

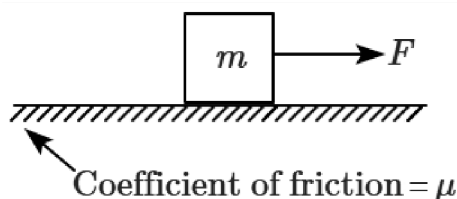
PHYSICS - SECTION A

1 Given below are two statements:

Statement I:	If two projectiles are projected in different directions, their relative velocity remains constant while they are both in the air.
Statement II:	Both projectiles fall freely under gravity and they have the same acceleration.

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

2 A horizontal force F is applied to a block of mass m resting on a plane, where the coefficient of friction is μ . As the value of F is slowly increased, the force of friction:



1.	is constant and equals μmg .
2.	is greater than F until F reaches μmg .
3.	is less than F , until F equals μmg .
4.	is equal to F , until F equals μmg .

3 If the unit of length is the distance between the earth and the sun, and the unit of time is 1 year, then the speed of the earth around the sun is numerically equal to:

1.	1	2.	2
3.	2π	4.	$\frac{1}{2\pi}$

4 Raindrops are falling vertically downward at a constant speed of 4 m/s. A man running forward at 4 m/s observes the raindrops falling with a velocity of:

1.	8 m/s	2.	0 m/s
3.	$4\sqrt{2}$ m/s	4.	$\frac{4}{\sqrt{2}}$ m/s

5 A ball, thrown vertically upward, is observed to move upward with a speed v_1 at time t_1 and a speed v_2 , downward, at time t_2 .

The acceleration of the ball is (downward):

- $\frac{v_2 - v_1}{t_2 - t_1}$
- $\frac{v_2 + v_1}{t_2 - t_1}$
- $\frac{v_2 - v_1}{t_2 + t_1}$
- $\frac{v_2 + v_1}{t_2 + t_1}$

6 When a gun is fired, it recoils a bit as the bullet leaves with a speed of 300 m/s. If a gunman fires a bullet from the gun, which is 100 times as massive as the bullet what is the recoil speed of the gun?

- 0.3 m/s
- 3 m/s
- 30 m/s
- 300 m/s

7 During uniformly accelerated motion in a straight line, which of the following can be negative or positive?

- distance travelled
- time travelled
- average velocity
- average speed

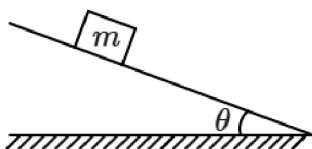
8 The angle between the force $F = 6\hat{i} + 2\hat{j}$ and the displacement $d = 2\hat{i} + 6\hat{j}$ is:

- $\sin^{-1}(0.3)$
- $\sin^{-1}(0.6)$
- $\cos^{-1}(0.3)$
- $\cos^{-1}(0.6)$

9 When a particle of mass m moves uniformly, with a speed v , in a circle of radius R ,

1.	no net force acts on the particle
2.	a centripetal force $\frac{mv^2}{R}$ must be acting on the particle
3.	a centrifugal force $\frac{mv^2}{R}$ must act on the particle
4.	no force is acting on the particle

- 10** A block of mass m is placed on an incline, where the coefficient of friction is μ . The block is observed to be at rest. The force of friction on the block equals:



1.	$mg \cos \theta$	2.	$mg \sin \theta$
3.	$\mu mg \cos \theta$	4.	$\mu mg \sin \theta$

- 11** If a ball is thrown at an angle of 60° with the upward vertical, with a speed of 20 m/s, it reaches its maximum altitude in: (Take $g = 10 \text{ m/s}^2$.)

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

- 12** A boy standing on a moving train throws a ball vertically upward. The train moves horizontally with a constant velocity. The path taken by the ball, as observed from the ground, is:

1.	a straight line	2.	a parabola
3.	a circular arc	4.	a hyperbola

- 13** The force of kinetic friction (F_k) and that of static friction (F_s) are related by: (μ_s : coefficient of static friction)

1.	$F_k = \mu_s F_s$	2.	$F_k \leq F_s$
3.	$F_k \geq F_s$	4.	$F_k = F_s$

- 14** The acceleration of a projectile, in the direction of its motion:

1.	is always positive
2.	is always negative
3.	maybe positive, negative or zero
4.	is always non-zero

- 15** Given below are two statements:

Assertion (A):	A block near the surface of the earth, is pulled down by its weight (W); the block, pulls the earth upward by exerting an equal force.
Reason (R):	This is a consequence of Newton's law of action and reaction.

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

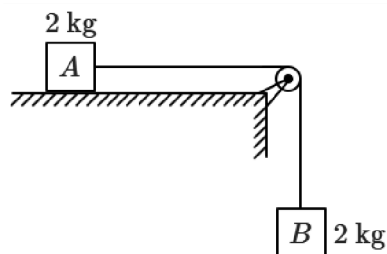
- 16** Which, of the following quantities, is a fundamental quantity?

1.	Electric charge	2.	Magnetic field
3.	Temperature	4.	Thermal energy

- 17** Two particles move uniformly along the periphery of a circle, one completing a revolution in 1 s while the other does it in 3 s. If they start from the same point and move in opposite directions, they will meet, for the first time, in:

1.	less than 1 s	2.	2 s
3.	3 s	4.	more than 3 s

- 18** The 2 kg block (A) lies on a smooth horizontal table and is connected by a light string passing over a smooth light pulley. The string is connected to a second 2 kg block (B). The system is released from rest. Take $g = 10 \text{ m/s}^2$.



The tension in the connecting string is:

1.	zero
2.	20 N
3.	less than 20 N (non-zero)
4.	greater than 20 N

19 A boy throws two balls A, B from the window of a tall multi-storeyed building. Ball A is dropped from rest, while ball B is given an initial horizontal speed of 30 m/s . The position of the boy is at a level of 80 m above the ground, and the balls are thrown simultaneously. Ignore air resistance, and take $g = 10 \text{ m/s}^2$.

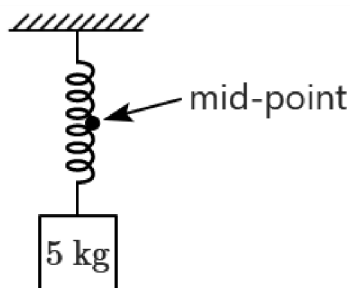
Ball A reaches the ground in:

1. 8 s
2. 4 s
3. 2 s
4. $\sqrt{8} \text{ s}$

20 A particle moves uniformly in a circle of radius R with a speed v . The average acceleration of the particle in one complete revolution is:

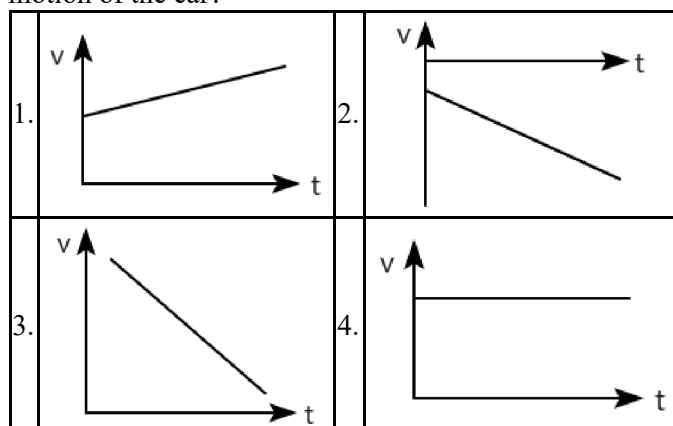
1.	$\frac{v^2}{R}$	2.	$\frac{v^2}{2R}$
3.	$\frac{v^2}{\pi R}$	4.	zero

21 A mass of 5 kg is suspended from a light spring which is attached to the ceiling. The tension at the mid-point of the spring is: (take $g = 10 \text{ m/s}^2$)



1.	25 N	2.	50 N
3.	0 N	4.	greater than 100 N

22 A car moving in a positive x -direction with uniform positive acceleration. Which one of the following velocity-time graphs correctly represents the motion of the car?



