PHYSICS

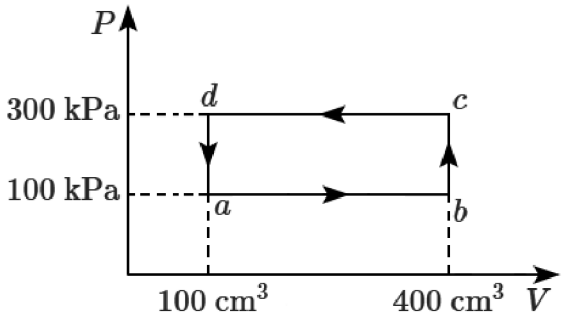
1 Match **List I** with **List II.**

List I (Spectral Lines of Hydrogen for transitions from)		**List II** (Wavelength (nm))	
A.	$n_2 = 3$ to $n_1 = 2$	I.	410.2
B.	$n_2 = 4$ to $n_1 = 2$	II.	434.1
C.	$n_2 = 5$ to $n_1 = 2$	III.	656.3
D.	$n_2 = 6$ to $n_1 = 2$	IV.	486.1

Choose the correct answer from the options given below:

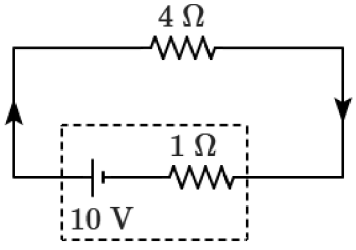
1.	A – III, B – IV, C – II, D – I
2.	A – IV, B – III, C – I, D – II
3.	A – I, B – II, C – III, D – IV
4.	A – II, B – I, C – IV, D – III

2 A thermodynamic system is taken through the cycle *abcda*. The work done by the gas along the path *bc* is:



1. 30 J
2. −90 J
3. −60 J
4. zero

3 A battery with an EMF of 10 V and an internal resistance of 1 Ω is connected to an external resistance of 4 Ω, as shown in the figure. The terminal voltage of the battery in this configuration is:

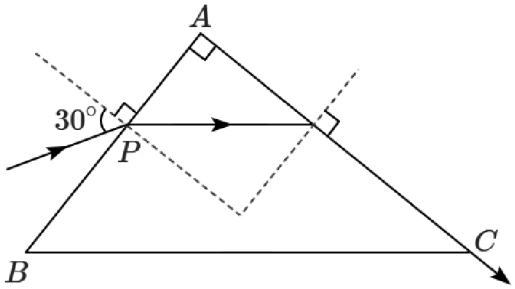


1.	6 V	2.	8 V
3.	10 V	4.	4 V

4 In an ideal transformer, the turns ratio is $\frac{N_p}{N_s} = \frac{1}{2}$. The ratio $V_s : V_p$ is equal to (the symbols carry their usual meaning):

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

5 A light ray enters through a right-angled prism at point P with the angle of incidence 30° as shown in the figure. It travels through the prism parallel to its base BC and emerges along the face AC. The refractive index of the prism is:

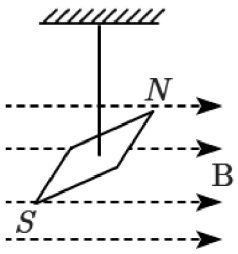


1.	$\frac{\sqrt{5}}{2}$	2.	$\frac{\sqrt{3}}{4}$
3.	$\frac{\sqrt{3}}{2}$	4.	$\frac{\sqrt{5}}{4}$

6 A thin flat circular disc of radius 4.5 cm is placed gently over the surface of water. If the surface tension of water is $0.07\ \text{Nm}^{-1}$, then the excess force required to take it away from the surface is:

1. 198 N
2. 1.98 mN
3. 99 N
4. 19.8 mN

7 In a uniform magnetic field of 0.049 T, a magnetic needle performs 20 complete oscillations in 5 seconds as shown. The moment of inertia of the needle is 9.8×10^{-6} kg m^2. If the magnitude of magnetic moment of the needle is $x \times 10^{-5}$ Am^2; then the value of 'x' is:



1. $128\pi^2$
2. $50\pi^2$
3. $1280\pi^2$
4. $5\pi^2$

8 If the monochromatic source in Young's double slit experiment is replaced by white light, then:

1.	there will be a central dark fringe surrounded by a few coloured fringes.
2.	there will be a central bright white fringe surrounded by a few coloured fringes.
3.	all bright fringes will be of equal width.
4.	interference pattern will disappear.

9 Given below are two statements:

Statement I:	Atoms are electrically neutral as they contain equal number of positive and negative charges.
Statement II:	Atoms of each element are stable and emit their characteristic spectrum.

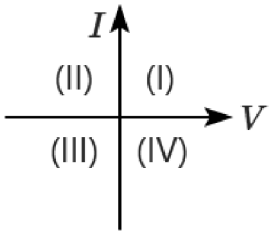
In the light of the above statements, choose the most appropriate answer from the options given below:

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

10 The maximum elongation of a steel wire of 1 m length if the elastic limit of steel and its Young's modulus, respectively, are 8×10^8 N m^{-2} and 2×10^{11} N m^{-2}, is:

1. 0.4 mm
2. 40 mm
3. 8 mm
4. 4 mm

11 Consider the following Statements **A** and **B** and identify the correct answer:



A.	For a solar-cell, the I-V characteristics lies in the IV quadrant of the given graph.
B.	In a reverse-biased pn junction diode, the current measured in (μA), is due to majority charge carriers.

1.	**A** is incorrect but **B** is correct.
2.	Both **A** and **B** are correct.
3.	Both **A** and **B** are incorrect.
4.	**A** is correct but **B** is incorrect.

12 A particle moving with uniform speed in a circular path maintains:

1.	constant acceleration
2.	constant velocity but varying acceleration
3.	varying velocity and varying acceleration
4.	constant velocity

13 If c is the velocity of light in free space, the correct statements about photons among the following are:

(A)	The energy of a photon is $E = h\nu$.
(B)	The velocity of a photon is c.
(C)	The momentum of a photon, $p = \frac{h\nu}{c}$.
(D)	In a photon-electron collision, both total energy and total momentum are conserved.
(E)	Photon possesses a positive electric charge.

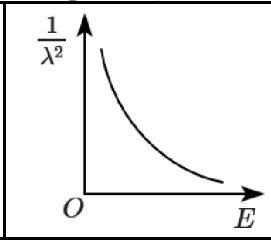
Choose the correct answer from the options given below:

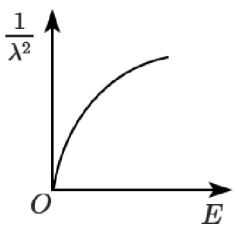
1.	**(A)**, **(B)**, **(C)** and **(D)** only
2.	**(A)**, **(C)** and **(D)** only
3.	**(A)**, **(B)**, **(D)** and **(E)** only
4.	**(A)** and **(B)** only

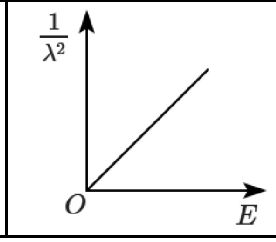
14 Two bodies A and B of the same mass undergo completely inelastic one-dimensional collision. The body A moves with velocity v_1 while the body B is at rest before collision. The velocity of the system after collision is v_2. The ratio of $v_1 : v_2$ is:

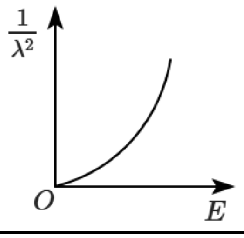
1. 2 : 1
2. 4 : 1
3. 1 : 4
4. 1 : 2

15 The graph that shows the variation of $\frac{1}{\lambda^2}$ with the kinetic energy E (where λ is the de-Broglie wavelength of a free particle) is:

1. 

2. 

3. 

4. 

16 An unpolarised light beam strikes a glass surface at Brewster's angle. Then:

1.	The refracted light will be completely polarised.
2.	Both the reflected and refracted light will be completely polarised.
3.	The reflected light will be completely polarised but the refracted light will be partially polarised.
4.	The reflected light will be partially polarised.

