ALPHA – TEST SERIES

प्रा. चिराग सरांचे
Alpha 360° Academy

Academic Director
Prof. Chirag Senma

Date	PHYSICS	CHEMISTRY	BIOLOGY
19 May	Mechanics Mechanical Properties of Solids, Fluids	ORGANIC CHEMISTRY	11th ZOOLOGY
21 May	Heat section Oscillation & waves	INORGANIC CHEMISTRY	12th ZOOLOGY
24 May	Electric and Magnetic Section	PHYSICAL CHEMISTRY	11th BOTANY
26 May	Modern Physics Light & Waves	COMPLETE CHEMISTRY	12th BOTANY
30 May	Final Round Starts		

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ALPHA 360 DEGREE ACADEMY

Date : 24-05-2026 Time : 3 Hrs

Physics : 45	Chemistry : 45	Biology : 90	Total : 180
Mark's-720	RE-NEET ALPHA TEST SERIES		TEST-03

Exam Syllabus

Physics : Electric and Magnetic Section
Chemistry : Physical Chemistry
Biology : 11th Botany

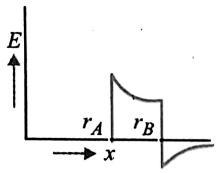
Physics

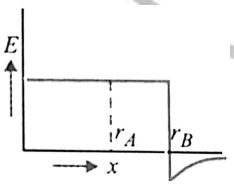
01. Two positive ions, each carrying a charge q, are separated by a distance d. If F is the force of repulsion between the ions, the number of electrons missing from each ion will be (e being the charge on an electron)

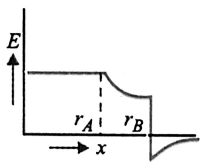
1) $\frac{4\pi \in_0 Fd^2}{q^2}$ 2) $\frac{4\pi \in_0 Fd^2}{e^2}$

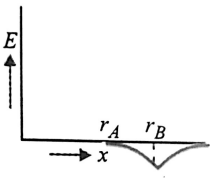
3) $\sqrt{\frac{4\pi \in_0 Fe^2}{d^2}}$ 4) $\sqrt{\frac{4\pi \in_0 Fd^2}{e^2}}$

02. Two concentric conducting thin spherical shells A and B having radii r_A and r_B ($r_B > r_A$) are charged to Q_A and $-Q_B$ ($|Q_B| > |Q_A|$). The electric field along a line passing through the centre is, Figure.

1) 

2) 

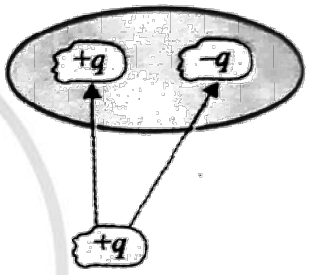
3) 

4) 

03. In a region where intensity of electric field is 5 NC^{-1}, 40 lines of force are crossing per square meter. The number of lines crossing per square meter, where intensity of electric field is 10 N/C will be

1) 20 2) 80
3) 100 4) 200

04. Shown below is a distribution of chargcs. The flux of electric field due to these charges through the surface is



1) $3\ q/\in_0$ 2) $2\ q/\in_0$
3) $q/\in_0$ 4) Zero

05. An electric dipole consists of chargcs + 2 e and – 2 t separated by 0.78 nm. It is placed in an external field of 3.4×10^6 N/C. Magnitude of torque when dipole is parallel to field is

1) 8.5×10^{-22} Nm 2) 8.5×10^{22} Nm
3) Zero 4) 8.5×10^{11} N-m

06. A long string with a charge of λ per unit length passes through an imaginary cube of edge a. The maximum flux of the electric field through the cube will be

1) $\lambda a/\in_0$ 2) $\sqrt{2}\lambda a/\in_0$
3) $6\lambda a^2/\in_0$ 4) $\sqrt{3}\lambda a/\in_0$

07. At a certain distance from a point charge, the electric field is 500 V/m and the potential is 3000 V. What is this distance?