23 A boy throws two balls A, B from the window of a tall multi-storeyed building. Ball A is dropped from rest, while ball B is given an initial horizontal speed of 30 m/s . The position of the boy is at a level of 80 m above the ground, and the balls are thrown simultaneously. Ignore air resistance, and take $g = 10 \text{ m/s}^2$.

The separation between the points of impact, of the balls on the ground, is:

1.	less than 50 m
2.	between 50 m and 100 m
3.	between 100 m and 150 m
4.	more than 150 m

24 If two trains are moving in opposite directions and they have a relative velocity of 100 km/h , their individual velocities cannot be:

1.	less than 50 km/h
2.	greater than 50 km/h
3.	less than 100 km/h
4.	greater than 100 km/h

25 A ball, thrown vertically upward, is observed to move upward with a speed v_1 at time t_1 and a speed v_2 , downward, at time t_2 .

The average velocity of the ball during the motion is (downward):

1.	$\frac{v_2 - v_1}{2}$	2.	$\frac{v_2 + v_1}{2}$
3.	$v_2 - v_1$	4.	$v_2 + v_1$

26 Which, of the following quantities, is dimensionally independent of mass?

1. $\frac{\text{Energy}}{\text{Time}}$
2. $\frac{\text{Energy}}{\text{Momentum}}$
3. $\text{Force} \times \text{Time}$
4. $\text{Pressure} \times \text{Time}$

27 Match the following:

Physical Quantity	Dimension	Unit
(A) Gravitational constant G	(P) $[M^1 L^1 T^{-1}]$	(i) N.m
(B) Torque	(Q) $[M^{-1} L^3 T^{-2}]$	(ii) N.s
(C) Momentum	(R) $[M^1 L^{-1} T^{-2}]$	(iii) Nm^2/kg^2
(D) Pressure	(S) $[M^1 L^2 T^{-2}]$	(iv) Pascal

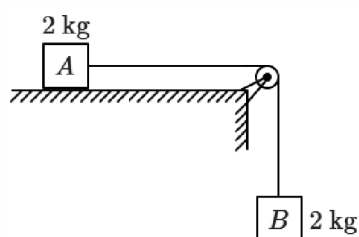
Codes:

	A	B	C	D
1.	Q, iii	S, i	P, ii	R, iv
2.	Q, i	S, iii	P, ii	R, iv
3.	Q, iii	S, i	P, iv	R, ii
4.	Q, iii	S, ii	P, i	R, iv

28 A gun is fired horizontally with its shell travelling at a velocity of 100 m/s, initially. It impacts the ground after 10 s. Assume that there is no air resistance and take $g = 10 \text{ m/s}^2$. The velocity of impact is:

1.	0 m/s	2.	200 m/s
3.	150 m/s	4.	$100\sqrt{2} \text{ m/s}$

29 The 2 kg block (A) lies on a smooth horizontal table and is connected by a light string passing over a smooth light pulley. The string is connected to a second 2 kg block (B). The system is released from rest. Take $g = 10 \text{ m/s}^2$.



The acceleration of block A is:

1.	10 m/s^2	2.	5 m/s^2
3.	15 m/s^2	4.	zero

30 A projectile is thrown at an angle of 60° with the horizontal, with a speed of 20 m/s. The horizontal component of its velocity:

1.	increases with time
2.	decreases with time
3.	first increases and then decreases
4.	remains constant

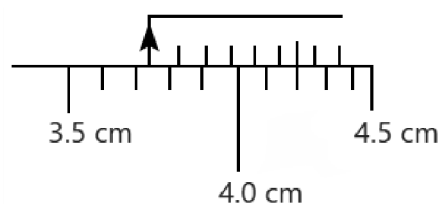
31 Surface tension is the force per unit length, acting on a line which is attached to the free surface of a liquid. The dimensions of surface tension are:

- $[ML^2T^{-2}]$
- $[ML^{-2}T^{-2}]$
- $[M^{-1}L^{-1}T^{-1}]$
- $[MT^{-2}]$

32 A girl of mass 45 kg stands on a weighing machine (A) which is placed on top of a second weighing machine (B). The weighing machines, each weigh 5 kg. Assume that the readings of the weighing machines can be seen easily. The readings on A and B are: (take $g = 10 \text{ m/s}^2$, if required)

1.	45 kg, 50 kg	2.	50 kg, 55 kg
3.	47.5 kg, 52.5 kg	4.	45 kg, 45 kg

33 The diagram shows part of vernier scale on a pair of calipers. Which reading is correct? (Least count is 0.1 mm.)

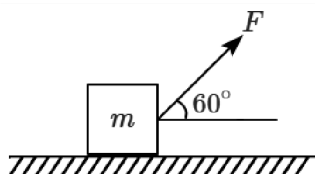


1.	3.7 cm	2.	3.72 cm
3.	3.64 cm	4.	3.76 cm

34 A particle moves along a straight line starting from rest at the origin and accelerates uniformly to reach a speed v in time T . The distance covered by it in time T is:

- $\frac{1}{2}vT$
- vT
- $\frac{3}{2}vT$
- $2vT$

- 35** A force F is acting at an angle of 60° , on a block of mass m resting on a smooth horizontal plane. If $F = mg$, then the acceleration of the block will be: (g is the acceleration due to gravity)



1.	g , at 60° above the horizontal
2.	g , at 60° below the horizontal
3.	$\frac{g}{2}$ along the horizontal
4.	$\frac{\sqrt{3}g}{2}$ along the horizontal

PHYSICS - SECTION B

- 36** A block moving horizontally on a smooth surface with a speed of 80 m/s splits into two equal parts. If one of parts moves at 60 m/s in the same direction, then the fractional change in the kinetic energy of the system will be equal to:

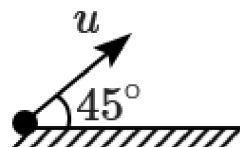
- 16
- 8
- $\frac{1}{8}$
- $\frac{1}{16}$

- 37** The toy car, after attaining a maximum speed, skids to a stop on a rough section of the surface. Which of the following quantities must be measured in order to calculate the length of this skid?

I.	The mass of the car
II.	The coefficient of kinetic friction between the road and the wheels
III.	The initial speed of the car

1.	I and II only
2.	I and III only
3.	II and III only
4.	I, II, and III

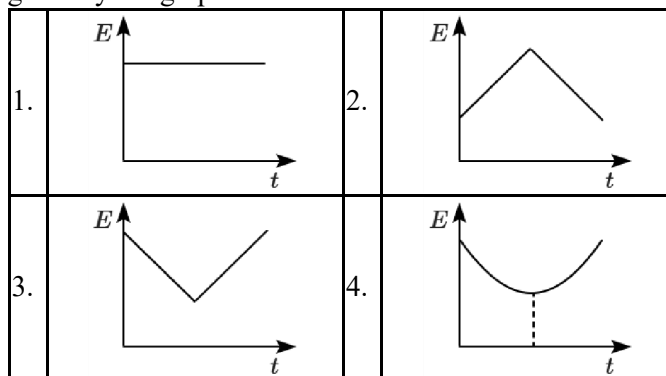
- 38** A particle of mass m is projected with a speed u at an angle of 45° with the horizontal. When it reaches its maximum height, let its gravitational potential energy be U and its kinetic energy be K .