17 At any instant of time t, the displacement of any particle is given by $2t - 1$ (SI unit) under the influence of the force of 5 N. The value of instantaneous power (in SI units) is:

1. 5
2. 7
3. 6
4. 10

18 A tightly wound 100 turns coil of radius 10 cm carries a current of 7 A. The magnitude of the magnetic field at the centre of the coil is: (Take permeability of free space as $4\pi \times 10^{-7}$SI units):

1. 4.4 T
2. 4.4 mT
3. 44 T
4. 44 mT

19 The moment of inertia of a thin rod about an axis passing through its mid-point and perpendicular to the rod is 2400 g cm^2. The length of the 400 g rod is nearly:

1. 17.5 cm
2. 20.7 cm
3. 72.0 cm
4. 8.5 cm

20 A bob is whirled in a horizontal plane by means of a string with an initial speed of ω rpm. The tension in the string is T. If speed becomes 2ω while keeping the same radius, the tension in the string becomes:

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

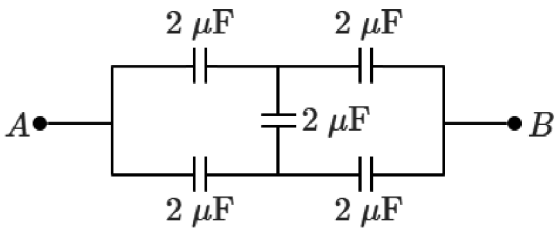
21 Match **List-I** with **List-II**.

List-I Material		**List-II** Susceptibility (χ)	
(A)	Diamagnetic	(I)	$\chi = 0$
(B)	Ferromagnetic	(II)	$0 > \chi \geq -1$
(C)	Paramagnetic	(III)	$\chi \gg 1$
(D)	Non-magnetic	(IV)	$0 < \chi < \varepsilon$ (a small positive number)

Choose the correct answer from the options given below:

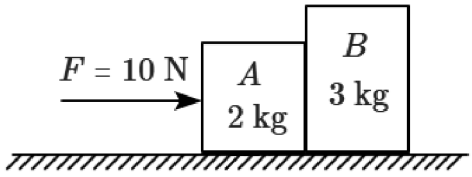
1.	A-II, B-I, C-III, D-IV	2.	A-III, B-II, C-I, D-IV
3.	A-IV, B-III, C-II, D-I	4.	A-II, B-III, C-IV, D-I

22 In the following circuit, the equivalent capacitance between terminal A and terminal B is:



1. 1 μF
2. 0.5 μF
3. 4 μF
4. 2 μF

23 A horizontal force 10 N is applied to a block A as shown in figure. The mass of blocks A and B are 2 kg and 3 kg, respectively. The blocks slide over a frictionless surface. The force exerted by block A on block B is :



1. 4 N
2. 6 N
3. 10 N
4. zero

24 ${}^{290}_{82}X \xrightarrow{\alpha} Y \xrightarrow{e^+} Z \xrightarrow{\beta^-} P \xrightarrow{e^-} Q$

In the nuclear emission stated above, the mass number and atomic number of the product Q respectively, are:

1. 286, 80
2. 288, 82
3. 286, 81
4. 280, 81

25 In a vernier callipers, $(N+1)$ divisions of the vernier scale coincide with N divisions of the main scale. If 1 MSD represents 0.1 mm, the vernier constant (in cm) is:

1.	$\frac{1}{100(N+1)}$	2.	$100N$
3.	$10(N+1)$	4.	$\frac{1}{10N}$

26 If $x = 5\sin\left(\pi t + \frac{\pi}{3}\right)$ m represents the motion of a particle executing simple harmonic motion, the amplitude and time period of motion, respectively are:

1. 5 m, 2 s
2. 5 cm, 1 s
3. 5 m, 1 s
4. 5 cm, 2 s

27 A logic circuit provides the output Y as per the following truth table:

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

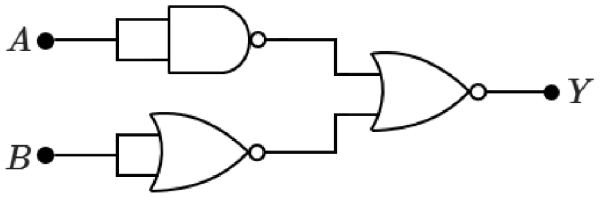
The expression for the output Y is :

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

28 A wire of length $'l'$ and resistance 100 Ω is divided into 10 equal parts. The first 5 parts are connected in series while the next 5 parts are connected in parallel. The two combinations are again connected in series. The resistance of this final combination is:

1.	52 Ω	2.	55 Ω
3.	60 Ω	4.	26 Ω

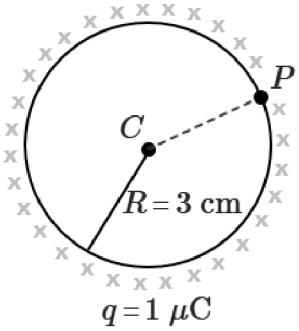
29 The output (Y) of the given logic gate is similar to the output of an/a:



1.	NOR gate	2.	OR gate
3.	AND gate	4.	NAND gate

30 A thin spherical shell is charged by some source. The potential difference between the two points C and P (in V) shown in the figure is:

(Take $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9$ SI units)



1. 1×10^5
2. 0.5×10^5
3. zero
4. 3×10^5

31 The mass of a planet is $\left(\frac{1}{10}\right)^{\text{th}}$ that of the earth and its diameter is half that of the earth. The acceleration due to gravity on that planet is:

1.	9.8 ms^{-2}	2.	4.9 ms^{-2}
3.	3.92 ms^{-2}	4.	19.6 ms^{-2}

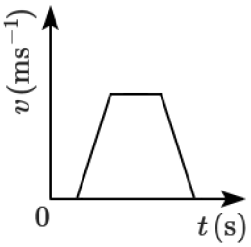
32 The minimum energy required to launch a satellite of mass m from the surface of the earth of mass M and radius R in a circular orbit at an altitude of $2R$ from the surface of the earth is:

1.	$\frac{2GmM}{3R}$	2.	$\frac{GmM}{2R}$
3.	$\frac{GmM}{3R}$	4.	$\frac{5GmM}{6R}$

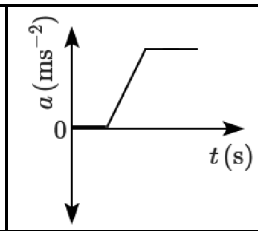
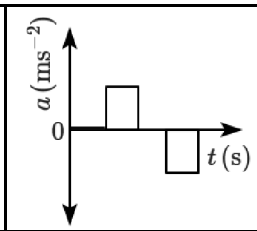
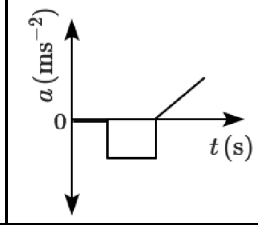
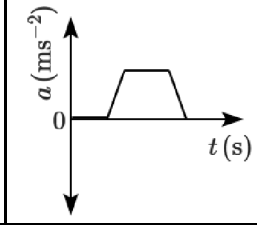
33 A small telescope has an objective of focal length 140 cm and an eyepiece of focal length 5.0 cm. The magnifying power of a telescope for viewing a distant object is:

1. 28
2. 17
3. 32
4. 34

34 The velocity (v)-time (t) plot of the motion of a body is shown below:



The acceleration (a)-time (t) graph that best suits this motion is:

1. 		2. 	
3. 		4. 	

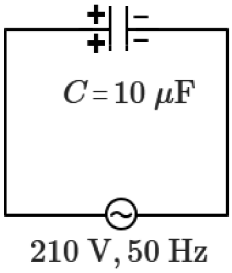
35 Two heaters A and B have power rating of 1 kW and 2 kW, respectively. Those two are first connected in series and then in parallel to a fixed power source. The ratio of power outputs for these two cases is:

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

36 A force defined by; $F = \alpha t^2 + \beta t$ acts on a particle at a given time t. The factor which is dimensionless, if α and β are constants, is:

1.	$\alpha t/\beta$	2.	$\alpha\beta t$
3.	$\alpha\beta/t$	4.	$\beta t/\alpha$

37 A 10 μF capacitor is connected to a 210 V, 50 Hz source as shown in the figure. The peak current in the circuit is nearly ($\pi = 3.14$):



1. 0.93 A
2. 1.20 A
3. 0.35 A
4. 0.58 A

38 A metallic bar of Young's modulus 0.5×10^{11} Nm^{-2}, coefficient of linear thermal expansion 10^{-5} °C^{-1}, length 1 m and cross-sectional area 10^{-3} m^2 is heated from 0°C to 100°C without expansion or bending. The compressive force developed in the metallic bar is:

1. 50×10^3 N
2. 100×10^3 N
3. 2×10^3 N
4. 5×10^3 N

39 A parallel plate capacitor is charged by connecting it to a battery through a resistor. If i is the current in the circuit, then in the gap between the plates:

1.	A displacement current of magnitude equal to i flows in the same direction as i.
2.	A displacement current of magnitude equal to i flows in the opposite direction to i.
3.	A displacement current of magnitude greater than i flows but it can be in any direction.
4.	There is no current.