1) 6 m 2) 12 m
3) 36 m 4) 144 m

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08. The potential at a point x measured in |xm due to some charges situated on the X-axis is given by

$$V(x)=\frac{20}{(x^2-4)}volt.$$

The electric field E at x = 4 μm is

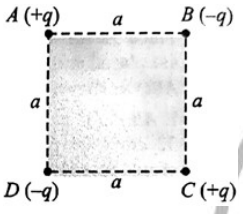
1) $\frac{10}{9}$ volt/ μm in positive x-direction

2) $\frac{5}{3}$ volt/ μm in negative x-direction

3) 5/3 volt/ μm is positive jr-direction

4) 10/9 volt/ μm in negative x-direction

09. There are four point charges + q, –q, + q and –q placed at the comers A, B, C and D respectively of a square of side a. The potential energy of the system is $\frac{1}{4\pi\varepsilon_0}$ times



1) $\frac{q^2}{a}(-4+\sqrt{2})$ 2) $\frac{q^2}{2a}(-4+\sqrt{2})$

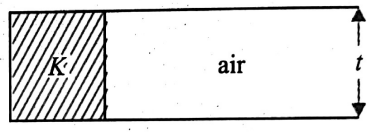
3) $\frac{4q^2}{a}$ 4) $\frac{-4\sqrt{2}q^2}{a}$

10. The capacitance of a parallel plate capacitor is 12 μF. If the distance between the plates is doubled and area is halved, then new capacitance will be

1) 8 μF 2) 6 μF

3) 4 μF 4) 3 μF

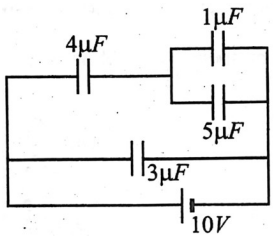
11. A parallel plate capacitor with air as the dielectric has capacitance C. A slab of dielectric constant K and having the same thickness as the separation between the plates is introduced so as to fill one-fourth of the capacitor as shown in figure. The new capacitance will be



1) $(K+3)\frac{C}{4}$ 2) $(K+2)\frac{C}{4}$

3) $(K+1)\frac{C}{4}$ 4) $\frac{KC}{4}$

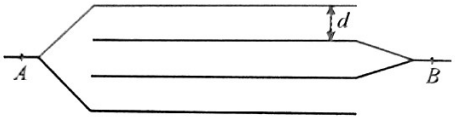
12. The change on $4\mu F$ capacitor in the given circuit in figure is



1) 12 μC 2) 24 μC

3) 36 μC 4) 32 μC

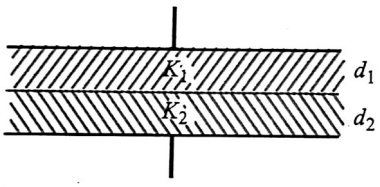
13. The capacitance of arrangement of 4 plates of area A at a distance d shown in figure is



1) $\frac{\in_0}{d}$ 2) $\frac{2\in_0}{d}A$

3) $\frac{3\in_0}{d}A$ 4) $\frac{4\in_0}{d}A$

14. What will be capacitance of a system of two parallel plates, each of area A separated by distances d_1 and d_2 packed with dielectrics of constants K_1 and K_2, figure?



1) $\frac{K_1K_2\in_0 A}{K_1d_2-K_1d_1}$ 2) $\frac{K_1K_2\in_0 A}{K_1d_1-K_2d_2}$

3) $\frac{K_1K_2\in_0 A}{K_1d_2+K_2d_1}$ 4) $\frac{K_1K_2\in_0 A}{K_1d_1+K_2d_2}$

15. If the current flowing through a wire depends on time as $I = 4t^2 - 2t + 5$, then, what is the time after which the value of current reaches a maximum or minimum value?

1) 0.12 s 2) 0.25 s

3) 0.5 s 4) 0.75 s

16. A wire 100 cm long and 2 0 mm diameter has a resistance of 0.7 Ω. The electrical resistivity of the material is

1) $4.4\times10^{-6}\ \Omega m$ 2) $2.2\times10^{-6}\ \Omega m$

3) $1.1\times10^{-6}\ \Omega m$ 4) $0.22\times10^{-6}\ \Omega m$

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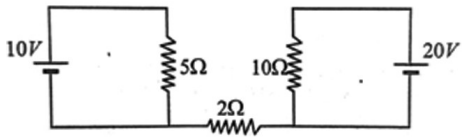
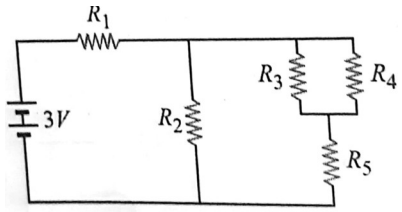
17. Find out the value of current through $2\,\Omega$ resistance for the given circuit figure.