Then:

1. $K = U$
2. $K = 0, U \neq 0$
3. $K > U > 0$
4. $U > K > 0$

- 39** A particle is projected at an angle of 45° with the horizontal. Its kinetic energy E , as a function of time, is given by the graph:



- 40** The potential energy of a long spring when stretched by 2 cm is U . If the spring is stretched by 8 cm, potential energy stored in it will be:

1.	$16U$	2.	$2U$
3.	$4U$	4.	$8U$

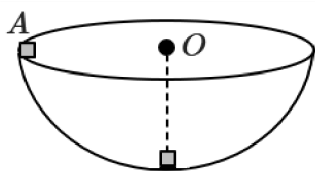
- 41** A ball is thrown vertically upward with a kinetic energy K . It reaches a maximum height H . When it is at half the maximum height (i.e. at $\frac{H}{2}$) its kinetic energy is:

1. K
2. $\frac{K}{2}$
3. $\frac{K}{4}$
4. $\frac{K}{8}$

42 A block slides down a smooth incline, starting from rest. The power due to the force of gravity acting on the block

- | | |
|----|--|
| 1. | increases with time |
| 2. | decreases with time |
| 3. | first increases with time and then becomes a maximum |
| 4. | first increases with time and then decreases |

43 A particle of mass m slides down a fixed smooth hemi-spherical bowl, starting from its rim. The normal reaction on the block when it reaches the lowest point is N . Then:



- | | | | |
|----|-----------|----|-----------|
| 1. | $N = mg$ | 2. | $N = 2mg$ |
| 3. | $N = 3mg$ | 4. | $N = 5mg$ |

44 When a man climbs up a ladder, positive work is done on the man by:

- | | |
|----|--|
| 1. | his weight. |
| 2. | the normal reaction of the ladder on the man. |
| 3. | the reaction forces of the ground on the ladder. |
| 4. | the internal forces of the man. |

45 Given below are two statements:

Statement I:	Work done by all forces on a body equals the change in its kinetic energy.
Statement II:	Work done by non-conservative forces does not change the kinetic energy of a system.

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

46 A block of mass m slides down an incline, through a height H . The angle of the incline is θ . The coefficient of friction is 0.5. The change in potential energy of the block is:

- | | |
|----|--|
| 1. | mgH |
| 2. | $\frac{mgH}{2}$ |
| 3. | less than $\frac{mgH}{2}$ |
| 4. | greater than $\frac{mgH}{2}$ but less than mgH |

47 The potential energy of a particle of mass m in a conservative force field can be expressed as $U = \alpha x - \beta y$ where (x, y) denote the position coordinates of the body. The acceleration of the body is:

- | | |
|----|---------------------------------------|
| 1. | $\frac{\alpha - \beta}{m}$ |
| 2. | $\frac{\alpha + \beta}{m}$ |
| 3. | $\frac{\sqrt{\alpha^2 - \beta^2}}{m}$ |
| 4. | $\frac{\sqrt{\alpha^2 + \beta^2}}{m}$ |

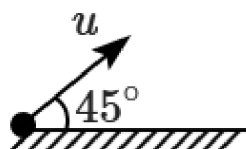
48 The work done by gravity, on a block of mass 10 kg which is raised upward by a rope through a height of 2 m (take $g = 10 \text{ m/s}^2$),

- | | |
|----|-------------------------------------|
| 1. | equals 200 J |
| 2. | equals -200 J |
| 3. | is less than 200 J, but positive |
| 4. | is greater than 200 J, but positive |

49 A 20 kg block is pulled on a smooth horizontal plane by a constant force, which gives it an acceleration of 1 m/s^2 . The block starts from rest. The power developed by the force after 10 s is:

- | | | | |
|----|--------|----|-------|
| 1. | 20 W | 2. | 200 W |
| 3. | 2000 W | 4. | 2 W |

- 50** A particle of mass m is projected with a speed u at an angle of 45° with the horizontal. When it reaches its maximum height, let its gravitational potential energy be U and its kinetic energy be K .



The gravitational potential energy, when it is at half its maximum elevation, is:

1. $\frac{K}{2}$
2. $\frac{K}{4}$
3. $2K$
4. $4K$

CHEMISTRY - SECTION A

- 51** The ratio of radii of 2nd & 3rd Bohr's orbit of H-atom is:

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

- 52** A 100- watt bulb emits monochromatic light of wavelength 400 nm. The number of photons emitted per second by the bulb are:

1. $3 \times 10^{20} \text{ s}^{-1}$
2. $2 \times 10^{-20} \text{ s}^{-1}$
3. $2 \times 10^{20} \text{ s}^{-1}$
4. $1 \times 10^{-20} \text{ s}^{-1}$

53

Statement-I:	The wave function is a mathematical function whose value depends upon the coordinates of the electron in the atom and does not carry any physical meaning.
Statement-II:	The ionization potential of He atom is greater than that of He^+ ion.

1. Both statements are correct.
2. Both statements are incorrect.
3. Statement -I is correct and statement -II is incorrect.
4. Statement -II is correct and statement-I is incorrect.

- 54** When 2 g of magnesium reacts with an excess of HCl, then H_2 gas and MgCl_2 are produced.

The volume of H_2 gas produced is $X \times 10^{-2}$ litres at STP.

The value of X is: (Nearest Integer)

1.	195	2.	186
3.	182	4.	179

- 55** The mass of a 2.5 mL solution (the density of the solution is 2.15 g/mL) in the correct significant figures is:

1. $5375 \times 10^{-3} \text{ g}$
2. 5.4 g
3. 5.38 g
4. 53.75 g

- 56** The hybridization of XeF_4 , SF_4 and BrCl_3 , respectively, among the following is:

1. sp^3 , sp^3 , sp^3
2. dsp^2 , sp^3 , sp^3
3. sp^3d^2 , sp^3d , sp^3d
4. d^2sp^2 , sp^3d , sp^3d

- 57** Match the prefixes present in column I with their multiples in column II and mark the appropriate choice:

	Column I (Prefixes)		Column II (Multiples)
(A)	pico	(i)	10^9
(B)	femto	(ii)	10^{-3}
(C)	milli	(iii)	10^{-12}
(D)	giga	(iv)	10^{-15}

1. (A) \rightarrow (i), (B) \rightarrow (ii), (C) \rightarrow (iii), (D) \rightarrow (iv)
2. (A) \rightarrow (ii), (B) \rightarrow (i), (C) \rightarrow (iv), (D) \rightarrow (iii)
3. (A) \rightarrow (iv), (B) \rightarrow (iii), (C) \rightarrow (i), (D) \rightarrow (ii)
4. (A) \rightarrow (iii), (B) \rightarrow (iv), (C) \rightarrow (ii), (D) \rightarrow (i)

- 58** A closed container has a mixture of 48 g of sodium hydroxide, 52 g of water, and 132 g of ammonium sulphate. The number of moles of oxygen atoms present in the container is:

1. 5
2. 7
3. 8
4. 10

59 A solution was prepared by adding 125 cm^3 of isopropyl alcohol to water until the volume of the solution was 175 cm^3 .

The volume percent of isopropyl alcohol in the solution is:

1.	80.2 %	2.	71.4 %
3.	78.3 %	4.	84.5 %

60

Assertion (A):	Mole fraction is a unitless quantity.
Reason (R):	Mole fraction is the ratio of the number of moles of a particular component to the total number of moles of the solution.

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

61 The element 'Re' belongs to which group and period, respectively?

1. 7 and 6
2. 7 and 7
3. 6 and 7
4. 6 and 6

62 Correct set of quantum numbers for the last electron of Ga is:

1. 3, 1, +1, $+\frac{1}{2}$
2. 4, 0, +1, $+\frac{1}{2}$
3. 4, 1, -2, $-\frac{1}{2}$
4. 4, 1, -1, $+\frac{1}{2}$

63 The incorrect statement among the following is:

1. All alkali metals are silvery white.
2. The density of potassium is less than that of sodium.
3. Compounds of group-1 elements are diamagnetic.
4. The melting point of group-1 elements increases down the group.