40 A sheet is placed on a horizontal surface in front of a strong magnetic pole. A force is needed to:

A.	hold the sheet there if it is magnetic.
B.	hold the sheet there if it is non-magnetic.
C.	move the sheet away from the pole with uniform velocity if it is conducting.
D.	move the sheet away from the pole with uniform velocity if it is both, non-conducting and non-polar.

Choose the correct statement(s) from the options given below:

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

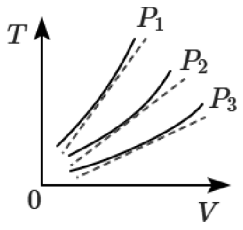
41 If the plates of a parallel plate capacitor connected to a battery are moved closer to each other, then:

(A)	The charge stored in it increases.
(B)	The energy stored in it decreases.
(C)	Its capacitance increases.
(D)	The ratio of charge to its potential remains the same.
(E)	The product of charge and voltage increases.

Choose the most appropriate answer from the options given below:

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

42 The following graph represents the T-V curves of an ideal gas (where T is the temperature and V the volume) at three pressures P_1, P_2 and P_3 compared with those of Charles's law represented as dotted lines.



Then the correct relation is :

1.	$P_1 > P_3 > P_2$	2.	$P_2 > P_1 > P_3$
3.	$P_1 > P_2 > P_3$	4.	$P_3 > P_2 > P_1$

43 The property which is not of an electromagnetic wave travelling in free space is that:

1.	the energy density in electric field is equal to energy density in magnetic field.
2.	they travel with a speed equal to $\frac{1}{\sqrt{\mu_0\,\varepsilon_0}}$.
3.	they originate from charges moving with uniform speed.
4.	they are transverse in nature.

44 An iron bar of length L has a magnetic moment M. It is bent at the middle of its length such that the two arms make an angle 60° with each other. The magnetic moment of this new magnet is:

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

45 If the mass of a bob in a simple pendulum is increased to thrice its original mass and its length is made half its original length, then the new time period of oscillation is $\frac{x}{2}$ times its original time period. The value of x is:

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

CHEMISTRY

46 The reagents with which glucose does not react to give the corresponding test/products are:

A. Tollen's reagent
B. Schiff's reagent
C. HCN
D. NH_2OH
E. $NaHSO_3$

Choose the correct option:

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

47 The energy of electron in the ground state $(n = 1)$ for He^+ ion is xJ, then that for an electron in $n = 2$ state for Be^{3+} ion in J is :

1.	$-\frac{x}{9}$	2.	$-4x$
3.	$-\frac{4}{9}x$	4.	$-x$

48 Which reaction is **NOT** a redox reaction?

1. $2KClO_3 + I_2 \rightarrow 2KIO_3 + Cl_2$
2. $H_2 + Cl_2 \rightarrow 2HCl$
3. $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$
4. $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

49 Match List I with List II.

	List-I (Process)		**List-II (Conditions)**
A.	Isothermal process	I.	No heat exchange
B.	Isochoric process	II.	Carried out at constant temperature
C.	Isobaric process	III.	Carried out at constant volume
D.	Adiabatic process	IV.	Carried out at constant pressure

Choose the correct answer from the options given below:

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

50 For the reaction $2\ A \rightleftharpoons B + C, K_c = 4 \times 10^{-3}$. At a given time, the composition of reaction mixture is : $[A] = [B] = [C] = 2 \times 10^{-3}M$.
In light of the above facts, which of the following is correct?

1.	Reaction has a tendency to go in the forward direction.
2.	Reaction has a tendency to go in the backward direction.
3.	Reaction has gone to completion in the forward direction.
4.	Reaction is at an equilibrium.

51 Match the complexes from List I with their corresponding type of isomerism from List II:

List I (Complex)	**List II (Type of isomerism)**
A. $\left[Co(NH_3)_5(NO_2)\right]Cl_2$	I. Solvate isomerism
B. $\left[Co(NH_3)_5(SO_4)\right]Br$	II. Linkage isomerism
C. $\left[Co(NH_3)_6\right]\left[Cr(CN)_6\right]$	III. Ionization isomerism
D. $\left[Co(H_2O)_6\right]Cl_3$	IV. Coordination isomerism

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

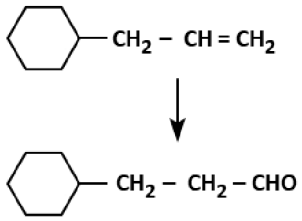
52 In which of the following processes entropy increases?

A.	A liquid evaporates to vapour.
B.	Temperature of a crystalline solid lowered from 130 K to 0 K.
C.	$2NaHCO_{3(s)} \rightarrow Na_2CO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$
D.	$Cl_{2(g)} \rightarrow 2Cl_{(g)}$

Choose the correct answer from the options given below:

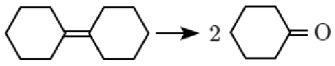
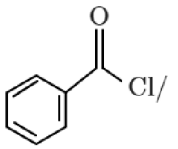
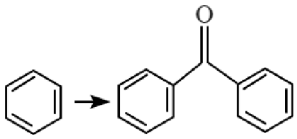
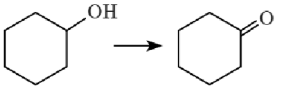
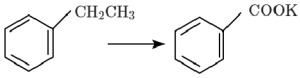
1.	A, B and D	2.	A, C and D
3.	C and D	4.	A and C

53 Identify the correct reagents that would bring about the following transformation.



1. (i) BH_3
   $(ii) H_2O_2/\ \overset{\ominus}{O}H$
   (iii) PCC
2. (i) BH_3
   $(ii) H_2O_2/\ \overset{\ominus}{O}H$
   (iii) alk. $KMnO_4$
   (iv) H_3O^+
3. (i) H_2O/H^+
   (ii) PCC
4. (i) H_2O/H^+
   (ii) CrO_3

54 Match the reactions listed in **List-I** with the appropriate reagents or conditions listed in **List-II**:

	List-I (Reaction)		**List-II (Reagents/ Condition)**
A.		I.	 Anhyd. $AlCl_3$
B.		II.	CrO_3
C.		III.	$KMnO_4$ KOH, Δ
D.		IV.	$(i) O_3$ $(ii) Zn - H_2O$

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

55 In which of the following equilibria, K_p and K_c are **NOT** equal?
1. $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$
2. $CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$
3. $2BrCl_{(g)} \rightleftharpoons Br_{2(g)} + Cl_{2(g)}$
4. $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$

56 Which one of the following alcohols reacts instantaneously with Lucas reagent?

1.	$CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-OH$
2.	$CH_3-\underset{\displaystyle CH_3}{\underset{\vert}{CH}}-CH_2OH$
3.	$CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{\vert}{\underset{\vert}{C}}}}-OH$
4.	$CH_3-CH_2-CH_2-CH_2OH$

57 Given below are two statements :

Statement I :	The boiling point of three isomeric pentanes follows the order n-Pentane > Isopentane > Neopentane
Statement II :	When branching increases, the molecule attains the shape of sphere. This results in smaller surface area for contact, due to which the intermolecular forces between the spherical molecules are weak, thereby lowering the boiling point.

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

58 Given below are two statements:

Statement I:	Aniline does not undergo Friedel-Crafts alkylation reaction.
Statement II:	Aniline cannot be prepared through Gabriel synthesis.

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

59 The E° value for the Mn^{3+}/Mn^{2+} couple is more positive than that of Cr^{3+}/Cr^{2+} or Fe^{3+}/Fe^{2+} due to change of:
1. d^5 to d^2 configuration
2. d^4 to d^5 configuration
3. d^3 to d^5 configuration
4. d^5 to d^4 configuration

60 Which solution is part of Fehling solution 'A' (used in tests for reducing sugars and aldehydes)?

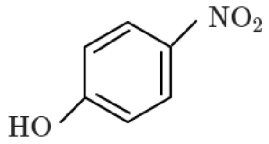
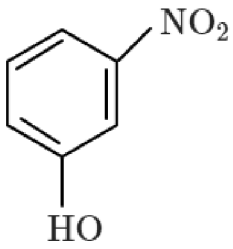
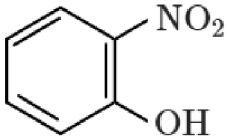
1.	Alkaline copper sulphate
2.	Alkaline solution of sodium potassium tartrate (Rochelle's salt)
3.	Aqueous sodium citrate
4.	Aqueous copper sulphate

61 Match List I with List II.

	List I (Molecule)		**List II (Number and types of bond/s between two carbon atoms)**
A.	Ethane	I.	One σ – bond and Two π – bonds
B.	Ethene	II.	Two π-bonds
C.	Carbon molecule, C_2	III.	One σ-bond
D.	Ethyne	IV.	One σ – bond and One π – bond

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

62 Intramolecular hydrogen bonding is present in:

1.		2.	
3.	HF	4.	