1) 5 A 2) 2 A
3) zero 4) 4 A

18. In the circuit shown in figure. $R_1 = R_2 = 50\,\Omega, R_3 = 60\,\Omega$, $R_4 = R_5 = 30\,\Omega$, the battery is assumed to be ideal (no internal resistance) and it has emf of 3.0 V. The resistor that dissipates most power is



1) R_1 2) R_2
3) R_3 4) R_4

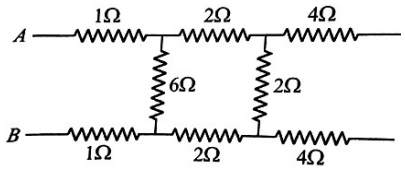
19. A heating coil can heat the water of a vessel from 20°C to 60°C in 30 minutes. Two such heating coils are put inseries and then used to heat the same amount of water through the same temperature range. The time taken now will be : (neglecting thermal capacity of the coils)

1) 60 minute 2) 30 minutes
3) 15 minutes 4) 7.5 minutes

20. The equivalent resistance of two resistors connected in series is 6Ω and their parallel equivalent resistance is 4/3, what are the values of resistors ?

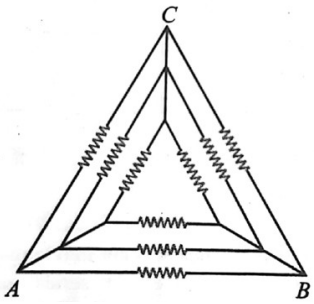
1) $8\Omega, 1\Omega$ 2) $6\Omega, 2\Omega$
3) $4\Omega, 6\Omega$ 4) $4\Omega, 2\Omega$

21. In the figure the equivalent resistance between A and B is



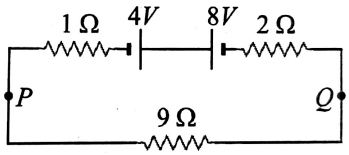
1) 5Ω 2) 8Ω
3) 2.5Ω 4) 6.8Ω

22. Nine resistors each of resistance R are connected in the circuit as shown in figure. The effective resistance between A and B is



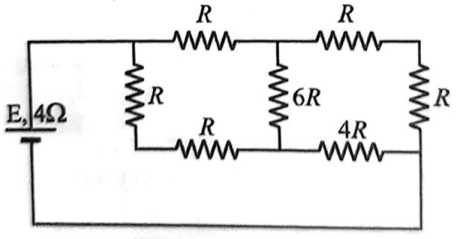
1) $\frac{7}{6}R$ 2) R
3) $\frac{3}{5}R$ 4) $\frac{2}{9}R$

23. Two batteries of emf 4V and 8V with internal resistance $1\,\Omega$ and $2\,\Omega$ respectively are connected to an external resistance R = $9\,\Omega$ as shown in figure. The current in the circuit and the potenial difference between P and Q respectively will be



1) $\frac{1}{2}A, 9V$ 2) $\frac{1}{12}A, 12V$
3) $\frac{1}{3}A, 3V$ 4) $\frac{1}{6}A, 4V$

24. A battery of internal resistance 4Ω is connected to the network of resistances as shown in figure. In order to give the maximum power to the network, the value of R (in Ω) should be



1) 4/9 2) /9
3) 2 4) 18

25. In a metre bridge, the balancing length from the left end (standard resistance of one ohm is in the right gap) is found to be 20 cm. The value of the unknown resistance is

1) $0.8\,\Omega$ 2) $0.5\,\Omega$
3) $0.4\,\Omega$ 4) $0.25\,\Omega$

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26. The dimensions of magnetic field induction is
1) $MLT^{-2}A^{-1}$ 2) $MT^{-2}A^{-1}$
3) ML^2TA^{-2} 4) $M^2LT^{-2}A^{-1}$

27. A proton with energy of 2 MeV enters a region of a uniform magnetic field of 2.5 T normally. The magnetic force on the proton is
(Take mass of proton to be 1.6×10^{-27} kg)
1) 3×10^{-12} N 2) 8×10^{-10} N
3) 8×10^{-12} N 4) 2×10^{-10} N

28. A proton and ari alpha particle, moving with the same velocity enter into a uniform magnetic field, acting normal to the plane of their motion. The ratio of their radii of the circular paths described by the proton and alpha particle is
1) 1 : 2 2) 1 : 4
3) 1 : 16 4) 4 : 1

29. Electrons move at right angles to a magnetic field of 1.5×10^{-2} tesla with a speed of 6×10^7 ms^{-1}. If the specific charge of the electron is 1.7×10^{11} C/kg, the radius of the circular path will be
1) 2.9 cm 2) 3.9 cm
3) 2.35 cm 4) 3 cm