64 A gaseous mixture contains $\text{CO}_2(\text{g})$ and $\text{N}_2\text{O}(\text{g})$ in 2 : 5 ratio by mass. The ratio of the number of molecules of $\text{CO}_2(\text{g})$ and $\text{N}_2\text{O}(\text{g})$ is:

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

65 Which of the following compounds has the same empirical formula as that of glucose?

1. CH_3CHO
2. CH_3COOH
3. CH_3OH
4. C_2H_6

66 The energy associated with the second orbit of He^+ ion is

1. $-4.36 \times 10^{-14} \text{ J}$
2. $-3.18 \times 10^{-14} \text{ J}$
3. $-2.18 \times 10^{-18} \text{ J}$
4. $-8.72 \times 10^{-18} \text{ J}$

67 The total number of electrons present in 120 g of CO_3^{-2} ion is:

1. $64 N_A$
2. $32 N_A$
3. $16 N_A$
4. $8 N_A$

68 Beryllium has higher ionization enthalpy than boron. This can be explained as

1.	beryllium has a higher size than boron, hence its ionization enthalpy is higher
2.	penetration of 2p-electrons to the nucleus is more than the 2s electrons
3.	it is easier to remove electrons from 2p-orbital as compared to 2s-orbital due to more penetration of s electron
4.	ionization energy increases in a period

69

Assertion (A):	Oxygen has less negative electron gain enthalpy than sulphur.
Reason (R):	The electronegativity of oxygen is higher than that of sulphur.

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

70 A pair that has both isoelectronic and isotopic;
(Atomic numbers: Ca=20, Ar=18, K=19, Mg=12, Fe=26, Na=11)

1. $^{40}\text{Ca}^{2+}$ and ^{40}Ar
2. $^{39}\text{K}^{+}$ and $^{40}\text{K}^{+}$
3. $^{24}\text{Mg}^{2+}$ and ^{25}Mg
4. ^{23}Na and $^{24}\text{Na}^{+}$

71 Millikan's Oil drop Method was used to determine:

1. Neutron
2. Alpha particle
3. Positron
4. Charge on the electrons

72 Which of the following has the maximum mass?

1. 0.1 gram molecule of oxygen.
2. 10 ml H_2O at STP
3. 3.01×10^{22} molecules of H_2SO_4
4. 1 gram atom of hydrogen.

73 The mass ratio of ethylene glycol (62 g/mol) required to make (500 ml, 0.25 M) and (250 ml, 0.25 M) solutions is:

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

74

Statement I:	1 amu is defined as the mass exactly equal to one-twelfth of the mass of one carbon-12 atom.
Statement II:	Number of atoms in 8 u of He is $2N_A$.

In the light of above statements, choose the correct option from the following :

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

75 A compound contains 17.28 % nitrogen, and its molecular mass is 162. The number of nitrogen atoms present in one molecule of the alkaloid are:

1. Five
2. Four
3. Three
4. Two

76 The correct statement among the following is:

1. The number of orbitals in n^{th} shell is n^2 .
2. The number of orbitals in a subshell is $(2l - 1)$.
3. The number of subshells in n^{th} shell is $(n + l)$.
4. The number of electrons in a shell is $2(2l + 1)$.

77

Statement I:	Elements like He, Ne, and nitrogen show positive electron gain enthalpies.
Statement II:	The formation of Cl^- from Cl and O^{2-} from O^- are exothermic processes.

1. Statement I is correct; Statement II is incorrect.
2. Statement I is correct; Statement II is correct.
3. Statement I is incorrect; Statement II is incorrect.
4. Statement I is incorrect; Statement II is correct.

78

	Column-I		Column-II (Ionic Size)
(p)	Mg^{2+}	(I)	1.19 Å
(Q)	O^{2-}	(II)	0.72 Å
(R)	Na^{+}	(III)	1.16 Å
(S)	F^{-}	(IV)	1.26 Å

Identify the option capturing the correct match of information given in Column I and Column II above:

	P	Q	R	S
1.	III	I	II	IV
2.	II	IV	I	III
3.	II	IV	III	I
4.	IV	II	III	I

79 The ion, from the ions given below, that has the same electron configuration as the noble gas argon is:

1. Na^{+}
2. P^{2-}
3. Al^{3+}
4. Cl^{-}

80 Identify the pair of elements with similar electronegativity from the options given below:

1. B and C
2. B and Al
3. B and Si
4. Al and C

81

Statement I:	According to Bohr's model, angular momentum is quantized for stationary orbits.
Statement II:	Bohr's Model doesn't follow Heisenberg's uncertainty principle.

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

82 The incorrect statement about spectra is:

1. Atomic spectra can be used in chemical analysis to identify unknown atoms.
2. Each element in the gaseous state has a unique line spectrum.
3. The number of lines in the spectrum is the same as the number of electrons in the atom.
4. The splitting of spectral lines in the presence of an electric field is known as the Stark effect.

83 Consider the following statements:

I:	The radius of an anion is larger than that of the parent atom.
II:	The electronegativity of any given element is a constant, and it is a measurable quantity.
III:	The electronegativity of an element is the tendency of an isolated atom to attract an electron.

Which of the above statements is/are correct?

1. Only I
2. Only II
3. Only I and III
4. Only II and III

84

	List-I		List-II
A.	XeF_4	(P)	T-shape
B.	SF_4	(Q)	See-saw
C.	NH_4^+	(R)	Square planar
D.	BrF_3	(S)	Tetrahedral

Match the species given in List I above with the geometries given in List II and identify the correct option from the following:

1. $A \rightarrow P, B \rightarrow Q, C \rightarrow R, D \rightarrow S$
2. $A \rightarrow R, B \rightarrow Q, C \rightarrow S, D \rightarrow P$
3. $A \rightarrow Q, B \rightarrow P, C \rightarrow S, D \rightarrow R$
4. $A \rightarrow S, B \rightarrow R, C \rightarrow P, D \rightarrow Q$

85 The number of moles of hydrogen gas liberated when 39 g of potassium reacts with 7.8 g of water is:

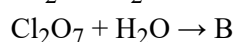
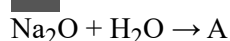
1. 0.22 mol
2. 0.43 mol
3. 0.50 mol
4. 1.0 mol

CHEMISTRY - SECTION B

86 Which of the following is not true about resonance?

1.	The resonating structures are hypothetical.
2.	The unpaired electrons in various resonating structures are the same.
3.	The energy of the resonance hybrid is less than the energy of any single canonical structure.
4.	In resonance, both π electrons and σ electrons can move.

87 Consider the following reaction.



The product A and B are respectively-

1. A is NaOH; and B is HOCl
2. A is NaH; and B is HOCl
3. A is NaH; and B is $HClO_2$
4. A is NaOH; and B is $HClO_4$

88 The correct order for capturing polarity among the following is:

1. $NH_3 < H_2O < HF < H_2S$
2. $H_2S < NH_3 < H_2O < HF$
3. $H_2O < NH_3 < H_2S < HF$
4. $HF < H_2O < NH_3 < H_2S$

89 Which of the following is not isoelectronic with H_2S ?

1.	F_2 gas	2.	Oxide ion
3.	Ca^{+2}	4.	Sc^{+3}

90 T-shaped molecule among the following is:

1. SF_4
2. NH_3
3. BrCl_3
4. FO_3^-

91 In which of the following processes does the value of the magnetic moment not change?

1. $\text{N}_2 \rightarrow \text{N}_2^-$
2. $\text{N}_2 \rightarrow \text{N}_2^+$
3. $\text{O}_2 \rightarrow \text{O}_2^{2-}$
4. $\text{O}_2^+ \rightarrow \text{O}_2^-$

92

Statement I:	The π^* antibonding MO has a node between the nuclei.
Statement II:	Antibonding MO is more stable than bonding MO.