63 Which of the following contains the highest number of helium atoms?
1. 4 u of helium
2. 4 g of helium
3. 2.27 L of helium at STP
4. 4 mol of helium

64 Match List I with List II.

List I (Conversion)		**List II (Number of Faraday required)**	
A.	1 mol of H_2O to O_2	I.	3F
B.	1 mol of MnO_4^- to Mn^{2+}	II.	2F
C.	1.5 mol of Ca from molten $CaCl_2$	III.	1F
D.	1 mol of FeO to Fe_2O_3	IV.	5F

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

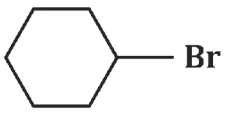
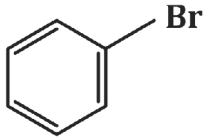
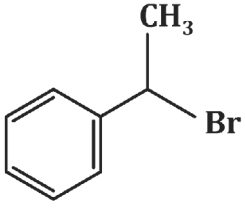
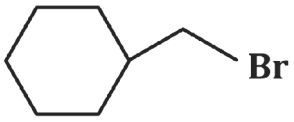
65 Among Group 16 elements, which one does NOT show -2 oxidation state?
1. Se
2. Te
3. Po
4. O

66 Which of the following ions have the same 'spin-only' magnetic moment?
A. Ti^{+3}
B. Cr^{2+}
C. Mn^{2+}
D. Fe^{2+}
E. Sc^{3+}
Choose the most appropriate answer from the options given below:
1. A and E only
2. B and C only
3. A and D only
4. B and D only

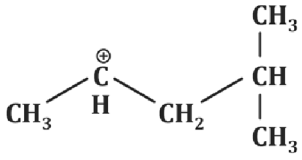
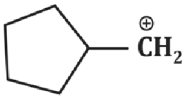
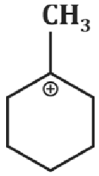
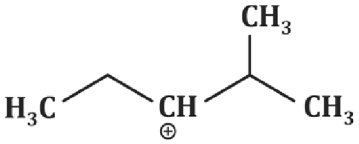
67 Determine the IUPAC name of the compound with the molecular formula **C_6H_{14}** that contains two tertiary carbon atoms. 1. 2-Methyl pentane
2. 2, 3-Dimethylbutane
3. 2, 2-Dimethylbutane
4. n-Hexane

68 The Henry's law constant K_H values of three gases (A, B, C) in water are 145, 2×10^{-5}, and 35 kbar, respectively. Determine the order of solubility of these gases in water from highest to lowest:
1. B > C > A
2. A > C > B
3. A > B > C
4. B > A > C

69 The compound that will undergo $S_N{}^1$ reaction with the fastest rate is:

1.		2.	
3.		4.	

70 The most stable carbocation among the following is:

1.	
2.	
3.	
4.	

71 Given below are two statements :

Statement I :	Both $\left[Co(NH_3)_6\right]^{3+}$ and $\left[CoF_6\right]^{3-}$ Complexes are octahedral but differ in their magnetic behaviour.
Statement II :	$\left[Co(NH_3)_6\right]^{3+}$ is diamagnetic whereas $\left[CoF_6\right]^{3-}$ is paramagnetic.

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

72 1 gram of sodium hydroxide was treated with 25 mL of 0.75 M HCl solution, the mass of sodium hydroxide left unreacted is equal to :
1. 250 mg
2. Zero mg
3. 200 mg
4. 750 mg

73 Given below are two statements :

Statement I:	The boiling point of hydrides of Group 16 elements follow the order $H_2O > H_2Te > H_2Se > H_2S$.
Statement II:	On the basis of molecular mass, H_2O is expected to have lower boiling point than the other members of the group but due to the presence of extensive H-bonding in H_2O, it has higher boiling point.

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

74 Arrange the elements Li, Be, B, C, and N in increasing order of their first ionization enthalpies:
1. Li < B < Be < C < N
2. Li < Be < C < B < N
3. Li < Be < N < B < C
4. Li < Be < B < C < N

75 Activation energy of any chemical reaction can be calculated if one knows the value of

1.	Probability of collision.
2.	Orientation of reactant molecules during collision.
3.	Rate constant at two different temperatures.
4.	Rate constant at standard temperature.

76 Arrange the following elements in increasing order of electronegativity N, O, F, C, Si.
Choose the correct answer from the options given below:
1. Si < C < O < N < F
2. O < F < N < C < Si
3. F < O < N < C < Si
4. Si < C < N < O < F

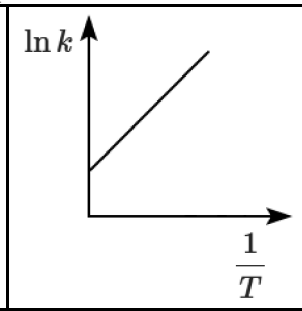
77 Match List I with List II.

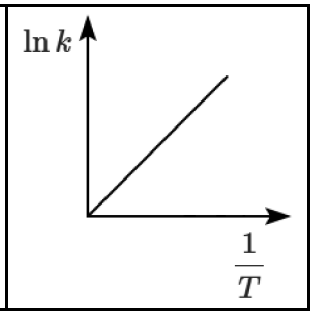
	List I Quantum Number		List II Information provided
A.	m_l	I.	Shape of the orbital
B.	m_s	II.	Size of the orbital
C.	l	III.	Orientation of the orbital
D.	n	IV.	Orientation of spin of the electron

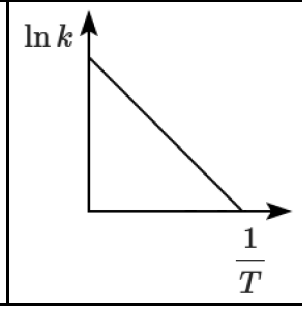
Choose the correct answer from the options given below:

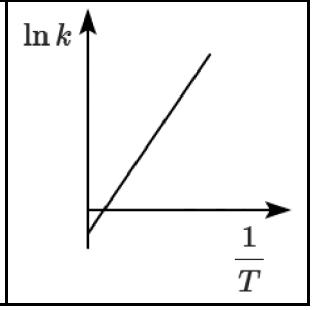
1. A-III, B-IV, C-I, D-II
2. A-III, B-IV, C-II, D-I
3. A-II, B-I, C-IV, D-III
4. A-I, B-III, C-II, D-IV

78 Which plot of In k vs $\frac{I}{T}$ is consistent with Arrhenius equation?

1. 

2. 

3. 

4. 

79 The work done during reversible isothermal expansion of one mole of hydrogen gas at 25°C from pressure of 20 atmosphere to 10 atmosphere is :

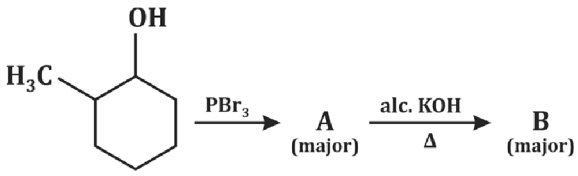
(Given R = 2.0 cal K^{-1} mol^{-1})

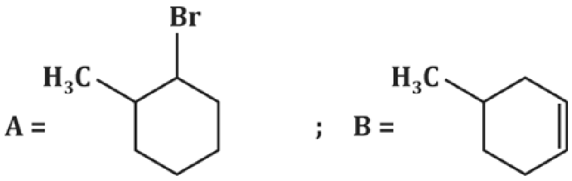
1. –413.14 calories
2. 413.14 calories
3. 100 calories
4. 0 calorie

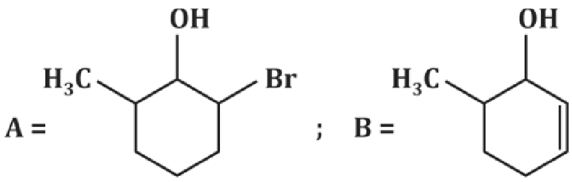
80 Which one of the following statements is correct?