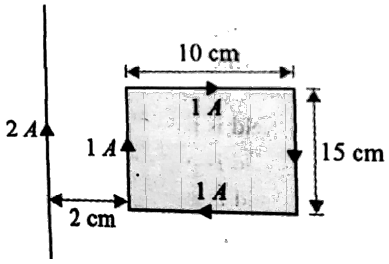
30. A particle of charge -16×10^{-18} C moving 10 ms^{-1} along the x-axis enters in a region where a magnetic field of induction B is along the y-axis and an clectric field of magnitude 10^4 Vm^{-1} is along the negative z-axis. If the charged particle continues moving aiong the x-axis. the magnitude of B is
1) 10^{-3}Wb m^{-2} 2) 10^3W bm^{-2}
3) 10^5 Wb m^{-2} 4) 10^{16} Wb m^{-2}

31. The magnetic field $d\vec{B}$ due to small current element $d\vec{l}$ at a distance $\vec{r}$ and element carrying current *I* is
1) $d\vec{B} = \frac{\mu_0}{4\pi} I \left(\frac{d\vec{l} \times \vec{r}}{r} \right)$ 2) $d\vec{B} = \frac{\mu_0}{4\pi} I^2 \left(\frac{d\vec{l} \times \vec{r}}{r} \right)$
3) $d\vec{B} = \frac{\mu_0}{4\pi} I^2 \left(\frac{d\vec{l} \times \vec{r}}{r^2} \right)$ 4) $d\vec{B} = \frac{\mu_0}{4\pi} I \left(\frac{d\vec{l} \times \vec{r}}{r^3} \right)$

32. An electron moving around the nucleus with an angular momentum *l* has a magnetic moment
1) $\frac{e}{m} l$ 2) $\frac{e}{2m} l$
3) $\frac{2e}{m} l$ 4) $\frac{e}{2\pi m} l$

33. Two long parallel wires placed 0.08 m apart carry currents 3 A and 5 A in the same direction. The distance from the conductor carrying larger current where the resultant magnetic field is zero is
1) 0.03 m 2) 0.05 m
3) 0.12 m 4) 0.2 m

34. What is the net force on the square coil shown in figure.

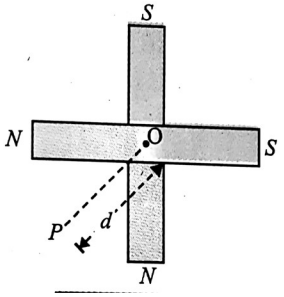


1) 25×10^{-7} N moving towards wire
2) 25×10^{-7} N moving away from wire
3) 35×10^{-7} N moving towards wire
4) 35×10^{-7} N moving away from wire

35. The angle of dip at a certain place is 30°. If the horizontal component of earth's magnetic field is H. The intensity of total field is
1) $\frac{H}{2}$ 2) $\frac{2H}{\sqrt{3}}$
3) $H\sqrt{2}$ 4) $2\sqrt{3}$

36. A solenoid has core of a material with relative permeability 500 and its windings carry a current of 1 A. The number of tarns of the solenoid is 500 per metre. The magnetisation of the material is nearly
1) 2.5×10^3 A m^{-1} 2) 2.5×10^5 A m^{-1}
3) 2.0×10^3 A m^{-1} 4) 2.0×10^5 A m^{-1}

37. Two short bar magnets of equal dipole moment 'M' are fastened perpendicularly at their centres, figure. The magnitude of resultant of two magnetic fields at a distance 'd' from the centre on the bisector of the right angle is



1) $\frac{\mu_0}{4\pi} \frac{2\sqrt{2}M}{d^3}$ 2) $\frac{\mu_0}{4\pi} \frac{2M}{d^3}$
3) $\frac{\mu_0}{4\pi} \frac{M}{d^3}$ 4) $\frac{\mu_0}{4\pi} \frac{\sqrt{2}M}{d^3}$

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38. A conducting circular loop is placed in a uniform magnetic field 0.04 T with its plane perpendicular to the magnetic field. The radius of the loop starts shrinking at 2 mm/s. The induced e.m.f. in the loop when the radius is 2 cm is

1) 3.2 $\pi\mu V$ 2) 4.8 $\pi\mu V$

3) 0.8 $\pi\mu V$ 4) 1.6 $\pi\mu V$

39. A coil of area 80 sq cm and 50 turns is rotating with 2000 rpm about an axis perpendicular to a magnetic field of 0.05 T. The maximum value of e.m.f. developed is

1) 200 πV 2) 10 $\pi / 3 V$

3) 4 $\pi / 3 V$ 4) $\frac{2}{3}V$

40. Two coils A and B having turns 300 and 600 respectively are placed near each other. On passing a current of 3 A in A, flux linked with A is 1.2×10^{-4} Wb and with B is 9.0×10^{-5} Wb. The mutual inductance of the system is

