
3.	Cold, dilute, aqueous solution of potassium permanganate
4.	Hot, concentrated solution of potassium permanganate

55 Which of the following molecules has "NON ZERO" dipole moment value?

1.	CCl_4	2.	HI
3.	CO_2	4.	BF_3

56 The major product X formed in the following reaction sequence is:



1.		2.	
3.		4.	

57 Which indicator is used and what is the color change at the endpoint in oxalic acid-sodium hydroxide titration?
1. Phenolphthalein, pink to yellow
2. Alkaline $KMnO_4$, colourless to pink
3. Phenolphthalein, colourless to pink
4. Methyl orange, yellow to pinkish red colour

58 Match List-I with List-II:

	List-I (Atom/Molecule)		**List-II (Property)**
A.	Nitrogen	I.	Paramagnetic
B.	Fluorine molecule	II.	Most reactive element in group 18
C.	Oxygen molecule	III.	Element with highest ionisation enthalpy in group 15
D.	Xenon atom	IV.	Strongest oxidising agent

Identify the correct answer from the option given below:

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

59 From the following select the one which is not an example of corrosion:

1.	Rusting of an iron object
2.	Production of hydrogen by electrolysis of water
3.	Tarnishing of silver
4.	Development of green coating on copper and bronze ornaments

60 Which of the following pairs of ions will have the same spin only magnetic moment values within the pair?

A. Zn^{2+}, Ti^{2+}

B. Cr^{2+}, Fe^{2+}

C. Ti^{3+}, Cu^{2+}

D. V^{2+}, Cu^{+}

Choose the correct answer from the options given below:

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

61 At a given temperature and pressure, the equilibrium constant value for the equilibria are given below:

$3A_2 + B_2 \rightleftharpoons 2A_3B, K_1$

$A_3B \rightleftharpoons \frac{3}{2}A_2 + \frac{1}{2}B_2, K_2$

The relation between K_1 and K_2 is:

1. $K_1^2 = 2K_2$
2. $K_2 = \frac{K_1}{2}$
3. $K_1 = \frac{1}{\sqrt{K_2}}$
4. $K_2 = \frac{1}{\sqrt{K_1}}$

62 Arrange the following compounds in increasing order of their solubilities in chloroform:

$NaCl, CH_3OH, \text{cyclohexane}(C_6H_{12}), CH_3CN$

1. $NaCl < CH_3CN < CH_3OH <$ Cyclohexane
2. $CH_3OH < CH_3CN < NaCl <$ Cyclohexane
3. $NaCl < CH_3OH < CH_3CN <$ Cyclohexane
4. Cyclohexane $< CH_3CN < CH_3OH < NaCl$

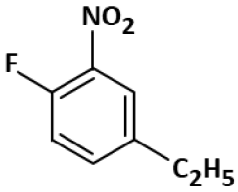
63 Identify the **incorrect** statement about PCl_5.

1.	PCl_5 possesses two different $Cl - P - Cl$ bond angles.
2.	All five $P - Cl$ bonds are identical in length.
3.	PCl_5 exhibits sp^3d hybridisation.
4.	PCl_5 consists of five $P - Cl$ (sigma) bonds.

64 Choose the correct statement for the work done in the expansion and heat absorbed or released when 5 liters of an ideal gas at 10 atmospheric pressure isothermally expands into a vacuum until the volume is 15 liters:

1.	Both the heat and work done will be greater than zero.
2.	Heat absorbed will be less than zero and work done will be positive.
3.	Work done will be zero and heat absorbed or evolved will also be zero.
4.	Work done will be greater than zero and heat absorbed will remain zero.

65 Which of the following options is the correct IUPAC name for the given compound?

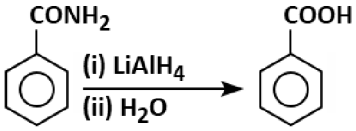


1. 4-Ethyl-1-fluoro-2-nitrobenzene
2. 4-Ethyl-1-fluoro-6-nitrobenzene
3. 3-Ethyl-6-fluoro-1-nitrobenzene
4. 1-Ethyl-4-fluoro-3-nitrobenzene

66 Which of the following set of ions act as oxidizing agents?

1. Ce^{4+} and Tb^{4+}
2. La^{3+} and Lu^{3+}
3. Eu^{2+} and Yb^{2+}
4. Eu^{2+} and Tb^{4+}

67 Select the incorrect reaction among the following:

1.	$CH_3COCl \xrightarrow[\Delta]{H_2O} CH_3COOH$
2.	
3.	$CH_3CH_2OH \xrightarrow[(ii)\ H_3O^{\oplus}]{(i)\ KMnO_4/OH^-} CH_3COOH$
4.	$CH_3CH_2CH_2OH \xrightarrow{CrO_3 - H_2SO_4} CH_3CH_2COOH$

68 The UV-visible absorption bands in the spectra of lanthanoid ions are 'X', probably because of the excitation of electrons involving 'Y'. The 'X' and 'Y', respectively, are:

1. Broad and f orbitals
2. Narrow and f orbitals
3. Broad and d and f orbitals
4. Narrow and d and f orbitals

69 Ethylene diaminetetraacetate ion is a/an :

1.	Hexadentate ligand	2.	Ambidentate ligand
3.	Monodentate ligand	4.	Bidentate ligand

70 How much glucose is needed to prepare 250 mL of a 1/20 M (M/20) glucose solution?
(Molar mass of glucose: 180 g/mol)

1. 2.25 g
2. 4.5 g
3. 0.44 g
4. 1.125 g

71 Identify the incorrect statement from the following:

1.	The acidic strength of HX (X=F, Cl, Br and I) follows the order: HF > HCI > HBr >HI
2.	Fluorine exhibits - 1 oxidation state whereas other halogens exhibit +1, +3, +5 and +7 oxidation states also.
3.	The enthalpy of dissociation of F_2 is smaller than that of Cl_2.
4.	Fluorine is stronger oxidising agent than chlorine.

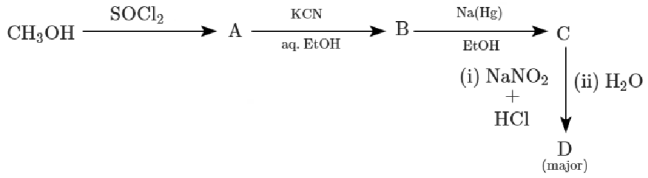
72 For the reaction in equilibrium

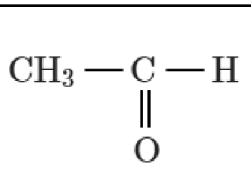
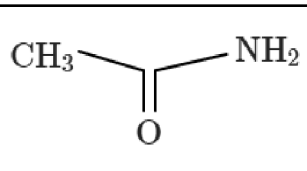
$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g), \Delta H = -Q$

Reaction is favoured in forward direction by:

1.	Use of catalyst
2.	Decreasing concentration of N_2
3.	Low pressure, high temperature and high concentration of ammonia
4.	High pressure, low temperature and higher concentration of H_2