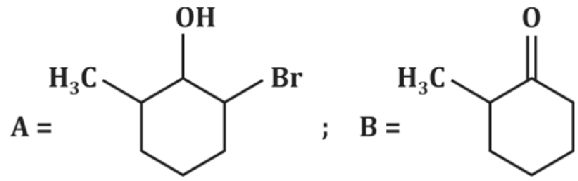
1.	BF_3 has non-zero dipole moment.
2.	The dipole moment of NF_3 is greater than that of NH_3.
3.	Three canonical forms can be drawn for CO_3^{2-} ion.
4.	Three resonance structures can be drawn for ozone.

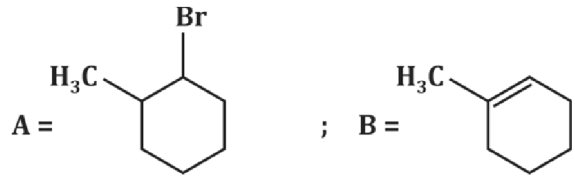
81 What are the major products A and B formed in the following reaction sequence?



1. 

2. 

3. 

4. 

82 The pair of lanthanoid ions, consisting of elements which are diamagnetic, is:

1. Ce^{3+} and Eu^{2+}
2. Gd^{3+} and Eu^{3+}
3. Pm^{3+} and Sm^{3+}
4. Ce^{4+} and Yb^{2+}

83 Given below are certain cations. Using inorganic qualitative analysis, arrange them in increasing group number from I to VI.

A. Al^{3+}

B. Cu^{2+}

C. Ba^{2+}

D. Co^{2+}

E. Mg^{2+}

Choose the correct answer from the options given below

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

84 The rate of a reaction quadruples when temperature changes from 27°C to 57°C. Calculate the energy of activation.

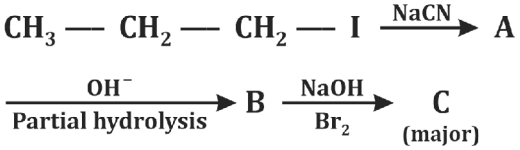
Given R = 8.314 J K^{-1} mol^{-1}, log 4 = 0.6021

1. 380.4 kJ/mol
2. 3.80 kJ/mol
3. 3804 kJ/mol
4. 38.04 kJ/mol

85 During the preparation of Mohr's salt solution (Ferrous ammonium sulphate), which of the following acid is added to prevent hydrolysis of Fe^{2+} ion?

1. Concentrated sulphuric acid
2. Dilute nitric acid
3. Dilute sulphuric acid
4. Dilute hydrochloric acid

86 Identify the major product C formed in the following reaction sequence:

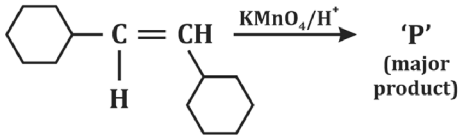


1. Butylamine
2. Butanamide
3. $\alpha-$ Bromobutanoic acid
4. Propylamine

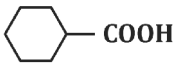
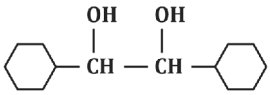
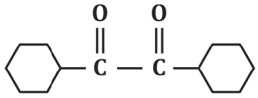
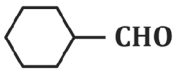
87 Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate for 100 seconds is(Given : Molar mass of Cu: $63 gmol^{-1}$ F = 96487 C)

1. 0.315 g
2. 31.5 g
3. 0.0315 g
4. 3.15 g

88 For the given reaction:



'P' is:

1.		2.	
3.		4.	

89 The plot of osmotic pressure (π) vs concentration $(molL^{-1})$ for a solution gives a straight line with slope 25.73 L bar mol^{-1}. The temperature at which osmotic pressure measurement is done is: $\left(\text{Use R} = 0.083 \text{ Lbarmol}^{-1} \text{ K}^{-1}\right)$

1.	310°C	2.	25.73°C
3.	12.05 °C	4.	37°C

90 How many interhalogens among those given below have a square pyramidal structure?

$ClF_3, IF_7, BrF_5, BrF_3, I_2Cl_6, IF_5, ClF, ClF_5$

1.	3	2.	5
3.	2	4.	4

BIOLOGY

91 Auxin is used by gardeners to prepare weed-free lawns. But no damage is caused to grass as auxin
1. promotes abscission of mature leaves only.
2. does not affect mature monocotyledonous plants.
3. can help in cell division in grasses, to produce growth.
4. promotes apical dominance

92 Lecithin, a small molecular weight organic compound found in living tissues, is an example of:
1. Phospholipids
2. Glycerides
3. Carbohydrates
4. Amino acids

93 Match List I and List II:

	List I		**List II**
A.	Two or more alternative forms of a gene	I.	Back Cross
B.	Cross of F_1 progeny with homozygous recessive parent	II.	Ploidy
C.	Cross of F_1 progeny with any of the parents	III.	Allele
D.	Number of chromosome sets in plant	IV.	Test cross

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

94 Identify the set of correct statements:

A:	The flowers of *Vallisneria* are colourful and produce nectar.
B:	The flowers of waterlily are not pollinated by water.
C:	In most of water-pollinated species, the pollen grains are protected from wetting.
D:	Pollen grains of some hydrophytes are long and ribbon like.
E:	In some hydrophytes, the pollen grains are carried passively inside water.

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

95 List of endangered species was released by:
1. WWF
2. FOAM
3. IUCN
4. GEAC

96 What is the fate of a piece of DNA carrying only gene of interest which is transferred into an alien organism?

A:	The piece of DNA would be able to multiply itself independently in the progeny cells of the organism.
B:	It may get integrated into the genome of the recipient.
C:	It may multiply and be inherited along with the host DNA.
D:	The alien piece of DNA is not an integral part of chromosome.
E:	It shows ability to replicate.

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

97 Which of the following are required for the dark reaction of photosynthesis?
A: Light
B: Chlorophyll
C: CO_2
D: ATP
E: NADPH
Choose the correct answer from the options given below:
1. **B**, **C** and **D** only
2. **C**, **D** and **E** only
3. **D** and **E** only
4. **A**, **B** and **C** only

98 The type of conservation in which the threatened species are taken out from their natural habitat and placed in special setting where they can be protected and given special care is called:
1. Biodiversity conservation
2. Semi-conservative method
3. Sustainable development
4. In-situ conservation

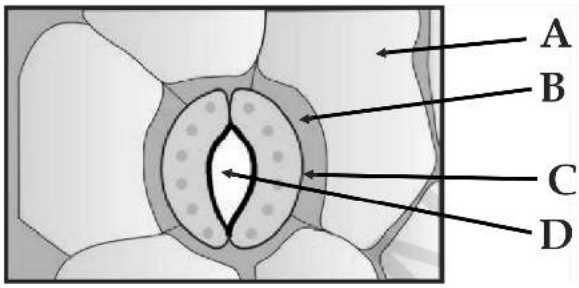
99 Given below are two statements:

Statement I:	Bt toxins are insect group specific and coded by a gene *cry* IAc.
Statement II:	Bt toxin exists as inactive protoxin in *B. thuringiensis*. However, after ingestion by the insect, the inactive protoxin gets converted into active form due to acidic pH of the insect gut.

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

100 A transcription unit in DNA is defined primarily by the three regions in DNA and these are with respect to upstream and downstream end:
1. Structural gene, Transposons, Operator gene
2. Inducer, Repressor, Structural gene
3. Promotor, Structural gene, Terminator
4. Repressor, Operator gene, Structural gene

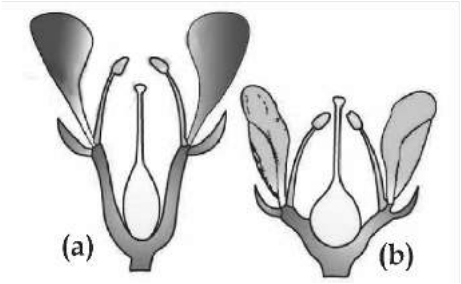
101 In the given figure, which component has thin outer walls and highly thickened inner walls?