1) 2×10^{-5} H 2) 6×10^{-5} H

3) 3×10^{-5} H 4) 4×10^{-5} H

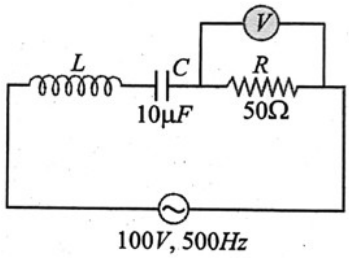
41. Voltage and current in an AC circuit arc given by

$V = 5\sin\left(100\pi t - \frac{\pi}{6}\right)$ and $I = 4\sin\left(100\pi t + \frac{\pi}{6}\right)$,

then

1) voltage leads the current by 30“
2) current leads the voltage by 30°
3) current leads the voltage by 60°
4) voltage leads the current by 60°

42. In the circuit shown in figure, voltmeter reads 100 V. Then L is



1) 0.1 H 2) 0.2 H

3) 0.02 H 4) 0.01 H

43. An alternating current of frequency f is flowing in a circuit containing a resistance R and a choke L in series. The impedance of the circuit is

1) $R + 2\pi f L$ 2) $\sqrt{R^2 + 4\pi^2 f^2 L^2}$

3) $\sqrt{R^2 + L^2}$ 4) $\sqrt{R^2 + 2\pi f L}$

44. An LC. circuit is in the state of resonance. If C = 0.1 μF and L = 0.25 Henry. Neglecting ohmic resistance of circuit, what is the frequency of oscillations ?

1) 1007 Hz 2) 100 Hz

3) 109 Hz 4) 500 Hz

45. A transformer is employed to reduce 220 V to 11 V. The primary draws a current of 5 A and the secondary 90 A. The efficiency of the transformer is

1) 20% 2) 40%

3) 70% 4) 90%

Space For Rough Work

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46. What is the absolute highest total number of gas molecules contained inside the following volume and pressure sample configurations at 298 K temperature?
1) 15 Liters of H_2 gas at 0.5 atm
2) 10 Liters of N_2 gas at 2.0 atm
3) 20 Liters of CO_2 gas at 0.2 atm
4) 5 Liters of O_2 gas at 3.0 atm

47. A sample of phosphorus oxide contains 43.6% phosphorus and 56.4% oxygen by weight. Calculate its primary empirical setup design.
1) PO_2 2) P_2O_5
3) PO_3 4) P_2O_3

48. **Assertion (A):** Pure gaseous dinitrogen (N_2) and carbon monoxide (CO) share identical legal volumes at standard STP limits.
Reason (R): Both of these specific diatomic gases share an identical molecular weight profile value of 28 g/mol.
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.

49. Read these statements derived from the laws of chemical combination rules:
Statement I: The law of definite proportions applies to isotopes of the same element.
Statement II: Total mass weights remain constant during any standard non-nuclear chemical reaction transformation.
Statement III: Law of multiple proportions is demonstrated by carbon monoxide and carbon dioxide configurations.
Statement IV: Gay-Lussac's gas volume rules apply even when reactants are solid crystals.
Select the accurate options combination:
1) II and III only 2) I, II and IV
3) I, II and III 4) All of the above

50. Match the chemical samples in Column-I with their corresponding total atom count values in Column-II:

Column-I (Chemical Sample)	Column-II (Total Atoms Count)
(A) 16.0 grams of Methane gas (CH_4)	(P) $1 \times N_A$ total atoms
(B) 4.0 grams of Helium gas (He)	(Q) $5 \times N_A$ total atoms
(C) 18.0 grams of Water liquid (H_2O)	(R) $3 \times N_A$ total atoms
(D) 32.0 grams of Oxygen gas (O_2)	(S) $2 \times N_A$ total atoms

1) A → Q, B → P, C → R, D → S
2) A → P, B → Q, C → R, D → S
3) A → R, B → S, C → P, D → Q
4) A → Q, B → R, C → P, D → S

51. **Assertion:** Addition of an inert gas at constant volume to a system in equilibrium has no effect on equilibrium position.
Reason: At constant volume, addition of inert gas does not change the partial pressures or molar concentrations of the reacting species.
1) Both A and R are true and R is the correct explanation.
2) Both A and R are true but R is not correct explanation.
3) A is true, R is false.
4) A is false, R is true.