73 The major product D formed in the following reaction sequence is:



1.		2.	
3.	CH_3CH_2OH	4.	CH_3CH_2Cl

74 Match List-I with List-II

	List-I (Block/group in periodic table)		**List-II (Element)**
A.	Lanthanoid	I.	Ce
B.	d-Block element	II.	As
C.	p-Block element	III.	Cs
D.	s-Block element	IV.	Mn

Choose the correct answer from the options given below:

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

75 Which of the following is not an ambidentate ligand?

1. $C_2O_4^{2-}$
2. SCN^-
3. NO_2^-
4. CN^-

76 The quantum numbers of four electrons are given below:

I. n=4; l=2; m_l=-2; s=$-\frac{1}{2}$

II. n=3; l=2; m_l=1; s=$+\frac{1}{2}$

III. n=4; l=1; m_l=0; s=$+\frac{1}{2}$

IV. n=3; l=1; m_l=-1; s=$+\frac{1}{2}$

The correct decreasing order of energy of these electrons is:

1. IV>II>III>I
2. I>III>II>IV
3. III>I>II>IV
4. I>II>III>IV

77 The major product C in the below-mentioned reaction is:

$$CH_3CH_2CH_2Br \xrightarrow[\Delta]{\text{alc. KOH}} A \xrightarrow{HBr} B \xrightarrow[\Delta]{\text{aq. KOH}} C$$

1.	Propan-1-ol	2.	Propan-2-ol
3.	Propane	4.	Propyne

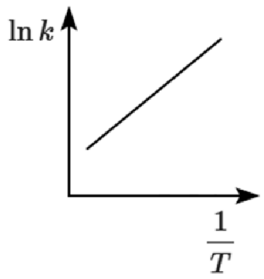
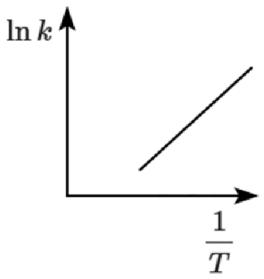
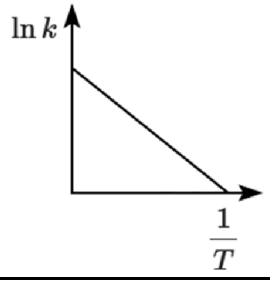
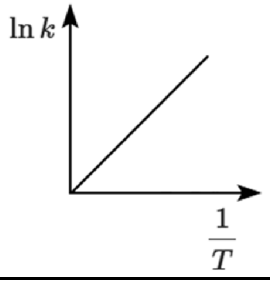
78 The compound that does not undergo Friedel-Crafts alkylation reaction but gives a positive carbylamine test is:
1. Aniline
2. Pyridine
3. N-Methylaniline
4. Triethylamine

79 For an endothermic reaction:
A. q_p(heat at constant pressure) is negative.
B. $\Delta_r H$ (enthalpy change of the reaction) is positive.
C. $\Delta_r H$ is negative.
D. q_p is positive.
Which of the following combinations is correct?
1. B and D
2. C and D
3. A and B
4. A and C

80 1.0 g of H_2 has same number of molecules as in:

1.	14 g of N_2	2.	18 g of H_2O
3.	16 g of CO	4.	28 g of N_2

81 Which of the following plot represents the variation of $ln\ k$ versus $\frac{1}{T}$ according to the Arrhenius equation?

1.		2.	
3.		4.	

82 A steam volatile organic compound which is immiscible with water has a boiling point of 250°C. During steam distillation, a mixture of this organic compound and water will boil:
1. Above 100°C but below 250°C.
2. Above 250°C.
3. At 250°C.
4. Close to but below 100°C.

83 Given below are two statements:

Statement I:	Glycogen is similar to amylose in its structure.
Statement II:	Glycogen is found in yeast and fungi also.

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

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

84 Given the following reaction involving manganese (Mn): $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$ Which oxidation states of manganese are not observed in the above reaction?
A. +6
B. +2
C. +4
D. +7
E. +3
Mark the most appropriate answer from the options given below:
1. D and E only
2. B and D only
3. A and B only
4. B and E only

85 Given below are two statements:

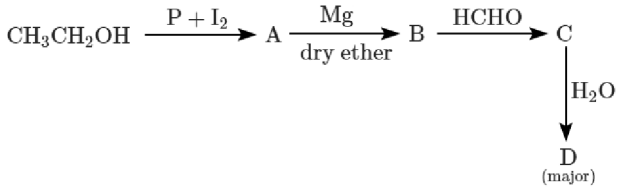
Statement I:	The Balmer spectral line for H atom with lowest energy appears at $\frac{5}{36}R_H\ cm^{-1}$ (R_H = Rydberg constant)
Statement II:	When the temperature of a black body increases, the maxima of the curve (intensity versus wavelength) shifts towards shorter wavelength.

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

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

CHEMISTRY - SECTION B

86 Identify D in the following sequence of reactions:



1. n-Propyl alcohol
2. Isopropyl alcohol
3. Propanal
4. Propionic acid

87 Identify the incorrect statement.

1.	PEt_3 and $Asph_3$ as ligands can form $d\pi - d\pi$ bond with transition metals.
2.	The N – N single bond is as strong as the P – P single bond.
3.	Nitrogen has unique ability to form $p\pi - p\pi$ multiple bonds with nitrogen, carbon and oxygen.
4.	Nitrogen cannot form $d\pi - p\pi$ bond as other heavier elements of its group.

88 Match the items given in **List-I** with those in **List-II** and select the correct option given below:

	List-I (Test/reagent)		**List-II (Radical identified)**
A.	Lake Test	I.	NO_3^-
B.	Nessler's Reagent	II.	Fe^{3+}
C.	Potassium sulpho cyanide	III.	Al^{3+}
D.	Brown Ring Test	IV.	NH_4^+

Options:
1. A-IV, B-II, C-III, D-I
2. A-II, B-IV, C-III, D-I
3. A-II, B-III, C-IV, D-I
4. A-III, B-IV, C-II, D-I

89 Match Column I (Molecule) with Column II (Bond enthalpy) and mark the correct option:

	Column-I (Molecule)		**Column-II (Bond enthalpy)** $\left(kJ\ mol^{-1}\right)$
A.	HCl	I.	435.8
B.	N_2	II.	498
C.	H_2	III.	946.0
D.	O_2	IV.	431.0

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

90 The standard cell potential of the following cell $Zn\left|Zn^{2+}(aq)\right\|Fe^{2+}(aq)\left|Fe\right.$ is 0.32 V. Calculate the standard Gibbs energy change for the reaction:
$Zn(s) + Fe^{2+}(aq) \rightarrow Zn^{2+}(aq) + Fe(s)$
(Given : $1\ F = 96487 C mol^{-1}$)

1.	$-61.75\ kJ\ mol^{-1}$	2.	$+5.006\ kJ\ mol^{-1}$
3.	$-5.006\ kJ\ mol^{-1}$	4.	$+61.75\ kJ\ mol^{-1}$

91 Match List-I with List-II:

	(List-I) Solid salt treated with dil. H_2SO_4		**(List-II)** Anion detected
A.	Effervescence of colourless gas	I.	NO_2^-
B.	Gas with smell of rotten egg	II.	CO_3^{2-}
C.	Gas with pungent smell	III.	S^{2-}
D.	Brown fumes	IV.	SO_3^{2-}