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

93 Match List I with List II:

List I	List II
A. H_2O	(I) 107.8°
B. NH_3	(II) 93.6°
C. CH_4	(III) 104°
D. PH_3	(IV) 109.5°

Choose the correct answer from the options given below:

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

94 The set of molecules having zero dipole moment is:

1. NF_3 , CO_2 , CCl_4
2. BF_3 , H_2S , CCl_4
3. BF_3 , CO_2 , CCl_4
4. BF_3 , CO_2 , CHCl_3

95 Match column I with column II:

Column-I (Compounds)	Column-II (number of lone pairs of a central atom)
A. IF_7	P. 0
B. ICl_4^-	Q. 1
C. XeF_2	R. 2
D. XeF_6	S. 3

Choose the correct answer from the options given below:

1. A - P, B - Q, C - R, D - S
2. A - P, B - R, C - S, D - Q
3. A - R, B - S, C - P, D - Q
4. A - S, B - R, C - Q, D - P

96

Assertion (A):	SeCl_4 does not have a tetrahedral structure.
Reason (R):	Se has two lone pairs in SeCl_4 .

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

97 The most volatile halogen acid is:

1. HF
2. HCl
3. HBr
4. HI

98 All of the following can form hydrogen bonds with water EXCEPT:

1. Aldehydes
2. Carboxylic acids
3. Ethers
4. Alkenes

99 Which of the following pairs is expected to have the same bond order?

1. O_2^- , N_2^-
2. O_2^- , N_2^+
3. O_2^+ , N_2^-
4. O_2 , N_2

100 The incorrect statement among the following is:

1. Ionic bonds are non-directional, while covalent bonds are directional.
2. The formation of π - bond shortens the distance between the two concerned atoms.
3. An ionic bond is possible between similar and dissimilar atoms.
4. Linear overlapping of atomic p-orbitals leads to a sigma bond.

BIOLOGY I - SECTION A

101 In case of plants, classes with a few similar characters are assigned to a higher category ideally called:

1. Phylum
2. Division
3. Subphylum
4. Infra Class

102 Consider the given two statements:

Assertion:	Equal weightage to vegetative and sexual characteristics in the artificial systems is not acceptable.
Reason:	The sexual characters are more easily affected by environment.

1.	Both Assertion and Reason are true and Reason explains Assertion
2.	Both Assertion and Reason are true and Reason does not explain Assertion
3.	Assertion is true but Reason is false
4.	Assertion is false but Reason is true

103 The correct chronological steps [earliest to last] in the sexual cycle of fungi are:

1.	Plasmogamy – Karyogamy – Mitosis in zygote resulting in diploid spores
2.	Plasmogamy – Karyogamy – Meiosis in zygote resulting in haploid spores
3.	Karyogamy – Plasmogamy – Mitosis in zygote resulting in diploid spores
4.	Karyogamy – Plasmogamy – Meiosis in zygote resulting in haploid spores

104 Mycorrhiza is:

1.	a fungus that lives on dead or decaying organic matter.
2.	a fungus that parasitizes on an animal body.
3.	is a symbiotic association between a fungus and a plant.
4.	is a symbiotic association between a fungus and a cyanobacterium

105 Consider the given two statements:

Statement I:	Taxonomists have been able to identify a vast majority of species present on Earth.
Statement II:	The number of species that are known and described range between 1.7-1.8 million.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

106 Consider the given two statements:

Statement I:	The algal component in lichen is known as phycobiont and fungal component as mycobiont, which are autotrophic and heterotrophic, respectively.
Statement II:	Lichens are very good pollution indicators – they grow profusely in polluted areas.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

107 The Mycoplasma:

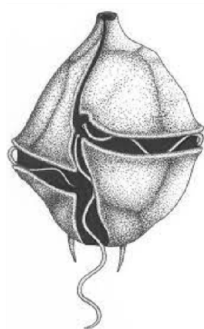
I:	are organisms that completely lack a cell wall.
II:	are the smallest living cells known and can survive without oxygen.

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

108 Which of the following fungus does not belong to the Class Ascomycetes?

1. *Rhizopus*
2. *Aspergillus*
3. *Neurospora*
4. *Claviceps*

109 The organism shown in the given figure is a/an:



1. Archaeobacterium	2. Chrysophyte
3. Dinoflagellate	4. Blue green laga

110 In taxonomy:

I:	Nomenclature is critical as it allows a particular organism to be known by the same name all over the world.
II:	Identification is critical as nomenclature or naming is only possible when the organism is described correctly and we know to what organism the name is attached to.

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

111 How many of the given pairs are correctly matched for Basidiomycetes?

A.	Basidium	Bears spores
B.	Basidiospores	Asexual Spores
C.	Basidiocarp	Fruiting body

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

112 Identify the incorrect statement regarding members of phycomycetes:

1.	They are found in aquatic habitats and on decaying wood in moist and damp places or as obligate parasites on plants.
2.	The mycelium is septate and coenocytic.
3.	Asexual reproduction takes place by zoospores (motile) or by aplanospores (non-motile).
4.	A zygospore is formed by fusion of two gametes.

113 Consider the given two statements regarding viroids:

I:	Viroids were discovered by Thomas Cech in 1998.
II:	The RNA of the viroid is of a very high molecular weight.

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

114 All the following spores are used in asexual reproduction by fungi except:

1. conidia
2. sporangiospores
3. ascospores
4. zoospores

115 How many of the given statements regarding viruses are correct?

I:	No virus contains both RNA and DNA.
II:	A virus is a nucleoprotein and the genetic material is infectious.
III:	In general, viruses that infect plants have single stranded RNA.
IV:	Bacterial viruses or bacteriophages (viruses that infect the bacteria) are usually double stranded DNA viruses.

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

116 Regarding the structural organisation of fungi:

I:	Their bodies consist of long, slender thread-like structures called hyphae.
II:	The network of hyphae is known as mycelium.
III:	Some hyphae are continuous tubes filled with multinucleated cytoplasm – these are called coenocytic hyphae.
IV:	The cell walls of fungi are composed of chitin and polysaccharides.

1. Only I, II and III are correct
2. Only I, III and IV are correct
3. Only II, III and IV are correct
4. I, II, III and IV are correct

117 The three-domain system is a biological classification that divides cellular life forms into three domains including all the following except:

1.	Archaea	2.	Bacteria
3.	Eukarya	4.	Animalia

118 All the following will be true for heterotrophic bacteria except:

1.	They are most abundant bacteria in nature.
2.	The majority are important decomposers.
3.	None of them is capable of fixing atmospheric nitrogen.
4.	Some are pathogens causing damage to human beings, crops, farm animals and pets.

119 A bacteria with the given shape will be called as a:



1.	Bacillus	2.	Coccus
3.	Spirillum	4.	Vibrios

120 Name of the author in a biological name:

1.	is never included.
2.	is always Latinised.
3.	is written before the generic name, in full and in capital letters.
4.	appears after the specific epithet, i.e., at the end of the biological name and is written in an abbreviated form.

121 Consider the given two statements:

Assertion:	Dueteromycetes are known as imperfect fungi.
Reason:	Only their asexual and vegetative phases are known.

1.	Both Assertion and Reason are true and Reason explains Assertion
2.	Both Assertion and Reason are true and Reason does not explain Assertion
3.	Assertion is true but Reason is false
4.	Assertion is false but Reason is true

122 What will not be true for members of Kingdom Fungi?

1.	The fungi are heterotrophic organisms.
2.	Fungi are cosmopolitan and occur in air, water, soil and on animals and plants.
3.	They prefer to grow in warm and humid places.
4.	None of the members is unicellular.