52. Statements regarding the reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ (brown color):
S1: Total pressure increase shifts the reaction backward.
S2: Addition of Helium at constant pressure shifts it forward.
S3: The colour deepens on increasing temperature.
S4: Kp is always numerically smaller than Kc at 298 K.
Identify the set of correct statements:
1) S1 and S2 only 2) S1, S2 and S3
3) S2, S3 and S4 4) S1 and S4 only

53. Match the physical equilibrium processes with their terms:

Column I	Column II
P. Liquid ⇄ Vapor	1. Melting Point
Q. Solid ⇄ Liquid	2. Boiling Point
R. Solid ⇄ Vapor	3. Henry's Law
S. Gas(g) ⇄ Gas(aq)	4. Sublimation

1) P-1, Q-2, R-3, S-4 2) P-2, Q-4, R-1, S-3
3) P-2, Q-1, R-4, S-3 4) P-4, Q-1, R-2, S-3

54. If the equilibrium pressure of a system containing $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$ is 0.5 atm at 1000 K, calculate Kc for this process (R = 0.0821 L atm/mol K):
1) 0.500 2) 0.006
3) 0.041 4) 41.00

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55. If K_c for $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$ is 1.0×10^4, find K_c for $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$:

1) 1.0×10^4 2) 1.0×10^{-4}

3) 1.0×10^2 4) 0.5×10^{-4}

56. Vapor pressure of pure liquid X is 300 torr and pure liquid Y is 500 torr. In an ideal solution mixture, the mole fraction of X in the vapor phase is found to be 0.25. Determine its mole fraction in the liquid phase.

1) 0.364 2) 0.250

3) 0.500 4) 0.125

57. If 0.1 M solution of an electrolyte shows an osmotic pressure of 4.92 atm at 300 K, determine its van 't Hoff factor (i). ($R = 0.0821$ L atm K^{-1} mol^{-1})

1) 2.0 2) 1.0

3) 1.5 4) 3.0

58. **Assertion (A):** Raw mangoes placed in concentrated salt solution shrivel up completely over time.

Reason (R): Solvent molecules move into the raw mango through the semipermeable cell wall due to endosmosis.

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.

59. Read the statements on liquid deviations from Raoult's Law:

I. A mixture of acetone and chloroform demonstrates a large positive deviation.

II. Systems showing positive deviation form minimum-boiling azeotropes.

III. For negative deviation, the volume of mixing (ΔV_{mix}) is less than zero.

IV. Ethanol and water form a maximum-boiling azeotropic solution.

Identify the true statement combination:

1) II and III 2) I and IV

3) I, II and III 4) II and IV only

60. Match the specific substance behavior in Column-I with its structural category in Column-II:

Column-I	Column-II
(A) Urea in water	(P) Fully ionized 1:1 binary salt
(B) Acetic acid in benzene	(Q) Molecular non-electrolyte cluster
(C) KCl in water	(R) Dimerizing self-associating system
(D) $MgSO_4$ in water	(S) Fully ionized 2:2 binary electrolyte

1) A-Q, B-R, C-P, D-S

2) A-P, B-Q, C-R, D-S

3) A-R, B-S, C-P, D-Q

4) A-Q, B-S, C-P, D-R

61. Calculate the potential drop generated at 298 K by a single chlorine gas electrode containing Cl_2(g, 10 atm) gas inside an aqueous medium containing 0.01 M Cl^- chloride ions, if the standard potential value is $E°(Cl_2/2Cl^-) = +1.36$ V.

1) +1.92 V 2) +1.30 V

3) +1.48 V 4) +1.24 V

62. How many Faradays of absolute electrical charge quantity must pass through an electrolytic medium containing molten aluminum oxide (Al_2O_3) in order to reduce and collect exactly 9.0 grams of pure metallic aluminum?

1) 0.5 F 2) 1.0 F

3) 1.5 F 4) 3.0 F

63. Read the following statements concerning standard reference electrodes:

Statement I: The potential of a standard hydrogen electrode (SHE) is assigned as exactly 0.00 V at all temperatures.

Statement II: Platinum black acts as a catalytic surface for hydrogen gas adsorption in a SHE.

Statement III: The concentration of HCl solution used in a standard SHE configuration is exactly 1.0 M.

Statement IV: Calomel electrode is an example of a secondary reference electrode.

Choose the correct option:

1) I and II only 2) II and III only

3) I, III and IV 4) II, III and IV

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64. **Assertion (A):** A negative value of standard reduction potential implies that the metal electrode is more stable than a standard hydrogen electrode.

Reason (R): Metals with negative reduction potentials act as stronger reducing agents than hydrogen gas.

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.