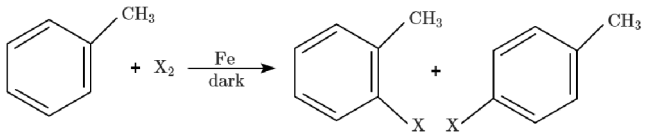
Choose the correct answer from the options given below:
1. A-II, B-III, C-IV, D-I
2. A-IV, B-III, C-II, D-I
3. A-I, B-II, C-III, D-IV
4. A-II, B-III, C-I, D-IV

92 The ratio of solubility of AgCl in 0.1 M KCl solution to the solubility of AgCl in water is:
(Given: Solubility product of AgCl $= 10^{-10}$)

1.	10^{-4}	2.	10^{-6}
3.	10^{-9}	4.	10^{-5}

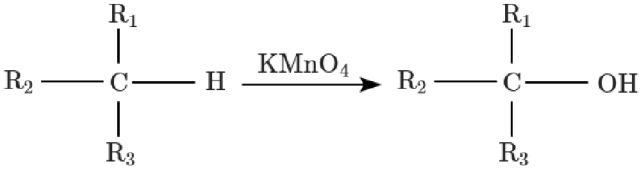
93 On complete combustion, 0.3 g of an organic compound gave 0.2 g of CO_2 and 0.1 g of H_2O. The percentage composition of carbon and hydrogen in the compound, respectively is:
1. 4.07% and 15.02%
2. 18.18% and 3.70%
3. 15.02% and 4.07%
4. 3.70% and 18.18%

94 The following reaction method



is not suitable for the preparation of the corresponding haloarene products, due to the high reactivity of halogen, when X is:
1. F
2. I
3. Cl
4. Br

95 The alkane that can be oxidized to the corresponding alcohol by $KMnO_4$ as per the equation



is, when:
1. $R_1 = H;\ R_2 = H;\ R_3 = H$
2. $R_1 = CH_3;\ R_2 = CH_3;\ R_3 = CH_3$
3. $R_1 = CH_3;\ R_2 = H;\ R_3 = H$
4. $R_1 = CH_3;\ R_2 = CH_3;\ R_3 = H$

96 For the following reaction at 300K
$A_2(g) + 3\,B_2(g) \rightarrow 2AB_3(g)$
the enthalpy change is +15 kJ, then the internal energy change is:
1. 19.98 K J
2. 200 J
3. 1999 J
4. 1.9988 kJ

97 Rate constants of a reaction at 500 K and 700 K are 0.04 s^{-1} and 0.14 s^{-1}, respectively; then, activation energy of the reaction is:
(Given : log 3.5 = 0.5441, R = 8.31 J K^{-1} mol^{-1})
1. 182310 J
2. 18500 J
3. 18219 J
4. 18030 J

98 What mass of **glucose ($C_6H_{12}O_6$)** must be dissolved in **1 liter** of solution to make it **isotonic** with a **15 g/L solution of urea (NH_2CONH_2)?** (Given : Molar mass in g mol^{-1} C:12, H:1, O: 16, N:14)
1. 55 g
2. 15 g
3. 30 g
4. 45 g

99 Identify the structural features common to $[Mn_2(CO)_{10}]$ and $[Co_2(CO)_8]$:
A. Presence of a metal-metal bond
B. Presence of terminal carbonyl groups
C. Presence of bridging carbonyl groups
D. Metals in the zero oxidation state
Choose the correct answer from the options given below:

1.	Only **A**, **B** and **C**	2.	Only **B**, **C** and **D**
3.	Only **A**, **C** and **D**	4.	Only **A**, **B** and **D**

100 Methyl group attached to a positively charged carbon atom stabilizes the carbocation due to:
1. -I inductive effect
2. Electromeric effect
3. Hyperconjugation
4. Mesomeric effect

BIOLOGY - I - SECTION A

101 The regions with high level of species richness, high degree of endemism and a loss of 70% of the species and habitat are identified as :
1. Natural Reserves
2. Sacred Groves
3. Biodiversity Hotspots
4. Biogeographical Regions

102 Which of the following simple tissues are commonly found in the fruit walls of nuts and pulp of pear?

1.	Sclereids	2.	Fibres
3.	Parenchyma	4.	Collenchyma

103 In a chromosome, there is a specific DNA sequence, responsible for initiating replication. It is called as:

1.	recognition sequence	2.	cloning site
3.	restriction site	4.	*ori* site

104 Given below are two statements:

Statement I:	When many alleles of single gene govern a character, it is called polygenic inheritance.
Statement II:	In polygenic inheritance, the effect of each allele is additive

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

105 Which of the following are required for the light reaction of photosynthesis?
A. CO_2
B. O_2
C. H_2O
D. Chlorophyll
E. Light
1. A , C, D and E only
2. C, D and E only
3. A and B only
4. A, C and E only

106 Match **List-I** with **List-II**

	List-I		**List-II**
A.	Fleming	I.	Disc shaped sacs or cisternae near cell nucleus
B.	Robert Brown	II.	Chromatin
C.	George Palade	III.	Ribosomes
D.	Camillo Golgi	IV.	Nucleus

Choose the correct answer form the options given below:

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

107

	List-I **Types of inheritance**		**List-II** **Example**
A.	Incomplete dominance	I.	Blood groups in human
B.	Co-dominance	II.	Flower colour in *Antirrhinum*
C.	Pleiotropy	III.	Skin colour in human
D.	Polygenic inheritance	IV.	Phenylketonuria

Choose the correct answer from the options given below:
1. A-III,B-IV, C-II, D-I
2. A-II, B-I, C-IV, D-III
3. A-II,B-III, C-I, D-IV
4. A-IV, B-I, C-III, D-II

108 Which part of the ovule store reserve food material?
1. Nucellus
2. Integument
3, Placenta
4. Funicle

109 Which one of the following is not found in Gymnosperms?
1. Sieve Cells
2. Albuminous Cells
3. Tracheids
4. Vessels

110 Which one of the following is not included under *in-situ* conservation?
1. Wild-life sanctuary
2. Botanical garden
3. Biosphere reserve
4. National park

111 Given below are two statements:

Statement I:	The Indian Government has set up GEAC, which will make decisions regarding the validity of GM research.
Statement II:	Biopiracy is the term used to refer to the use of bio-resources by native people

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

112 Pollen grains remain preserved as fossil due to the presence of :
1. Epidermal layer
2. Tapetum
3. Exine layer
4. Intine layer

113 Identify the incorrect pair:
1. Sphenopsida-*Adiantum*
2. Pteropsida-*Dryopteris*
3. Psilopsida-*Psilotum*
4. Lycopsida - *Selaginella*

114 Which of the following is the correct match?
1. Gymnosperms: *Cedrus, Pinus, Sequoia*
2. Angiosperms: *Wolffia, Eucalyptus, Sequoia*
3. Bryophytes : *Polytrichum, Polysiphonia, Sphagnum*
4. Pteridophytes : *Equisetum, Ginkgo, Adiantum*

115 Given below are statements regarding RNA polymerase in prokaryotes:

Statement I:	In prokaryotes, RNA polymerase is capable of catalysing the process of elongation during transcription.
Statement II:	RNA polymerase associates transiently with 'Rho' factor to initiate transcription.