123 In plants, the common symptoms of viral infection can be all the following except:

1. mosaic formation
2. leaf rolling and curling
3. yellowing and vein clearing
4. smuts and rusts

124 The asexual spores in Ascomycetes:

- I: are called conidia.
II: are produced endogenously
1. Only I is correct
2. Only II is correct
3. Both I and II are correct
4. Both I and II are incorrect

125 The dikaryon is a nuclear feature that is unique to certain fungi including the members of class:

- I: Phycomycetes
II: Ascomycetes
III: Deuteromycetes
IV: Basidiomycetes
1. I and II only
2. I and IV only
3. II and III only
4. II and IV only

126 Consider the two statements:

Statement I:	Viruses are obligate cellular endoparasites.
Statement II:	Once they infect a cell they take over the machinery of the host cell to replicate themselves, killing the host.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

127 Match each item in Column I with one in Column II and select the correct match from the codes given:

	COLUMN I		COLUMN II
A	The gametes are flagellated and similar in size	P	Eudorina
B	The gametes are non-flagellated (non-motile) but similar in size	Q	Ulothrix
C	the female gametes are larger and flagellated, while the male gametes are smaller and flagellated	R	Fucus
D	one large, non-motile (static) female gamete and a smaller, motile male gamete	S	Spirogyra

Codes:

	A	B	C	D
1.	S	Q	P	R
2.	Q	S	P	R
3.	Q	S	R	P
4.	S	Q	R	P

128 Called 'The Darwin of the 20th century', identify the biologist who almost single-handedly made the origin of species diversity the central question of evolutionary biology that it is today:

1.	Ernst Mayr	2.	Louis Pasteur
3.	Charles Darwin	4.	Hugo de Vries

129 Consider the given two statements:

Assertion:	Diatoms have left behind large amount of cell wall deposits in their habitat.
Reason:	Diatoms are the chief 'producers' in the oceans.

1.	Both Assertion and Reason are true and Reason explains Assertion
2.	Both Assertion and Reason are true and Reason does not explain Assertion
3.	Assertion is true but Reason is false
4.	Assertion is false but Reason is true

130 All the following criteria are used for the classification of fungi into related classes except:

1. the morphology of the mycelium
2. mode of spore formation
3. type of photosynthetic pigment
4. fruiting bodies

131 Slime moulds:

I:	under unfavourable conditions, they form an aggregation called plasmodium which may grow and spread over several feet.
II:	during suitable conditions, the plasmodium differentiates and forms fruiting bodies bearing spores at their tips.

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

132 African sleeping sickness is caused by an infection with:

1. a dsDNA virus
2. a gram negative bacterium
3. a flagellated protozoan
4. a fungus

133 Eukaryotic cell type, cell wall of chitin and multicellular/loose tissue body organisation is seen in the members of Kingdom:

1. Fungi
2. Protista
3. Archaea
4. Plantae

134 All the following fungi belong to Dueteromycetes except:

1. *Alternaria*
2. *Colletotrichum*
3. *Trichoderma*
4. *Ustilago*

135 Phylogenetic classification systems are based on:

- | | |
|----|--|
| 1. | all observable characteristics. |
| 2. | cytological information like chromosome number, structure, behaviour. |
| 3. | evolutionary relationships between the various organisms. |
| 4. | natural affinities among the organisms and consider, not only the external features, but also internal features, like ultra-structure, anatomy, embryology and phytochemistry. |

BIOLOGY I - SECTION B

136 All the following are example of green alga except:

1. *Ectocarpus*
2. *Chara*
3. *Ulothrix*
4. *Spirogyra*

137 Which of the following is not a feature of Red Algae?

1. r-phycoerythrin is a major pigment.
2. Floridean starch is stored food.
3. Cell wall contains poly sulphate esters.
4. There are 2, unequal, lateral flagellar insertions.

138 Consider the given two statements:

Assertion:	The spread of living pteridophytes is limited and restricted to narrow geographical regions.
Reason:	Pteridophytes are not dependent on water for fertilisation.

- | | |
|----|--|
| 1. | Both Assertion and Reason are true and Reason explains Assertion |
| 2. | Both Assertion and Reason are true and Reason does not explain Assertion |
| 3. | Assertion is true but Reason is false |
| 4. | Assertion is false but Reason is true |

139 Pteridophytes:

I:	evolutionarily are the first terrestrial plants to possess vascular tissues – xylem and phloem.
II:	have gametophytes as the dominant generation in their life cycle.

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

140 Biflagellate zoospores that are pear-shaped and have two unequal laterally attached flagella are involved in:

1. Asexual reproduction in brown algae
2. Asexual reproduction in red algae
3. Sexual reproduction in brown algae
4. Sexual reproduction in red algae

141 In gymnosperms:

I:	the ovules are not enclosed by any ovary wall and remain exposed, both before and after fertilisation.
II:	the male and the female gametophytes do not have an independent free-living existence.

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

142 All the following are examples of mosses except:

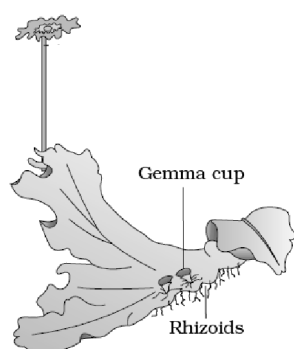
1.	<i>Funaria</i>	2.	<i>Polytrichum</i>
3.	<i>Marchantia</i>	4.	<i>Sphagnum</i>

143 How many of the given statements regarding the life cycle of mosses are true?

I:	The predominant stage of the life cycle of a moss is the gametophyte.
II:	Protonema stage develops directly from a spore.
III:	Leafy stage bears the sex organs.

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

144 The figure shows:



1. Female thallus of *Marchantia*
2. Male thallus of *Marchantia*
3. Gametophyte of *Funaria*
4. Sporophyte of *Funaria*

145 Regarding Pteridophytes:

I:	Genera like <i>Selaginella</i> and <i>Salvinia</i> are heterosporous.
II:	<i>Dryopteris</i> , <i>Pteris</i> , and <i>Adiantum</i> belong to Pteropsida.

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

146 How many of the given statements are correct regarding economic importance of algae?

I:	Many species of <i>Porphyra</i> , <i>Laminaria</i> and <i>Sargassum</i> are used as food.
II:	Hydrocolloids (water holding substances), e.g., algin from red algae and carrageen from brown algae are used commercially.
III:	Agar is obtained from <i>Gelidium</i> and <i>Gracilaria</i> .
IV:	Chlorella a unicellular alga rich in proteins is used as food supplement.

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

147 Consider the given two statements:

Assertion:	Bryophytes are also called amphibians of the plant kingdom.
Reason:	Bryophytes play an important role in plant succession on bare rocks/soil.

1.	Both Assertion and Reason are true and Reason explains Assertion
2.	Both Assertion and Reason are true and Reason does not explain Assertion
3.	Assertion is true but Reason is false
4.	Assertion is false but Reason is true

148 The members of phaeophyceae or brown algae;

1.	are found primarily in fresh water habitats.
2.	possess chlorophyll a, c, carotenoids and xanthophylls.
3.	store food as glycogen.
4.	do not reproduce asexually.

149 How many of the given statements regarding sexual reproduction in Bryophytes are true?

I:	The sex organs in bryophytes are multicellular.
II:	The male sex organ is called antheridium and they produce biflagellate antherozoids.
III:	The female sex organ called archegonium is flask-shaped and produces a single egg.
IV:	The antherozoids are released into water where they come in contact with archegonium.
V:	Zygotes undergo reduction division immediately.