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

102 Hind II always cuts DNA molecules at a particular point called recognition sequence and it consists of:
1. 6 bp
2. 4 bp
3. 10 bp
4. 8 bp

103 Identify the type of flowers based on the position of calyx, corolla and androecium with respect to the ovary from the given figures (a) and (b):



1. (a) Hypogynous; (b) Epigynous
2. (a) Perigynous; (b) Epigynous
3. (a) Perigynous; (b) Perigynous
4. (a) Epigynous; (b) Hypogynous

104 Which of the following is an example of actinomorphic flower?
1. *Cassia*
2. *Pisum*
3. *Sesbania*
4. *Datura*

105 Which one of the following is not a criterion for classification of fungi?
1. Mode of nutrition
2. Mode of spore formation
3. Fruiting body
4. Morphology of mycelium

106 The equation of Verhulst-Pearl logisitic growth model is

$$\frac{dN}{dt} = rN\left[\frac{K-N}{K}\right]$$

From this equation, *K* indicates:
1. Biotic potential
2. Carrying capacity
3. Population density
4. Intrinsic rate of natural increase

107 Which one of the following can be explained as the basis of Mendel's Law of dominance?

A:	Out of one pair of factors, one is dominant and the other is recessive.
B:	Alleles do not show any expression and both the characters appear as such in F_2 generation.
C:	Factors occur in pairs in normal diploid plants.
D:	The discrete unit controlling a particular character is called factor.
E:	The expression of only one of the parental characters is found in a monohybrid cross.

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

108 Match List I with List II:

	List I		**List II**
A.	*Rhizopus*	I.	Mushroom
B.	*Ustilago*	II.	Smut fungus
C.	*Puccinia*	III.	Bread mould
D.	*Agaricus*	IV.	Rust fungus

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

109 Inhibition of Succinic dehydrogenase enzyme by malonate is a classical example of:
1. Feedback inhibition
2. Competitive inhibition
3. Enzyme activation
4. Cofactor inhibition

110 Formation of interfascicular cambium from fully developed parenchyma cells is an example of
1. Redifferentiation
2. Dedifferentiation
3. Maturation
4. Differentiation

111 A pink flowered Snapdragon plant was crossed with red flowered Snapdragon plant. What type of phenotype/s is/are expected in the progeny?
1. Red flowered as well as pink flowered plants
2. Only pink flowered plants
3. Red, Pink as well as white flowered plants
4. Only red flowered plants

112 In a plant, black seed color (BB/Bb) is dominant over white seed color (bb). In order to find out the genotype of black seed plant, with which of the following genotype will you cross it?
1. bb
2. Bb
3. BB/Bb
4. BB

113 Match List I with List II

	List I		**List II**
A.	*Clostridium butylicum*	I.	Ethanol
B.	*Saccharomyces cerevisiae*	II.	Streptokinase
C.	*Trichoderma Polysporum*	III.	Butyric acid
D.	*Streptococcus sp.*	IV.	Cyclosporin-A

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

114 How many molecules of ATP and NADPH are required for every molecule of CO_2 fixed in the Calvin cycle?
1. 2 molecules of ATP and 2 molecules of NADPH
2. 3 molecules of ATP and 3 molecules of NADPH
3. 3 molecules of ATP and 2 molecules of NADPH
4. 2 molecules of ATP and 3 molecules of NADPH

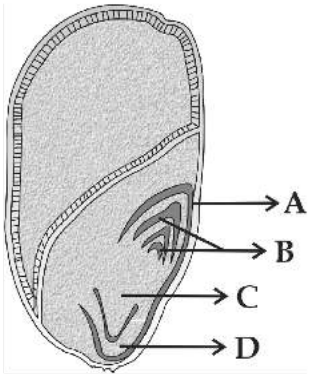
115 The capacity to generate a whole plant from any cell of the plant is called:
1. Micropropagation
2. Differentiation
3. Somatic hybridization
4. Totipotency

116 Tropical regions show greatest level of species richness because

A:	Tropical latitudes have remained relatively undisturbed for millions of years, hence more time was available for species diversification.
B:	Tropical environments are more seasonal.
C:	More solar energy is available in tropics.
D:	Constant environments promote niche specialization.
E:	Tropical environments are constant and predictable.

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

117 Identify the part of the seed from the given figure which is destined to form root when the seed germinates:



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

118 Spindle fibers attach to kinetochores of chromosomes during
1. Metaphase
2. Anaphase
3. Telophase
4. Prophase

119 Given below are two statements:

Statement I:	Chromosomes become gradually visible under light microscope during leptotene stage.
Statement II:	The begining of diplotene stage is recognized by dissolution of synaptonemal complex.

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

120 These are regarded as major causes of biodiversity loss:
A: Over exploitation
B: Co-extinction
C: Mutation
D: Habitat loss and fragmentation
E: Migration
Choose the correct option:
1. **A**, **B**, **C** and **D** only
2. **A**, **B** and **E** only
3. **A**, **B** and **D** only
4. **A**, **C** and **D** only

121 The lactose present in the growth medium of bacteria is transported to the cell by the action of:
1. Acetylase
2. Permease
3. Polymerase
4. Beta-galactosidase

122 Bulliform cells are responsible for
1. Protecting the plant from salt stress.
2. Increased photosynthesis in monocots.
3. Providing large spaces for storage of sugars.
4. Inward curling of leaves in monocots.

123 The cofactor of the enzyme carboxypeptidase is:
1. Niacin
2. Flavin
3. Haem
4. Zinc

124 Read the following statements and choose the set of correct statements:
In the members of Phaeophyceae,

A:	Asexual reproduction occurs usually by biflagellate zoospores.
B:	Sexual reproduction is by oogamous method only.
C:	Stored food is in the form of carbohydrates which is either mannitol or laminarin.
D:	The major pigments found are chlorophyll a, c and carotenoids and xanthophyll.
E:	Vegetative cells have a cellulosic wall, usually covered on the outside by gelatinous coating of algin.

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

125 Match List I with List II:

	List I		**List II**
A.	Robert May	I.	Species-Area relationship
B.	Alexander von Humboldt	II.	Long term ecosystem experiment using outdoor plots
C.	Paul Ehrlich	III.	Global species diversity is about 7 million
D.	David Tilman	IV.	Rivet Popper hypothesis

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

126 Given below are two statements:

Statement I:	In C_3 plants, some O_2 binds to RuBisCO, hence CO_2 fixation is decreased.
Statement II:	In C_4 plants, mesophyll cells show very little photorespiration while bundle sheath cells do not show photorespiration.

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

127 The DNA present in chloroplast is:
1. Circular, double stranded
2. Linear, single stranded
3. Circular, single stranded
4. Linear, double stranded

128 In an ecosystem, if the Net Primary Productivity (NPP) of first trophic level is $100x\left(\text{kcal m}^{-2}\right)\text{yr}^{-1}$, what would be the GPP (Gross Primary Productivity) of the third trophic level of the same ecosystem?
1. $x\left(\text{kcal m}^{-2}\right)yr^{-1}$
2. $10x\left(\text{kcal m}^{-2}\right)\text{yr}^{-1}$
3. $\frac{100x}{3x}\left(\text{kcal m}^{-2}\right)\text{yr}^{-1}$
4. $\frac{x}{10}\left(\text{kcal m}^{-2}\right)yr^{-1}$

129 Which of the following are fused in somatic hybridization involving two varieties of plants?
1. Somatic embryos
2. Protoplasts
3. Pollens
4. Callus

130 Match List I with List II:

	List I		**List II**
A.	Citric acid cycle	I.	Cytoplasm
B.	Glycolysis	II.	Mitochondrial matrix
C.	Electron transport system	III.	Intermembrane space of mitochondria
D.	Proton gradient	IV.	Inner mitochondrial membrane

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

131 Match List I with List II:

	List I		**List II**
A.	Frederick Griffith	I.	Genetic code
B.	Francois Jacob & Jacque Monod	II.	Semi-conservative mode of DNA replication
C.	Har Gobind Khorana	III.	Transformation
D.	Meselson Stahl	IV.	*Lac* operon

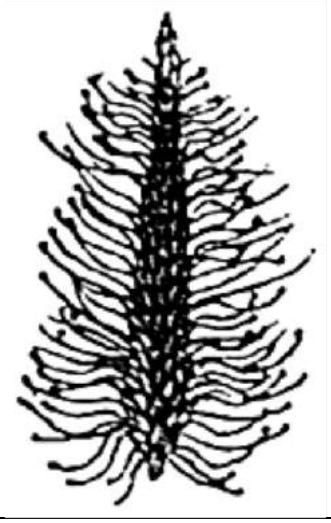
Choose the correct answer from the options given below:
1. A-III, B-IV, C-I, D-II
2. A-II, B-III, C-IV, D-I
3. A-IV, B-I, C-II, D-III
4. A-III, B-II, C-I, D-IV

132 Match List I with List II:

	List I (Types of stamens)		**List II (Example)**
A.	Monoadelphous	I.	Citrus
B.	Diadelphous	II.	Pea
C.	Polyadelphous	III.	Lily
D.	Epiphyllous	IV.	China-rose

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

133 Identify the correct description about the given figure:



1.	Water pollinated flowers showing stamens with mucilaginous covering.
2.	Cleistogamous flowers showing autogamy.
3.	Compact inflorescence showing complete autogamy.
4.	Wind pollinated plant inflorescence showing flowers with well exposed stamens.