In the light of the above statements, choose the correct answer from 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

116 Which of the following is a nucleotide?
1. Uridine
2. Adenylic acid
3. Guanine
4. Guanosine

117 Match List I with List II:

	List I		**List II**
A.	Vexillary aestivation	I.	Brinjal
B.	Epipetalous stamens	II.	Peach
C.	Epiphyllous stamens	III.	Pea
D.	Perigynous flower	IV.	Lily

Choose the correct answer from the options given below:
1. A- III, B-I, C-IV, D-II
2. A- III, B-IV, C-I, D-II
3. A- III, B-II, C-I, D-IV
4. A- II, B-I, C-IV, D-III

118 Match List I with List II

	List I		**List II**
A.	China rose	I.	Free central
B.	Mustard	II.	Basal
C.	Primrose	III.	Axile
D.	Marigold	IV.	Parietal

Choose the correct answer from the options given below:
1. A- IV, B-III, C-II, D-I
2. A- II, B-III, C-IV, D-I
3. A- III, B-IV, C-I, D-II
4. A- III, B-VI, C-II, D-I

119 Which of the following helps in maintenance of the pressure gradient in sieve tubes?
1. Albuminous cells
2. Sieve cells
3. Phloem parenchyma
4. Companion cells

120 Mesosome in a cell is a:

1.	Membrane bound vesicular structure
2.	Chain of many ribosomes attached to a single mRNA
3.	special structure formed by the extension of plasma membrane
4.	medium sized chromosome

121 Match **List-I** with **List-II**:

	List-I		List-II
A.	Abscisic acid	I.	Promotes female flowers in cucumber
B.	Ethylene	II.	Helps seeds to withstand desiccation
C.	Gibberellin	III.	Helps in nutrient mobilisation
D.	Cytokinin	IV.	Promotes bolting in beet cabbage etc

Choose the correct answer from the options given below:
1. A-II, B-III, C- IV, D- I
2. A-III, B-II, C- I, D- IV
3. A-II, B-I, C- IV, D- III
4. A-II, B-I, C- III, D- IV

122 Match **List-I** with **List-II**:

	List-I		List-II
A.	Genetically engineered Human Insulin	I.	Gene therapy
B.	GM Cotton	II.	*E.Coli*
C.	ADA Deficiency	III.	Antigen-antibody interaction
D.	ELISA	IV.	*Bacillus thuringiensis*

Choose the correct answer from the options given below:
1. A-III, B-II, C- IV, D- I
2. A-II, B-I, C- IV, D- III
3. A-IV, B-III, C- I, D- II
4. A-II, B-IV, C- I, D- III

123 Match **List-I** with **List-II**:

	List-I		List-II
A.	ETS Complex I	I.	NADH Dehydrogenase
B.	ETS Complex II	II.	Cytochrome bC_1
C.	ETS Complex III	III.	Cytochrome C oxidase
D.	ETS Complex IV	IV.	Succinate Dehydrogenase

Choose the correct answer from the options given below:
1. A-IV, B-I, C- III, D- II
2. A-I, B-IV, C- II, D- III
3. A-III, B-I, C- IV, D- II
4. A-I, B-II, C- IV, D- III

124 Cryopreservation technique is used for:

1.	Protection of environment
2.	Protection of biodiversity hotspots
3.	Preservation of gametes in viable and fertile conditions for a long period
4.	*In-situ* conservation

125 Which of the following are correct about cellular respiration?

A.	Cellular respiration is the breaking of C-C bonds of complex organic molecules by oxidation.
B.	The entire cellular respiration takes place in mitochondria.
C.	Fermentation takes place under anaerobic conditions in germinating seeds.
D.	The fate of pyruvate formed during glycolysis depends on the type of organism also.
E.	Water is formed during respiration as a result of O_2 accepting electrons and getting reduced.

Choose the correct answer from the options given below:
1. **A**, **C**, **D**, **E** only
2. **A**, **B**, **E** only
3. **A**, **B**, **C**, **E** only
4. **B**, **C**, **D**, **E** only

126 Given below are two statements:

Statement I:	In eukaryotes, there are three RNA polymerases in the nucleus in addition to the RNA polymerase found in the organelle.
Statement II:	All the three RNA polymerases in eukaryotic nucleus have different roles.

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** is correct.
4. Both **Statement I** and **Statement II** is incorrect.

127 Match List I with List II:

	List I		List II
A.	Histones	I.	Loosely packed chromatin
B.	Nucleosome	II.	Densely packed chromatin
C.	Euchromatin	III.	Positively charged basic proteins
D.	Heterochromatin	IV.	DNA wrapped around histone octamer

Choose the correct answer from the options given below:
1. A-IV, B-III, C- II, D- I
2. A-III, B-I, C- IV, D- II
3. A-II, B-III, C- IV, D- I
4. A-III, B-IV, C- I, D- II

128 Given below are two statements:

Statement I:	Failure of segregation of chromatids during cell cycle, resulting in the gain or loss of whole set of chromosome in an organism, is known as aneuploidy.
Statement II:	Failure of cytokinesis after anaphase stage of cell division resulting in the gain or loss of chromosome is called polyploidy.

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

129 Recombination between homologous chromosomes is completed by the end of:

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

130 Match List I with List II:

	List I		**List II**
A.	Metacentric chromosome	I.	Chromosome has a terminal centromere
B.	Sub-metacentric chromosome	II.	Middle centromere forming two equal arms of chromosome
C.	Acrocentric chromosome	III.	Centromere is slightly away from the middle chromosome resulting into two unequal arms
D.	Telocentric chromosome	IV.	Centromere is situated close to its end forming one extremely short and one very long arm

Choose the correct answer from the options given below:
1. A-II, B-I, C- IV, D- III
2. A-IV, B-I, C- II, D- III
3. A-I, B-II, C- III, D- IV
4. A-II, B-III, C- IV, D- I

131 Ligases is a class of enzymes responsible for catalysing the linking together of two compounds. Which of the following bonds is not catalysed by it?

1.	C-C	2.	P-O
3.	C-O	4.	C-N

132 F. Skoog observed that callus proliferated from the internodal segments of tobacco stem when auxin was supplied with one of the following, except:
1. Extract of vascular tissues
2. Coconut milk
3. Abscisic acid
4. Yeast extract

133 Given below are some statements about plant growth regulators:

A.	All GAs are acidic in nature.
B.	Auxins are antagonists to GAs.
C.	Zeatin was isolated from coconut milk.
D.	Ethylene induces flowering in Mango.
E.	Abscisic acid induces parthenocarpy.

Choose the correct set of statements from the ones given below:

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

134 Identify the incorrect statement related to electrophoresis:

1.	Separated DNA fragments can be directly seen under UV radiation
2.	Separated DNA can be extracted from gel piece.
3.	Fragments of DNA move toward anode.
4.	Sieving effect of agarose gel helps in separation of DNA fragments.