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

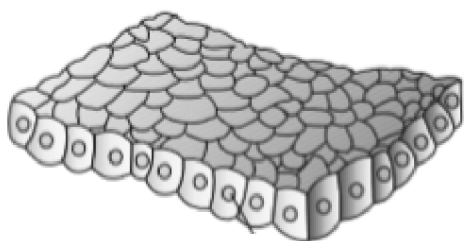
150 How many of the comparisons between *Pinus* and *Cycas* given below are correct:

	<i>Pinus</i>	<i>Cycas</i>
I:	Coralloid roots	Mycorrhizal associations
II:	Stems are branched	Stems are unbranched
III:	The male or female cones or strobili are borne on different trees	The male or female cones or strobili are borne on the same tree

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

BIOLOGY II - SECTION A

151 The epithelium shown will be found in the lining of:



1. PCT
2. DCT
3. Trachea
4. Urinary bladder

152 Match the biological names of vertebrates in Column I with their corresponding common names in Column II and select the correct match as your answer from the codes given:

	COLUMN I		COLUMN II
A	Psittacula	P	Parrot
B	Neophron	Q	Platypus
C	Ornithorhynchus	R	Vulture
D	Balaenoptera	S	Blue whale

Codes:

	A	B	C	D
1.	P	R	S	Q
2.	R	P	Q	S
3.	P	R	Q	S
4.	R	P	S	Q

153 Animals belonging to phylum Chordata are fundamentally characterised by:

I:	the presence of a notochord, a dorsal hollow nerve cord and paired pharyngeal gill slits.
II:	bilateral symmetry, triploblastic body organisation, true coelom with organ-system level of organisation.
III:	a post anal tail and a closed circulatory system.

1. Only I and II are correct
2. Only I and III are correct
3. Only II and III are correct
4. I, II and III are correct

154 How many of the given statements are correct:

I:	Arthropods have true coelom.
II:	Aschelminthes have pseudocoelom.
III:	Platyhelminthes lack coelom.
IV:	A true coelom is lined on all sides by embryonic mesoderm.

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

155 For osmoregulation and excretion, flatworms use:

1.	statocysts	2.	osphradia
3.	flame cells	4.	antennal glands

156 Notochord:

I:	is an endodermally derived rod-like structure formed on the ventral side during embryonic development in some animals.
II:	is replaced by a vertebral column in vertebrates.

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

157 How many of the given statements regarding Annelids are true?

I:	They exhibit organ-system level of body organisation and bilateral symmetry.
II:	They are triploblastic, metamerically segmented and coelomate animals.
III:	They possess only longitudinal muscles in their body wall which help in locomotion.
IV:	A closed circulatory system is present.

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

158 Identify the incorrect statement regarding Aschelminthes in general:

1.	Alimentary canal is complete with a well-developed muscular pharynx.
2.	An excretory tube removes body wastes from the body cavity through the excretory pore.
3.	Sexes are separate (dioecious), i.e., males and females are distinct.
4.	Often females are shorter than males.

159 Consider the given two statements:

Statement I:	All members of Animalia are multicellular.
Statement II:	All members of Animalia exhibit the same pattern of organisation of cells.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

160 Radula, a tongue rasping like organ, is characteristically seen in most:

1.	Annelids	2.	Mollusca
3.	Round worms	4.	Arthropods

161 Consider the given two statements:

Statement I:	Over two-thirds of all named species on earth are arthropods.
Statement II:	Mollusca is the second largest animal phylum.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

162 How many of the animals given in the box belong to Mollusca?

Pila, Echinus, Pinctada, Sepia, Loligo, Cucumaria, Octopus, Limulus, Chaetopleura

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

163 Consider the given two statements:

Statement I:	Protochordates are exclusively marine.
Statement II:	In Urochordata, notochord is present only in larval tail, while in Cephalochordata, it extends from head to tail region and is persistent throughout their life.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

164 In amphibians cloaca is the common chamber and outlet into which open the:

I: gastrointestinal tract

II: urinary tract

III: genital tract

1. Only I and II are correct
2. Only I and III are correct
3. Only II and III are correct
4. I, II and III are correct

165 Match the biological names of Invertebrates in Column I with their corresponding common names in Column II and select the correct match as your answer from the codes given:

	COLUMN I		COLUMN II
A	Gorgonia	P	Brittle star
B	Ophiura	Q	Sea hare
C	Aplysia	R	Sea fan
D	Dentallium	S	Tusk shell

Codes:

	A	B	C	D
1.	P	R	s	Q
2.	R	P	Q	S
3.	P	R	Q	S
4.	R	P	S	Q

166 How many of the given statements are correct for cyclostomes?

I:	All living members are ectoparasites on some fishes.
II:	They have an elongated body bearing 6-15 pairs of gill slits for respiration.
III:	They have a sucking and circular mouth without jaws.
IV:	Their body has scales and paired fins.
V:	Circulation is of open type.
VI:	Cyclostomes are fresh water animals but migrate for spawning to marine water.

1. 3
2. 4
3. 5
4. 6

167 How many of the given statements regarding arthropods in general are true?

I:	Body of arthropods is covered by chitinous exoskeleton.
II:	They have jointed appendages (arthros-joint, poda-appendages).
III:	Circulatory system is of open type.
IV:	Excretion takes place through malpighian tubules in insects.
V:	They are mostly dioecious and fertilisation is usually internal.
VI:	They are mostly oviparous.

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

168 Consider the given two statements regarding Cnidarians:

Statement I:	The name cnidaria is derived from the cnidoblasts or cnidocytes that are collared flagellated cells involved in water transport through the body of Cnidarians.
Statement II:	Polyps are free swimming Cnidarians and Medusae are sessile Cnidarians.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

169 In birds:

I:	The digestive tract of birds has additional chambers, the crop and gizzard.
II:	Air sacs connected to lungs supplement respiration.
III:	They possess beak with teeth.

1. Only I and II are correct
2. Only I and III are correct
3. Only II and III are correct
4. I, II and III are correct

170 In metamerism:

I:	the body is externally and internally divided into segments
II:	there is a serial repetition of at least some organs

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

171 All the following animals are Urochordates except:

1. *Ascidia*
2. *Salpa*
3. *Doliolum*
4. *Branchiostoma*

172 The Order [taxon] of *Musca domestica* is:

1.	Hymenoptera	2.	Diptera
3.	Coleoptera	4.	Orthoptera

173 Consider the given two statements:

Statement I:	All vertebrates are chordates but all chordates are not vertebrates.
Statement II:	All vertebrates are tetrapods.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

174 Consider the given two statements:

Statement I:	In nearly all animal tissues, specialised junctions provide both structural and functional links between its individual cells.
Statement II:	Cell junctions are more common in connective, muscle and neural tissue than in epithelium.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

175 How many of the given statements regarding Mollusca are true?

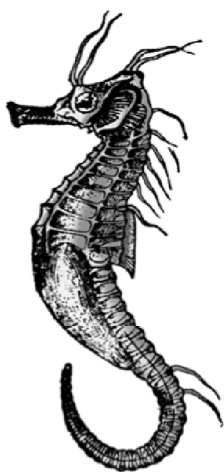
I:	They are bilaterally symmetrical, triploblastic and coelomate animals.
II:	Body is covered by a calcareous shell and is segmented with a distinct head, muscular foot and visceral hump as metamerous.
III:	A soft and spongy layer of skin forms a mantle over the visceral hump.
IV:	They are usually dioecious and oviparous with indirect development.

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

176 A water vascular system is characteristically seen in the members of Phylum:

1. Mollusca	2. Porifera
3. Cnidaria	4. Echinodermata

177 The organism shown below:



I:	is a bony fish.
II:	is unusual as the male is equipped with a brood pouch on the ventral, or front-facing, side of the tail.

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

178 Identify the correct statements:

I:	The digestive system in Platyhelminthes has only a single opening to the outside of the body that serves as both mouth and anus, and is hence called incomplete.
II:	In open type circulation, the blood is pumped out of the heart and the cells and tissues are directly bathed in it.

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

179 Consider the given two statements:

Assertion:	Hemichordata was earlier considered as a sub-phylum under phylum Chordata but now it is placed as a separate phylum under non-chordata.
Reason:	Hemichordates have a rudimentary structure in the collar region called stomochord, a structure analogous to notochord.