65. Match the battery commercial application systems with their respective chemical active component matrices:

Column-I (Battery Type)	Column-II (Active Components)
(A) Mercury Button Cell	(P) H_2 gas and O_2 gas fuel elements
(B) Lead Storage Battery	(Q) Zn amalgam and HgO-Carbon paste
(C) Fuel Cell	(R) Cadmium anode and NiO_2 cathode core
(D) Ni-Cd Rechargeable Cell	(S) Spongy lead plates and PbO_2 layer

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

66. A reaction progress graph reveals that a catalyst decreases the forward activation barrier from 80 kJ mol^{-1} to 50 kJ mol^{-1} at 300 K. By what exponential factor does the reaction rate accelerate? (Assume A factor is unchanged)

1) e^{12} 2) e^{30}
3) $e^{3.6}$ 4) e^{24}

67. For a second-order reaction 2A $\rightarrow$ Products, a plot of 1/[A] versus time (t) yields a linear trend. What does the slope of this line represent physically?

1) Rate constant (k) 2) Negative rate constant (-k)
3) Half-life ($t_{1/2}$) 4) Initial rate (r_0)

68. **Assertion (A):** The rate of a zero-order reaction remains constant throughout the entire progress of the reaction.

Reason (R): The velocity of a zero-order reaction is proportional to the square root of the reactant concentration.

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.

69. Read the following statements derived from collision theory:

I. Collision frequency (Z) increases slightly with an increase in absolute temperature.
II. The steric factor (P) reflects the geometric orientation requirements of colliding molecules.
III. Every collision with kinetic energy greater than E_a results in a reaction.
IV. Activation energy is the difference between threshold energy and average reactant energy.

Select the accurate statements:

1) I, II and IV 2) I and III
3) II, III and IV 4) II and III only

70. Match the linear graphical plot feature in Column-I with its kinetic parameter in Column-II:

Column-I (Linear Plot)	Column-II (Slope / Characteristic)
(A) [A] vs time (Zero order)	(P) Slope = -k / 2.303
(B) log[A] vs time (First order)	(Q) Slope = +k
(C) 1/[A] vs time (Second order)	(R) Slope = $-E_a$ / R
(D) ln(k) vs 1/T (Arrhenius)	(S) Slope = -k

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

71. **Assertion (A):** A mixture of sodium acetate and acetic acid maintains a nearly constant pH.

Reason (R): It forms an acidic buffer system with maximum buffer capacity when pH = pK_a.

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.

72. Evaluate these four statements regarding salt hydrolysis phenomena:

S1: Salt of strong acid and strong base does not undergo chemical hydrolysis.
S2: Hydrolysis constant K_h of NH_4Cl is given by K_w/K_b.
S3: Aqueous solution of Na_2CO_3 has pH less than 7.
S4: Degree of hydrolysis increases upon dilution for CH_3COONH_4.

1) S1 and S2 are correct
2) S2 and S3 are correct
3) S1, S2 and S4 are correct
4) All statements are correct

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73. Match the species with their exact conjugate counterparts:

Column I	Column II
A. Acid conjugate of H2O	P. H3O+
B. Base conjugate of H2O	Q. OH-
C. Base conjugate of NH4+	R. NH3
D. Acid conjugate of HCO3-	S. H2CO3

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

74. Find the pH of a 0.1 M sodium cyanide (NaCN) solution. (K_a for HCN = 6.2×10^{-10})

1) 11.10 2) 9.20
3) 8.50 4) 12.40

75. Calculate the mass of sodium acetate required to prepare 1 liter of buffer solution with pH = 5.00 containing 0.1 M acetic acid. ($pK_a = 4.74$, Molar mass of CH_3COONa = 82 g/mol)

1) 4.52 g 2) 8.20 g
3) 14.92 g 4) 1.82 g

76. Three moles of an ideal gas expand isothermally and reversibly from an initial volume of 20 L to a final volume of 60 L at a constant temperature of 300 K. Calculate the work done by the gas during this expansion process.

1) –8.22 kJ 2) –2.74 kJ
3) –5.48 kJ 4) –11.35 kJ

77. The heat capacity of a bomb calorimeter is 10.5 kJ K^{-1}. When 1.0 g of a organic compound is completely burnt inside it, the temperature rises by 2.4 K. Find the internal energy of combustion per gram.

1) –12.5 kJ g^{-1} 2) –25.2 kJ g^{-1}
3) –50.4 kJ g^{-1} 4) –18.2 kJ g^{-1}

78. The standard enthalpy of formation of $OH^-(aq)$, $H^+(aq)$, and $H_2O(l)$ are –230, 0, and –286 kJ mol^{-1} respectively. Calculate the standard enthalpy of neutralization of H^+ and OH^-.

1) –14 kJ mol^{-1} 2) –56 kJ mol^{-1}
3) –70 kJ mol^{-1} 4) –286 kJ mol^{-1}

79. **Assertion:** A reaction with a positive enthalpy change ($\Delta H > 0$) and negative entropy change ($\Delta S < 0$) can never be spontaneous at any temperature.