135 Which of the following examples show monocarpellary, unilocular ovary with many ovules?
A. *Sesbania*
B. Brinjal
C. *Indigofera*
D. Tobacco
E. *Asparagus*
Choose the correct answer from options given below:
1. **B** and **E** only
2. **C**, **D** and **E** only
3. **A**, **B** and **D** only
4. **A** and **C** only

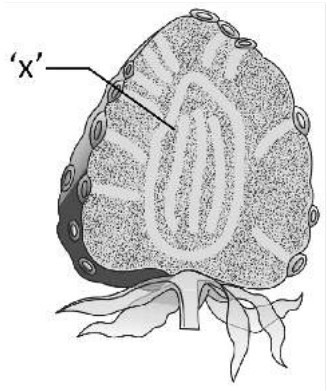
BIOLOGY - I - SECTION B

136 Given below are two statements :

Statement I:	In the *lac* operon, the z gene codes beta-galactosidase which is primary responsible for the hydrolysis of lactose into galactose and glucose.
Statement II:	In addition of lactose, glucose or galactose can also induce *lac* operon.

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

137 The marked part as 'x' in the given figure is



1.	Endosperm	2.	Thalamus
3.	Endocarp	4.	Mesocarp

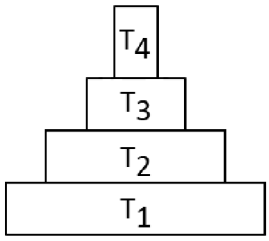
138 Given below are two statements:

Statement I:	In a dicotyledonous leaf, the adaxial epidermis general bears more stomata than the abaxial epidermis.
Statement II:	In a dicotyledonous leaf, the adaxially placed palisade parenchyma is made up of elongated cells, which are arranged vertically and parallel to each other.

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

139 Which of the following are not fatty acids?
A. Glutamic acid
B. Arachidonic acid
C. Palmitic acid
D. Lecithin
E. Aspartic acid
Choose the correct answer from the options given below:
1. **C**, **D** and **E** only
2. **A** and **B** only
3. **A**, **D** and **E** only
4. **B** and **C** only

140 Consider the pyramid of energy of an ecosystem given below :



If T_4 is equivalent to 1000 J, what is the value of T_1?

1.	$\frac{1000}{10}$ J	2.	$\frac{1000}{10} \times 4$ J
3.	10, 000 J	4.	10, 00, 000 J

141 Which one of the following products diffuses out chloroplast during photosynthesis?
1. ADP
2. NADPH
3. O_2
4. ATP

142 Recombinant DNA molecule can be created normally by cutting the vector DNA and source DNA respectively with:
1. *Hind II*, *Hind II*
2. *Hind II*, *Alu I*
3. *Hind II*, *EcoR I*
4. *Hind II*, B*am HI*

143 Which one of the following is not a limitation of ecological pyramids?

1.	Saprophytes are not given any place in ecological pyramids
2.	It assumes a simple food chain that, almost, never exists in nature
3.	It accommodates a food web
4.	It does not take into account the same species belonging to two or more trophic levels

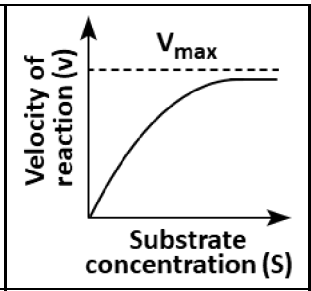
144 The *Bt* toxin in genetically engineered *Bt* cotton kills the pest by:
1. creating pores in the midgut
2. damaging the respiratory system
3. degenerating the nervous system
4. altering the pH of body fluids

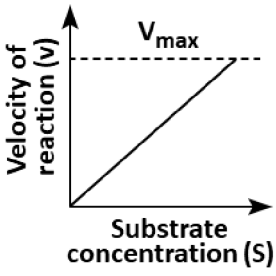
145 Match **List-I** with **List-II**:

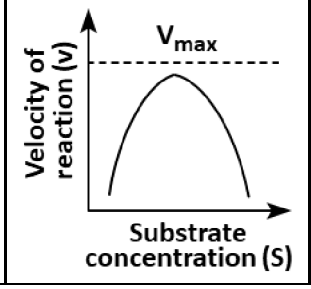
	List-I Organisms		List-II Mode of Nutrition
A.	Euglenoid	I.	Parasitic
B.	Dinoflagellate	II.	Saprophytic
C.	Slime mould	III.	Photosynthetic
D.	*Plasmodium*	IV.	Switching between photosynthetic and heterotrophic mode

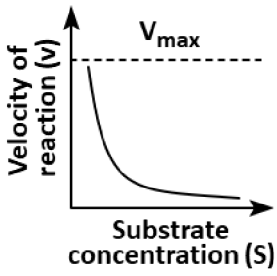
Choose the correct answer from the options given below:
1. A-III, B-IV, C- II, D- I
2. A-IV, B-II, C- I, D- III
3. A-IV, B-III, C- II, D- I
4. A-IV, B-II, C- III, D- I

146 Which of the following graphs depicts the effect of substrate concentration on velocity of enzyme catalysed reaction?

1.


2.


3.


4.


147 When will the population density increase, under special conditions?
When the number of:

1.	deaths exceeds number of births and also number of emigrants equals number of immigrants
2.	births plus number of immigrants equal number of deaths plus number of emigrants
3.	birth plus number of emigrants is more than the number of deaths plus number of immigrants
4.	birth plus number of immigrants is more than the sum of number of deaths and number of emigrants

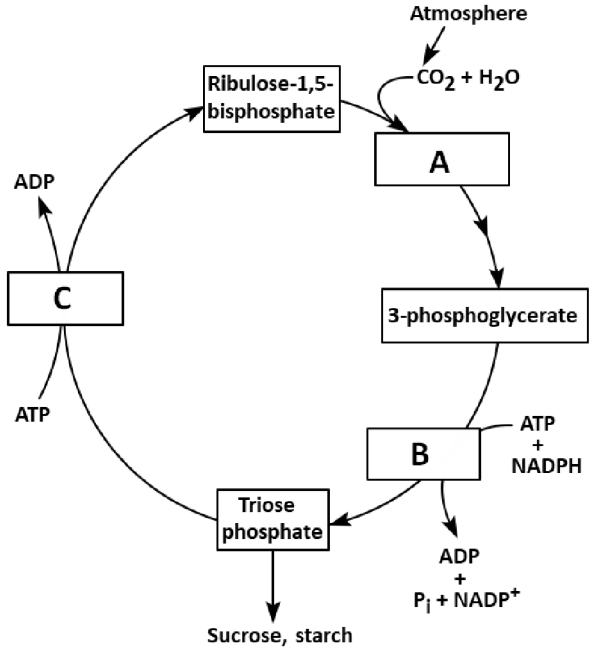
148 When a tall pea plant with round seeds was selfed, it produced the progeny of:
(a) tall plants with round seeds and
(b) tall plants with wrinkled seeds
Identify the genotype of the parent plant:
1. TtRr
2. TtRR
3. TTRR
4. TTRr

149 Match **List-I** with **List-II**:

	List-I		List-II
A.	Biodiversity hotspot	I.	Khasi and Jantia hills in Meghalaya
B.	Sacred groves	II.	World Summit in Sustainable Development 2002
C.	Johannesburg South Africa	III.	*Parthenium*
D.	Alien species invasion	IV.	Western Ghats