1.	Both Assertion and Reason are true and Reason explains Assertion
2.	Both Assertion and Reason are true and Reason does not explain Assertion
3.	Assertion is true but Reason is false
4.	Assertion is false but Reason is true

180 The number of correct statements regarding sponges are:

I:	In sponges, food is digested in the spongocoel.
II:	When sponges reproduce asexually by buds, these are called gemmules
III:	Sponge bodies are organized at the tissue level of structure.
IV:	The collar of the collar cell is composed of microvilli.

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

181 Identify the incorrect statement regarding reptiles:

1.	They are mostly aquatic animals and their body is covered by dry and cornified skin, dermal scales or scutes.
2.	They do not have external ear openings. Tympanum represents ear.
3.	Heart is usually three-chambered, but four-chambered in crocodiles.
4.	They are oviparous and development is direct.

182 Ctenophores:

I:	are commonly known as sea walnuts or comb jellies
II:	are exclusively marine, radially symmetrical, diploblastic organisms with tissue level of organisation
III:	use cilia for locomotion
IV:	reproduce only by sexual means

- Only I, II and III are correct
- Only I, III and IV are correct
- Only II, III and IV are correct
- I, II, III and IV are correct

183 Parapodia are seen in:

1.	Terrestrial Annelids	2.	Aquatic Annelids
3.	Terrestrial Molluscs	4.	Aquatic molluscs

184 Identify the correct statements regarding mammals:

I:	The skin of mammals is unique in possessing hair.
II:	External ears or pinnae are present.
III:	Different types of teeth are present in the jaw.
IV:	They are homoiothermous.
V:	All are viviparous and development is direct.

- 2
- 3
- 4
- 5

185 In chondrichthyes:

1.	Mouth is ventral, teeth are modified ctenoid scales and directed forwards.
2.	Mouth is ventral, teeth are modified placoid scales and directed backwards.
3.	Mouth is dorsal, teeth are modified ctenoid scales and directed forwards.
4.	Mouth is dorsal, teeth are modified placoid scales and directed backwards.

BIOLOGY II - SECTION B

186 Frogs:

I:	have a constant body temperature and are warm blooded.
II:	have the ability to change the colour to hide them from their enemies (camouflage).
III:	are not seen during peak summer and winter.

- Only I and II are correct
- Only I and III are correct
- Only II and III are correct
- I, II and III are correct

187 Consider the given two statements:

Assertion:	The alimentary canal in frog is short.
Reason:	Frog is a herbivore.

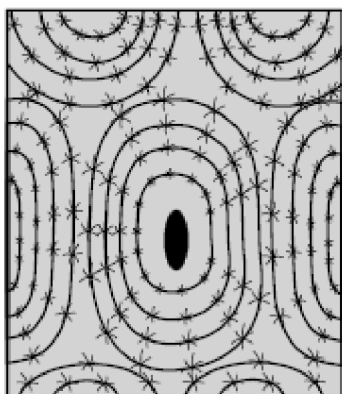
1.	Both Assertion and Reason are true and Reason explains Assertion
2.	Both Assertion and Reason are true and Reason does not explain Assertion
3.	Assertion is true but Reason is false
4.	Assertion is false but Reason is true

188 Neuroglial cells:

I:	protect and support neurons.
II:	make up more than one-half the volume of neural tissue in our body.

- Only I is correct
- Only II is correct
- Both I and II are correct
- Both I and II are incorrect

189 Regarding the histology shown in the given figure:



- I: It is called as the Osteon
II: It is the structural unit of a cartilage
1. Only I is correct
 2. Only II is correct
 3. Both I and II are correct
 4. Both I and II are incorrect

190 Consider the given two statements:

Assertion:	Compound epithelium has a limited role in secretion and absorption.
Reason:	Their main function is to provide protection against chemical and mechanical stresses.

1. Both Assertion and Reason are true and Reason explains Assertion
2. Both Assertion and Reason are true and Reason does not explain Assertion
3. Assertion is true but Reason is false
4. Assertion is false but Reason is true

191 In frogs:

I:	neck and tail are absent.
II:	a pair of nostrils is present.
III:	a membranous tympanum (ear) receives sound signals.

1. Only I and II are correct
2. Only I and III are correct
3. Only II and III are correct
4. I, II and III are correct

192 Consider the given two statements:

Statement I:	The frog never drinks water but absorb it through the skin.
Statement II:	In frog, the skin is always maintained in a moist condition.

1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

193 Consider the given two statements regarding frogs:

Statement I:	In water, skin acts as aquatic respiratory organ (cutaneous respiration).
Statement II:	On land, the buccal cavity, skin and lungs act as the respiratory organs.

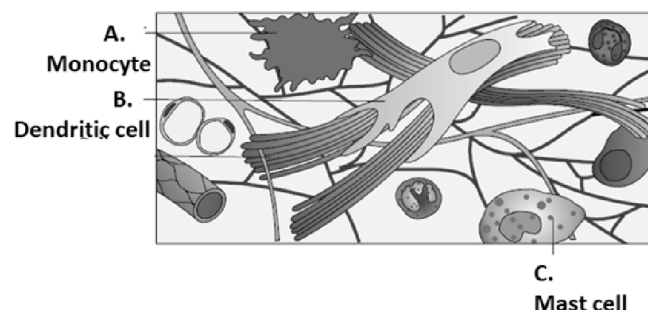
1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

194 Consider the given two statements:

Statement I:	The fore limbs in frogs end in five digits and they are larger and muscular than hind limbs that end in four digits.
Statement II:	Feet in frogs have webbed digits that help in swimming.

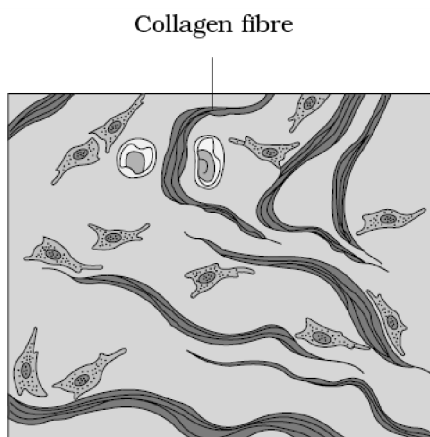
1. Statement I is correct; Statement II is correct
2. Statement I is correct; Statement II is incorrect
3. Statement I is incorrect; Statement II is correct
4. Statement I is incorrect; Statement II is incorrect

195 Identify the incorrectly labelled parts in the given diagram of areolar tissue:



- | | | | |
|----|--------------|----|--------------|
| 1. | Only A | 2. | Only B and C |
| 3. | Only A and B | 4. | A, B and C |

196 The type of connective tissue shown below is seen in:



1.	Tendon	2.	Ligament
3.	Skin	4.	Bone

197 The frog has:

I: Hepatic portal system

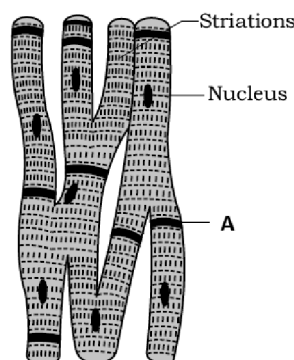
II: Renal portal system

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

198 The number of cranial nerves in frogs are:

1.	8 pairs	2.	10 pairs
3.	12 pairs	4.	31 pairs

199 The structure labelled as A in the given figure:



I:	allow the cells to contract as a unit, i.e., when one cell receives a signal to contract, its neighbours are also stimulated to contract.
II:	stop the passage of impulse from one cell to another in the tissue.

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

200 Forebrain in frogs does not includes:

1. olfactory lobes
2. paired cerebral hemispheres
3. unpaired diencephalon
4. a pair of optic lobes

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