134 Identify the step in tricarboxylic acid cycle, which does not involve oxidation of substrate?
1. Succinic acid $\rightarrow$ Malic acid
2. Succinyl-CoA $\rightarrow$ Succinic acid
3. Isocitrate $\rightarrow$ α - ketoglutaric acid
4. Malic acid $\rightarrow$ Oxaloacetic acid

135 Spraying sugarcane crop with which of the following plant growth regulators, increases the length of the stem, thus, increasing the yield?
1. Gibberellin
2. Cytokinin
3. Abscisic acid
4. Auxin

136 Match the following:

	List I		List II
A.	Rose	I.	Twisted aestivation
B.	Pea	II.	Perigynous flower
C.	Cotton	III.	Drupe
D.	Mango	IV.	Marginal placentation

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

137 Which of the following statement is correct regarding the process replication in *E. coli* ?

1.	The DNA dependent RNA polymerase catalyses polymerization in one direction, that is 5' $\rightarrow$ 3'
2.	The DNA dependent DNA polymerase catalyses polymerization in 5' $\rightarrow$ 3' as well as the 3' $\rightarrow$ 5' direction.
3.	The DNA dependent DNA polymerase catalyses polymerization in 5' $\rightarrow$ 3' direction.
4.	The DNA dependent DNA polymerase catalyses polymerization in one direction which is 3' $\rightarrow$ 5'.

138 Match List I with List II:

	List I		List II
A.	Pons	I.	Provides additional space for Neurons, regulates posture and balance
B.	Hypothalamus	II.	Controls respiration and gastric secretions
C.	Medulla	III.	Connects different regions of the brain
D.	Cerebellum	IV.	Neuro secretory cells

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

139 The " Ti plasmid " of *Agrobacterium tumefaciens* stands for
1. Tumor independent plasmid
2. Tumor inducing plasmid
3. Temperature independent plasmid
4. Tumour inhibiting plasmid

140 Match List I with List II:

	List I		List II
1.	Expiratory capacity	I.	Expiratory reserve volume + Tidal volume + Inspiratory reserve volume
2.	Functional residual capacity	II.	Tidal volume + Expiratory reserve volume
3.	Vital capacity	III.	Tidal volume + Inspiratory reserve volume
4.	Inspiratory capacity	IV.	Expiratory reserve volume + Residual volume

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

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

Assertion (A):	FSH acts upon ovarian follicles in female and Leydig cells in male.
Reason (R):	Growing ovarian follicles secrete estrogen in female while interstitial cells secrete androgen in male human being.

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

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

142 Given below are some stages of human evolution. Arrange them in the correct sequence (Past to Recent):
A. *Homo habilis*
B. *Homo sapiens*
C. *Homo neanderthalensis*
D. *Homo erectus*
Choose the correct sequence of human evolution from the options given below :
1. B-A-D-C
2. C-B-D-A
3. A-D-C-B
4. D-A-C-B

143 Match List I with List II:

	List I		**List II**
A.	Common cold	I.	*Plasmodium*
B.	Haemozoin	II.	Typhoid
C.	Widal test	III.	Rhinoviruses
D.	Allergy	IV.	Dust mites

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

144 Match List I with List II:

	List I		**List II**
A.	Axoneme	I.	Centriole
B.	Cartwheel pattern	II.	Cilia and flagella
C.	Crista	III.	Chromosome
D.	Satellite	IV.	Mitochondria

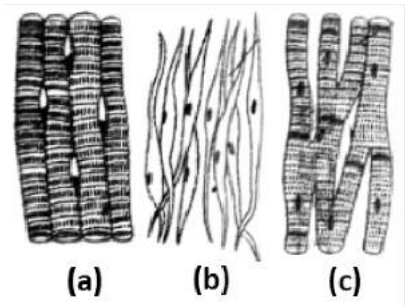
Choose the correct answer from the options given below:
1. A-IV, B-II, C-III, D-I
2. A-II ,B-IV, C-I, D-III
3. A-II, B-I, C-IV, D-III
4. A-IV,B-III, C-II, D-I

145 Match List I with List II:

	List I		**List II**
A.	Pleurobrachia	I.	Mollusca
B.	Radula	II.	Ctenophora
C.	Stomochord	III.	Osteichthyes
D.	Air bladder	IV.	Hemichordata

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

146 Three types of muscles are given as a, b and c. Identify the correct matching pair along with their location in human body:



Name of muscle/location

1.	(a) Skeletal - Triceps (b) Smooth - Stomach (c) Cardiac - Heart	2.	(a) Skeletal - Biceps (b) Involuntary - Intestine (c) Smooth - Heart
3.	(a) Involuntary - Nose tip (b) Skeletal - Bone (c) Cardiac - Heart	4.	(a) Smooth - Toes (b) Skeletal - Legs (c) Cardiac - Heart

147 Match List I with List II:

	List I (Sub Phase of Prophase I)		**List II (Specific characters)**
A.	Diakinesis	I.	Synaptonemal complex formation
B.	Pachytene	II.	Completion of terminalisation of chiasmata
C.	Zygotene	III.	Chromosomes look like thin threads
D.	Leptotene	IV.	Appearance of recombination nodules

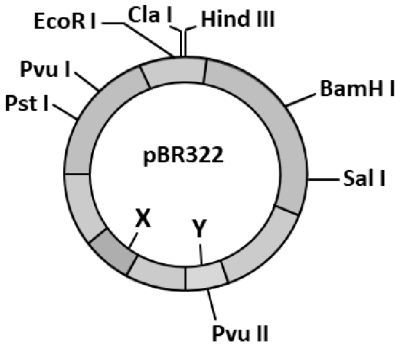
Choose the correct answer from the options given below:
1. A-I, B-II, C-IV, D-III
2. A-II, B-IV, C-I, D-III
3. A-IV, B-III, C-II, D-I
4. A-IV, B-II, C-III, D-I

148 Match List I with List II:

	List I		**List II**
A.	*Pterophyllum*	I.	Hag fish
B.	*Myxine*	II.	Saw fish
C.	*Pristis*	III.	Angel fish
D.	*Exocoetus*	IV.	Flying fish

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

149 The following diagram showing restriction sites in *E.coli* cloning vector pBR322. Find the role of '*X*' and '*Y*' genes :



1.	The gene '*X*' is responsible for controlling the copy number of the linked DNA and '*Y*' for protein involved in the replication of Plasmid.
2.	The gene '*X*' is 'for protein involved in replication of Plasmid and '*Y*' for resistance to antibiotics.
3.	Gene '*X*' is responsible for recognition sites and '*Y*' is responsible for antibiotic resistance.
4.	The gene '*X*' is responsible for resistance to antibiotics and '*Y*' for protein involved in the replication of Plasmid.

150 Given below are two statements:

Statement I:	The presence or absence of hymen is not a reliable indicator of virginity.
Statement II:	The hymen is torn during the first coitus only.

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

151 Consider the following statements:
A. Annelids are true coelomates
B. Poriferans are pseudocoelomates
C. Aschelminthes are acoelomates
D. Platyhelminthes are pseudocoelomates
Choose the correct answer from the options given below:
1. **A** only
2. **C** only
3. **D** only
4. **B** only

152 Given below are statements:

Statement I:	In the nephron, the descending limb of loop of Henle is impermeable to water and permeable to electrolytes.
Statement II:	The proximal convoluted tubule is lined by simple columnar brush border epithelium and increases the surface area for reabsorption.