Choose the correct answer from the options given below:
1. A-IV, B-I, C- II, D- III
2. A-II, B-III, C- IV, D- I
3. A-I, B-IV, C- III, D- I
4. A-III, B-I, C- II, D- IV

150 Observe the given figure. Identify the different stages labelled with alphabets by selecting the correct option:



1.	A-Carboxylation, B-Regeneration, C-Reduction
2.	A-Reduction, B-Decarboxylation, C-Regeneration
3.	A-Carboxylation, B-Reduction, C-Regeneration
4.	A-Reduction, B-Carboxylation, C-Regeneration

BIOLOGY - II - SECTION A

151 Match **List-I** with **List-II**:

	List-I		List-II
A.	Predator	I.	*Ophrys*
B.	Mutualism	II.	*Pisaster*
C.	Parasitism	III.	Female wasp and fig
D.	Sexual deceit	IV.	*Plasmodium*

Choose the correct answer from the options given below:
1. A-III,B-II,C-I,D-IV
2. A-IV,B-I,C-II,D-III
3. A-II,B-III,C-I,D-IV
4. A-II,B-III,C-IV,D-I

152 Match List-I with List-II:

	List-I Location of Joint		List-II Type of Joint
A.	Joint between humerus and pectoral girdle	I.	Gliding joint
B.	Knee joint	II.	Ball and socket joint
C.	Joint between atlas and axis	III.	Hinge Joint
D.	Joint between carpals	IV.	Pivot joint

Choose the correct answer from the options given below:
1. A-II,B-III,C-IV,D-I
2. A-III,B-II,C-I,D-IV
3. A-I,B-IV,C-III,D-II
4. A-II,B-I,C-III,D-IV

153 Following are the steps involved in action of toxin in *Bt* Cotton:

A.	The inactive toxin converted into active form due to alkaline pH of gut of insect
B.	*Bacillus thuringiensis* produce crystals with toxic insecticidal proteins.
C.	The alkaline pH solubilises the crystals.
D.	The activated toxin binds to the surface of midgut cells, creates pores and causes death of the insect.
E.	The toxin proteins exist as inactive protoxins in bacteria.

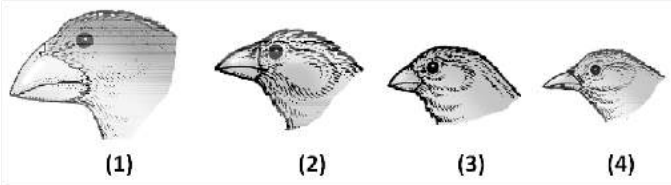
Choose the correct sequence of steps from the options given below:
1. E→C→B→A→D
2. B→C→A→E→D
3. A→E→B→D→C
4. B→E→C→A→D

154 Match List-I with List-II:

	List-I		List-II
A.	Gene pool	I.	Stable within a generation
B.	Genetic drift	II.	Change in gene frequency by chance
C.	Genetic flow	III.	Transfer of genes into or out of population
D.	Gene frequency	IV.	Total number of genes and their alleles

Choose the correct answer from the options given below:
1. A-III,B-II,C-I,D-IV
2. A-IV,B-II,C-III,D-I
3. A-I,B-II,C-III,D-IV
4. A-II,B-III,C-IV,D-I

155 Which evolutionary phenomenon is depicted by the sketch given in figure?



1. Artificial selection
2. Genetic drift
3. Convergent evolution
4. Adaptive radiation

156 A person with blood group A Rh^- can receive the blood transfusion from which of the following types?

A. B Rh^-
B. AB Rh^-
C. O Rh^-
D. A Rh^-
E. A Rh^+

Choose the correct answer from the options given below:
1. **D** and **E** only
2. **D** only
3. **A** and **B** only
4. **C** and **D** only

157 Enzymes that catalyse the removal of groups from substrates by mechanisms other than hydrolysis leaving double bonds, are known as:
1. Transferases
2. Oxidoreductases
3. Dehydrogenases
4. Lyases

158 Match List-I with List-II:

	List-I Event		List-II Stage of Prophase-I (Meiosis - I)
A.	Chiasmata	I.	Pachytene
B.	Crossing over	II.	Diakinesis
C.	Synaptonemal complex formation	III.	Diplotene
D.	Terminalisation of chiasmata	IV.	Zygotene

Choose the correct answer from the options given below:
1. A-III,B-I,C-IV,D-II
2. A-II,B-I,C-III,D-IV
3. A-III,B-I,C-II,D-IV
4. A-II,B-III,C-IV,D-I

159 Match List-I with List-II:

	List-I		List-II
A.	Primary structure of protein	I.	Human haemoglobin
B.	Secondary structure of protein	II.	Disulphide bonds
C.	Tertiary structure of protein	III.	Polypeptide chain
D.	Quaternary structure of protein	IV.	Alpha helix and β sheet

Choose the correct answer from the options given below:
1. A-III,B-IV,C-II,D-I
2. A-III,B-II,C-I,D-IV
3. A-I,B-III,C-II,D-IV
4. A-IV,B-III,C-II,D-I

160 Match List-I with List-II

	List-I		List-II
A.	Epinephrine	I.	Hyperglycemia
B.	Thyroxine	II.	Smooth muscle contraction
C.	Oxytocin	III.	Basal metabolic rate
D.	Glucagon	IV.	Emergency hormone

Choose the correct answer from the options given below:
1. A-II,B-I,C-IV,D-III
2. A-III,B-II,C-I,D-IV
3. A-IV,B-III,C-II,D-I
4. A-I,B-IV,C-III,D-II

161 Which of the following statements is correct about the type of junction and their role in our body?

1.	Adhering junctions facilitate the cells to communicate with each other.
2.	Tight junctions help to stop substances from leaking across a tissue.
3.	Tight junctions help to perform cementing to keep neighbouring cells together.
4.	Gap junctions help to create gap between the cells and tissues.

162 Select the restriction endonuclease enzymes whose restriction sites are present for the tetracycline resistance (tet^R) gene in the pBR322 cloning vector.
1. *Bam HI* and *Sal I*
2. *Sal I* and *Pst I*
3. *Pst I* and *Pvu I*
4. *Pvu I* and *Bam HI*

163 Match List-I with List-II:

	List-I		List-II
A.	Chondrichthyes	I.	*Clarias*
B.	Cyclostomata	II.	*Carcharodon*
C.	Osteichthyes	III.	*Myxine*
D.	Amphibia	IV.	*Ichthyophis*

Choose the correct answer from the options given below:

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

164 Given below are two statements: One is labelled as Assertion (A) and other is labelled as Reason (R).

Assertion (A):	During menstrual cycle, the ovulation takes place approximately on 14^{th} day.
Reason (R):	Rapid secretion of LH in the middle of menstrual cycle induces rupture of Graafian follicle and thereby the release of ovum.

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)**.

165 Match List-I with List-II with respect to convergent evolution:

	List-I		List-II
A.	Lemur	I.	Flying phalanger
B.	Bobcat	II.	Numbat
C.	Anteater	III.	Spotted cuscus
D.	Flying squirrels	IV.	Tasmanian tiger cat

Choose the correct answer from the options given below:
1. A-III,B-IV,C-II,D-I
2. A-III,B-II,C-IV,D-I
3. A-IV,B-III,C-II,D-I
4. A-IV,B-II,C-III,D-I

166 Match List-I with List-II:

	List-I		List-II
A.	Cells are metabolically active and proliferate	I.	G_2 phase
B.	DNA replication takes place	II.	G_1 phase
C.	Proteins are synthesised	III.	G_0 phase
D.	Quiescent stage with metabolically active cells	IV.	S phase

Choose the correct answer from the options given below:
1. A-IV,B-II,C-III,D-I
2. A-I,B-III,C-IV,D-II
3. A-II,B-I,C-III,D-IV
4. A-II,B-IV,C-I,D-III

167 Match **List-I** with **List-II**:

	List-I		List-II
A.	Migratory flamingoes and resident fish in South American lakes	I.	Interference competition
B.	Abingdon tortoise became extinct after introduction of goats in their habitat	II.	Competitive release
C.	*Chathamalus* expands its distributional range in the absence of *Balanus*	III.	Resource partitioning
D.	Five closely related species of Warblers feeding in different location on the same tree	IV.	Interspecific competition

Choose the correct answer from the options given below:
1. A-I,B-IV,C-III,D-II
2. A-IV,B-I,C-II,D-III
3. A-III,B-I,C-II,D-IV
4. A-II,B-IV,C-III,D-I

168 Match List-I with List-II relating to microbes and their products :

	List-I (Microbes)		List-II (Products)
A.	*Streptococcus*	I.	Citric acid
B.	*Trichoderma polysporum*	II.	Clot buster
C.	*Monascus purpureus*	III.	Cyclosporin A
D.	*Aspergillus niger*	IV.	Statins

Choose the correct answer from the options given below:
1. A-II, B-III, C-IV, D-I
2. A-I, B-II, C-III, D-IV
3. A-I, B-III, C-II, D-IV
4. A-I, B-IV, C-II, D-III

169 Match List-I with List-II.

	List-I		List-II
A.	F_1 Particles	I.	Chromosomes
B.	Histones	II.	Cilia
C.	Axoneme	III.	Golgi apparatus
D.	Cisternae	IV.	Mitochondria

Choose the correct answer from the options given below:
1. A-II, B-I, C-IV, D-III
2. A-IV, B-I, C-II, D-III
3. A-IV, B-I, C-III, D-II
4. A-IV, B-III, C-I, D-II

170 Match List-I with List-II relating to examples of various kind of IUDs and barrier :

	List-I		List-II
A.	Copper releasing IUD	I.	Vaults
B.	Non-medicated IUD	II.	Multiload 375
C.	Contraceptive barrier	III.	LNG-20
D.	Hormone releasing IUD	IV.	Lippes loop

Choose the correct answer from the options given below :
1. A-II, B-IV, C-III, D-I
2. A-IV, B-III, C-I, D-II
3. A-II, B-I, C-III, D-IV
4. A-II, B-IV, C-I, D-III

171 Given below are two statements:

Statement I:	Antibiotics are chemicals produced by microbes that kill other microbes.
Statement II:	Antibodies are chemicals formed in body that eliminate microbes.

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.

172 Arrange the following parts in human mammary gland, traversing the route of milk ejection.
A. Mammary duct
B. Lactiferous duct
C. Mammary alveolus
D. Ampulla
E. Mammary tubule
Choose the correct answer from the options given below:
1. D→C→E→A→B
2. C→E→B→A→D
3. C→E→A→D→B
4. A→C→E→D→B

173 Which of the following are correct about EcoRI?

A.	Cut the DNA with blunt end
B.	Cut the DNA with sticky end
C.	Recognises a specific palindromic sequence.
D.	Cut the DNA between the base G and A where it encounters the DNA sequence 'GAATTC'
E.	Exonuclease

Choose the correct answer from the options given below:

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

174 Which of the following is/are present in female cockroach?
A. Collateral gland
B. Mushroom gland
C. Spermatheca
D. Anal style
E. Phallic gland
Choose the most appropriate answer from the options given below:
1. **B** and **D** only
2. **B** and **E** only
3. **A** only
4. **A** and **C** only

175 Match **List-I** with **List-II**:

	List-I		**List-II**
A.	Malignant tumors	I.	*Destroy tumors*
B.	MALT	II.	*AIDS*
C.	NACO	III.	Metastasis
D.	α - Interferons	IV.	Lymphoid tissue

Choose the correct answer from the options given below:
1. A-III,B-IV,C-II,D-I
2. A-IV,B-III,C-II,D-I
3. A-III,B-IV,C-I,D-II
4. A-III,B-I,C-IV,D-II

176 Open Circulatory system is present in:

1.	*Palaemon, Nereis, Balanoglossus*
2.	*Hirudinaria, Bombyx, Salpa*
3.	*Anopheles, Limax, Limulus*
4.	*Pheretima, Musca, Pila*

177 In which of the following connective tissues, the cells secrete fibres of collagen or elastin?
A. Cartilage
B. Bone
C. Adipose tissue
D. Blood
E. Areolar tissue
Choose the most appropriate answer from the options given below:
1. **B**,**C**,**D** and **E** only
2. **A**,**B**,**C** and **E** only
3. **B**,**C** and **D** only
4. **A**,**C** and **D** only

178 Which of the following pairs is an incorrect match?
1. Annelids and arthropods - Bilateral symmetry
2. Sponges - Acoelomates
3. Coelenterates and Ctenophores - Radial symmetry
4. Platyhelminthes - Diploblastic organisation

179 Match List-I with List-II:

	List-I		List-II
A.	Residual volume	I.	Maximum volume of air that can be breathed in after forced expiration
B.	Vital capacity	II.	Volume of air inspired or expired during normal respiration
C.	Expiratory capacity	III.	Volume of air remaining in lungs after forcible expiration
D.	Tidal Volume	IV.	Total volume of air expired after normal inspiration

Choose the correct answer from the options given below:
1. A-IV,B-III,C-II,D-I
2. A-II,B-IV,C-I,D-III
3. A-III,B-I,C-IV,D-II
4. A-I,B-II,C-III,D-IV

180 Match List-I with List-II

	List-I		List-II
A.	Living Fossil	I.	Elongated canine teeth
B.	Connecting Link	II.	Vermiform appendix
C.	Vestigial Organ	III.	*Echidna*
D.	Atavism	IV.	*Latimeria*

Choose the correct answer from the options given below:
1. A-IV,B-III,C-II,D-I
2. A-IV,B-II,C-III,D-I
3. A-IV,B-III,C-I,D-II
4. A-III,B-IV,C-I,D-II

181 Match List-I with List-II

	List-I		List-II
A.	Schwann cells	I.	Neurotransmitter
B.	Synaptic knob	II.	Cerebral cortex
C.	Bipolar neurons	III.	Myelin Sheath
D.	Multipolar neurons	IV.	Retina

Choose the correct answer from the options given below:
1. A-III,B-I,C-IV,D-II
2. A-I,B-IV,C-II,D-III
3. A-IV,B-III,C-II,D-I
4. A-II,B-III,C-I,D-IV