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

153 Following are the stages of cell division :
A. Gap 2 phase
B. Cytokinesis
C. Synthesis phase
D. Karyokinesis
E. Gap I phase
Choose the correct sequence of stages from the options given below :
1. E-B-D-A-C
2. B-D-E-A-C
3. E-C-A-D-B
4. C-E-D-A-B

154 In both sexes of cockroach, a pair of jointed filamentous structures called anal cerci are present on:
1. 10^{th} segment
2. 8^{th} and 9^{th} segment
3. 11^{th} segment
4. 5^{th} segment

155 Match List I with List II:

	List I		**List II**
A.	Fibrous joints	I.	Adjacent vertebrae, limited movement
B.	Cartilaginous joints	II.	Humerus and Pectoral girdle, rotational movement
C.	Hinge joints	III.	Skull, don't allow any movement
D.	Ball and socket joints	IV.	Knee, help in locomotion

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

156 Which of the following is not a steroid hormone?
1. Testosterone
2. Progesterone
3. Glucagon
4. Cortisol

157 Following are the stages of pathway for conduction of an action potential through the heart:
A. AV bundle
B. Purkinje fibres
C. AV node
D. Bundle branches
E. SA node
Choose the correct sequence of pathway from the options given below :
1. A-E-C-B-D
2. B-D-E-C-A
3. E-A-D-B-C
4. E-C-A-D-B

158 Match List I with List II:

	List I		**List II**
A.	Non-medicated IUD	I.	Multiload 375
B.	Copper releasing IUD	II.	Progestogens
C.	Hormone releasing IUD	III.	Lippes loop
D.	Implants	IV.	LNG-20

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

159 Which of the following is not a natural/traditional contraceptive method?
1. Periodic abstinence
2. Lactational amenorrhea
3. Vaults
4. Coitus interruptus

160 Which one is the correct product of DNA dependent RNA polymerase to the given template?
3'TACATGGCAAATATCCATTCA5'
1. 5'AUGUAAAGUUUAUAGGUAAGU3'
2. 5'AUGUACCGUUUAUAGGGAAGU3'
3. 5'ATGTACCGTTTATAGGTAAGT3'
4. 5'AUGUACCGUUUAUAGGUAAGU3'

161 Which one of the following factors will not affect the Hardy-Weinberg equilibrium?
1. Genetic drift
2. Gene migration
3. Constant gene pool
4. Genetic recombination

162 Match List I with List II:

	List I		**List II**
A.	Cocaine	I.	Effective sedative in surgery
B.	Heroin	II.	*Cannabis sativa*
C.	Morphine	III.	*Erythroxylum*
D.	Marijuana	IV.	*Papaver somniferum*

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

163 Match List I with List II:

	List I		**List II**
A.	Typhoid	I.	Fungus
B.	Leishmaniasis	II.	Nematode
C.	Ringworm	III.	Protozoa
D.	Filariasis	IV.	Bacteria

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

164 Match List I with List II:

	List I		**List II**
A.	$\alpha - 1$ antitrypsin	I.	Cotton bollworm
B.	Cry IAb	II.	ADA deficiency
C.	Cry IAc	III.	Emphysema
D.	Enzyme replacement therapy	IV.	Corn borer

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

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

Assertion (A):	Breast-feeding during initial period of infant growth is recommended by doctors for bringing a healthy baby.
Reason (R):	Colostrum contains several antibodies absolutely essential to develop resistance in the new born baby.

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

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

166 The flippers of the Penguins and Dolphins are the example of:
1. Natural selection
2. Convergent evolution
3. Divergent evolution
4. Adaptive radiation

167 Which of the following factors are favourable for the formation of oxyhaemoglobin in alveoli?
1. High pO_2 and Lesser H^+ concentration
2. Low pCO_2 and High H^+ concentration
3. Low pCO_2 and High temperature
4. High pO_2 and High pCO_2

168 Match List I with List II:

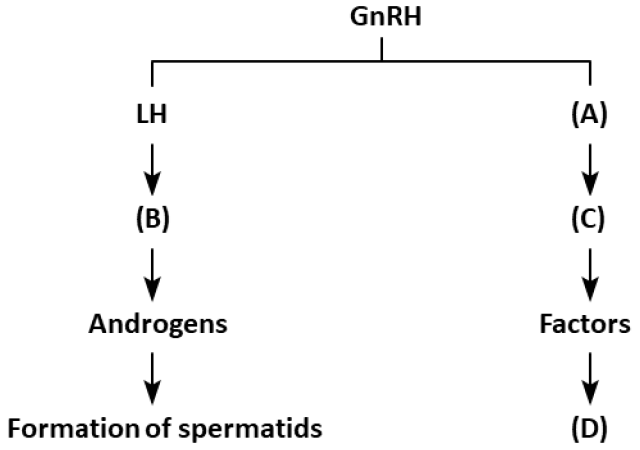
	List I		**List II**
A.	Unicellular glandular epithelium	I	Salivary glands
B.	Compound epithelium	II	Pancreas
C.	Multicellular glandular epithelium	III	Goblet cells of alimentary canal
D.	Endocrine glandular epithelium	IV	Moist surface of buccal cavity

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

169 Choose the correct statement given below regarding juxta medullary nephron.

1.	Renal corpuscle of juxta medullary nephron lies in the outer portion of the renal medulla.
2.	Loop of Henle of juxta medullary nephron runs deep into medulla.
3.	Juxta medullary nephrons outnumber the cortical nephrons.
4.	Juxta medullary nephrons are located in the columns of Bertini.

170 Identify the correct option (A), (B), (C), (D) with respect to spermatogenesis.



1. ICSH, Interstitial cells, Leydig cells, spermiogenesis.
2. FSH, Sertoli cells, Leydig cells, spermatogenesis.
3. ICSH, Leydig cells, Sertoli cells, spermatogenesis.
4. FSH, Leydig cells, Sertoli cells, spermiogenesis

171 Match List I with List II:

	List I		**List II**
A.	P wave	I.	Heart muscles are electrically silent
B.	QRS complex	II.	Depolarisation of ventricles.
C.	T wave	III.	Depolarisation of atria.
D.	T-P gap	IV.	Repolarisation of ventricles.

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

172 Given below are two statements:

Statement I:	Bone marrow is the main lymphoid organ where all blood cells, including lymphocytes, are produced.
Statement II:	Both bone marrow and thymus provide micro environments for the development and maturation of T-lymphocytes.

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

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

173 Given below are two statements:

Statement I:	Gause's competitive exclusion principle states that two closely related species competing for different resources cannot exist indefinitely.
Statement II:	According to Gause's principle, during competition, the inferior will be eliminated. This may be true if resources are limiting.

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

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

174 Match List I with List II:

	List I		**List II**
A.	Exophthalmic goiter	I.	Excess secretion of cortisol, moon face & hyperglycemia
B.	Acromegaly	II.	Hypo-secretion of thyroid hormone and stunted growth.
C.	Cushing's syndrome	III.	Hyper secretion of thyroid hormone & protruding eye balls.
D.	Cretinism	IV.	Excessive secretion of growth hormone.

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

175 Match List I with List II related to digestive system of cockroach:

	List I		List II
A.	The structures used for storing of food.	I.	Gizzard
B.	Ring of 6-8 blind tubules at junction of foregut and midgut.	II.	Gastric Caeca
C.	Ring of 100-150 yellow coloured thin filaments at junction of midgut and hindgut.	III.	Malpighian tubules
D.	The structures used for grinding the food.	IV.	Crop

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

176 As per ABO blood grouping system, the blood group of father is B^+, mother is A^+ and child is O^+. Their respective genotype can be

A.	$I^Bi/I^Ai/ii$
B.	$I^BI^B/I^AI^A/ii$
C.	$I^AI^B/iI^A/I^Bi$
D.	$I^Ai/I^Bi/I^Ai$
E.	$iI^B/iI^A/I^AI^B$

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

177 Match List I with List II:

	List I		List II
A.	Mesozoic Era	I.	Lower invertebrates
B.	Proterozoic Era	II.	Fish & Amphibia
C.	Cenozoic Era	III.	Birds & Reptiles
D.	Paleozoic Era	IV.	Mammals

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

178 Given below are two statements:

Statement I:	The cerebral hemispheres are connected by nerve tract known as corpus callosum.
Statement II:	The brain stem consists of the medulla oblongata, pons and cerebrum.

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

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

179 Regarding catalytic cycle of an enzyme action, select the correct sequential steps:

A.	Substrate enzyme complex formation.
B.	Free enzyme ready to bind with another substrate.
C.	Release of products.
D.	Chemical bonds of the substrate broken.
E.	Substrate binding to active site.

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

180 Given below are two statements:

Statement I:	Mitochondria and chloroplasts are both double membrane bound organelles.
Statement II:	Inner membrane of mitochondria is relatively less permeable, as compared to chloroplast.

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

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