182 Diuresis is prevented by:
1. Renin from JG cells via switching off the osmoreceptors.
2. ANF from atria of the heart
3. Aldosterone from adrenal medulla
4. Vasopressin from Neurohypophysis

183 Following is a list of STDs. Select the diseases which are not completely curable.
A. Genital warts
B. Genital herpes
C. Syphilis
D. Hepatitis-B
E. Trichomoniasis
Choose the correct answer from options given below:
1. A and D only
2. B and D only
3. A and C only
4. D and E only

184 What is the correct order (old to recent) of periods in Paleozoic era?

1.	Silurian, Devonian, Permian, Carboniferous
2.	Silurian, Devonian, Carboniferous, Permian
3.	Permian, Devonian, Silurian, Carboniferous
4.	Silurian, Carboniferous, Permian, Devonian

185 'Lub' sound of heart is caused by the _____.
1. closure of the semilunar valves
2. opening of tricuspid and bicuspid valves
3. opening of the semilunar valves
4. closure of the tricuspid and bicuspid valves

BIOLOGY - II - SECTION B

186 Match List-I with List-II relating to human female external genitalia :

	List-I (Structures)		List-II (Features)
A.	Mons pubis	I.	A fleshy fold of tissue surrounding the vaginal opening
B.	Clitoris	II.	Fatty cushion of cells covered by skin and hair
C.	Hymen	III.	Tiny finger-like structure above labia minora
D.	Labia majora	IV.	A thin membrane-like structure covering vaginal opening

Choose the correct answer from the options given below:
1. A-II, B-III, C-IV, D-I
2. A-IV, B-III, C-II, D-I
3. A-I, B-IV, C-III, D-II
4. A-II, B-III, C-I, D-IV

187 Aneuploidy is a chromosomal disorder where chromosome number is not the exact copy of its haploid set of chromosomes, due to :

A. Substitution
B. Addition
C. Deletion
D. Translocation
E. Inversion

Choose the most appropriate answer from the options given below :

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

188 Given below are two statements:

Statement I:	RNA interference takes place in all eukaryotic organisms as method of cellular defense.
Statement II:	RNAi involves the silencing of a specific mRNA due to a complementary single stranded RNA molecule that binds and prevents translation of mRNA

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.

189 Identify the wrong statements :

A.	Erythropoietin is produced by juxtaglomerular cells of the kidney
B.	Leydig cells produce Androgens
C.	Atrial Natriuretic factor, a peptide hormone is secreted by the seminiferous tubules of the testes
D.	Cholecystokinin is produced by gastro intestinal tract
E.	Gastrin acts on intestinal wall and helps in the production of pepsinogen

Choose the most appropriate answer from the options given below

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

190 Following are the steps involved in the process of PCR.

A. Annealing
B. Amplification (~1 billion times)
C. Denaturation
D. Treatment with Taq polymerase and deoxynucleotides
E. Extension

Choose the correct sequence of steps of PCR from the options given below :

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

191 Given below are two statements:

Statement I:	Concentrated urine is formed due to counter current mechanism in nephron.
Statement II:	Counter current mechanism helps to maintain osmotic gradient in the medullary interstitium.

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.

192 Given below are two statements:

Statement I:	Concentrically arranged cisternae of Golgi complex are arranged near the nucleus with distinct convex *cis* or maturing and concave *trans* or forming face.
Statement II:	A number of proteins are modified in the cisternae of Golgi complex before they are released from *cis* face.

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

193 Match List-I with List-II:

	List-I		**List-II**
A.	Parturition	I.	Several antibodies for new-born babies
B.	Placenta	II.	Collection of ovum after ovulation
C.	Colostrum	III.	Foetal ejection reflex
D.	Fimbriae	IV.	Secretion of the hormone hCG

Choose the correct answer from the options given below:

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

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

Assertion (A):	Members of subphylum vertebrate possess notochord during the embryonic period. The notochord is replaced by a cartilaginous or bony vertebral column in the adult.
Reason (R):	All chordates are vertebrates but not all vertebrates are chordates

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)**.

195 The mother has A+ blood group, the father has B+ and the child is A+. What can be possible genotypes of all three, respectively?

A. $I^AI^A \mid I^Bi \mid I^Bi$

B. $I^AI^A \mid I^Bi \mid I^Ai$

C. $I^B\,i\; I^A\; I^A \mid I^A\; I^B$

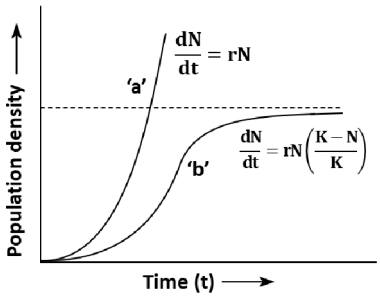
D. $I^AI^A \mid I^BI^B \mid I^Ai$

E. $I^A \mid I^Bi \mid I^Ai$

Choose the correct answer from the options given below:

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

196 What do 'a' and 'b' represent in the following population growth curve?



1.	'a' represents exponential growth when responses are not limiting the growth; and 'b' represents logistic growth when responses are limiting the growth.
2.	'a' represents logistic growth when responses are not limiting the growth; 'b' represents exponential growth when responses are limiting the growth.
3.	'a' represents carrying capacity and 'b' shows logistic growth when responses are limiting the growth.
4.	'a' represents exponential growth when responses are not limiting the growth and 'b' shows carrying capacity.

197 Select the correct statements regarding mechanism of muscle contraction.

A.	It is initiated by a signal sent by CNS via sensory neuron.
B.	Neurotransmitter generates action potential in the sarcolemma.
C.	Increased Ca^{++} level leads to the binding of calcium with troponin actin filaments.
D.	Masking of active site for actin is activated.
E.	Utilising the energy from ATP hydrolysis to form cross bridge.

Choose the most appropriate answer from the options given below:

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

198 Match List-I with List-II:

	List-I		**List-II**
A.	Squamous Epithelium	I.	Goblet cells of alimentary canal
B.	Ciliated Epithelium	II.	Inner lining of pancreatic ducts
C.	Glandular Epithelium	III.	Walls of blood vessels
D.	Compound Epithelium	IV.	Inner surface of Fallopian tubes

Choose the correct answer from the options given below:
1. A-II,B-III,C-I,D-IV
2. A-II,B-IV,C-III,D-I
3. A-III,B-I,C-II,D-IV
4. A-III,B-IV,C-I,D-II

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

	List-I		**List-II**
A.	B-Lymphocytes	I.	Passive immunity
B.	Interferons	II.	Cell mediated immunity
C.	T-Lymphocytes	III.	Produce an army of proteins in response to pathogens
D.	Colostrum	IV.	Innate immunity

Choose the correct answer from the options given below:
1. A-I,B-IV,C-II,D-III
2. A-IV,B-II,C-III,D-I
3. A-III,B-IV,C-II,D-I
4. A-II,B-IV,C-I,D-III

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

Assertion (A):	During the transporation of gases, about 20-25 percent of CO_2 is carried by haemoglobin as carbamino-haemoglobin.
Reason (R):	This binding is related to high pCO_2 and low pO_2 in the tissues

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)**.