Reason: The Gibb's free energy change (ΔG) will always remain positive under these thermodynamic conditions.

1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
2) Both Assertion and Reason are true but Reason is not the correct explanation.
3) Assertion is true but Reason is false.
4) Assertion is false but Reason is true

80. Analyze the following statements about Hess's Law of Constant Heat Summation:

I. The standard enthalpy change of a reaction is independent of the pathway.

II. It is a direct consequence of the conservation of energy law.

III. It cannot be applied to determine lattice energy values.

IV. The heat change in a multi-step process equals the sum of individual steps.

Which combination highlights all correct statements?

1) I, II and III 2) II and IV only
3) I, II and IV 4) I and IV only

81. Match the molecular systems in Column-I with the sign of their entropy changes (ΔS) in Column-II:

Column-I	Column-II
(P) $H_2O(l) \rightarrow H_2O(g)$	(1) ΔS is positive
(Q) C(graphite) → C(diamond)	(2) ΔS is negative
(R) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$	(3) ΔS is highly negative
(S) Dissolution of NH_4Cl in water	(4) ΔS is highly positive

1) P-1, Q-2, R-3, S-4 2) P-4, Q-2, R-3, S-1
3) P-1, Q-3, R-2, S-4 4) P-4, Q-3, R-2, S-1

82. Constant volume heat capacity (C_v) of an ideal monoatomic gas is 12.47 J/mol·K. Calculate the change in enthalpy when 2 moles of this gas is heated from 300 K to 400 K.

1) 2494 J 2) 4157 J
3) 3117 J 4) 1662 J

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83. **Assertion (A):** Enthalpy of atomization of diatomic oxygen gas is exactly double its conventional standard bond energy.

Reason (R): Atomization breaks one mole of molecular oxygen gas completely into two moles of distinct isolated gaseous oxygen atoms.

1) Both A and R are true and R is correct explanation
2) Both A and R are true but R is NOT correct explanation
3) A is true, R is false
4) A is false, R is true

84. Consider the criteria for standard enthalpies of formation:

I. The compound must be synthesized exclusively from its constituent elements.
II. All interacting elements must exist in their standard physical states.
III. The chemical equation must be strictly balanced for 1 mole of product compound.
IV. Enthalpy of formation can never possess a negative numerical sign value.

1) I, II and III are correct
2) II, III and IV are correct
3) I, III and IV are correct
4) All choices are valid

85. Match types of enthalpy changes:

Column-I	Column-II
A. $C(s) + O_2(g) \rightarrow CO_2(g)$	P. Enthalpy of Neutralization
B. $HCl + NaOH \rightarrow NaCl + H_2O$	Q. Enthalpy of Combustion / Formation
C. $H_2O(s) \rightarrow H_2O(l)$	R. Enthalpy of Atomization
D. $H_2(g) \rightarrow 2H(g)$	S. Enthalpy of Fusion

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

86. Which of the following statement do not form a part of Bohr's model of hydrgoen atom?

1) Energy of the electrons in the orbits are quantized
2) The electron in the orbit nearest to the nucleus has the lowest energy.
3) Electrons revolve in different orbits around the nucleus.
4) The position and velocity of the electrons in the orbit cannot be determined simultaneously.

87. The following quantum numbers are possible for how many orbital(s) $n = 3$, $l = 2$, $m = +2$?

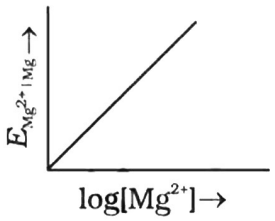
1) 1 2) 3
3) 2 4) 4

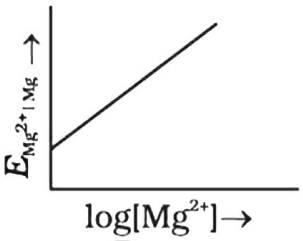
88. ClO^-_4 does not disproportionate because

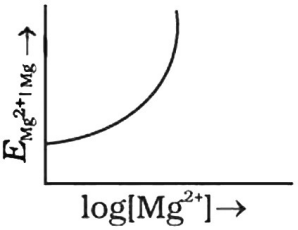
1) it undergoes combination reaction
2) it only undergoes oxidation
3) chlorine is present in highest oxidation state that is +7
4) None of the above

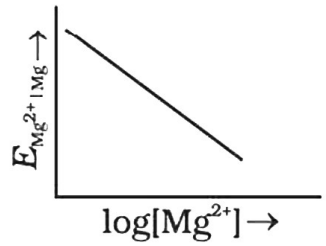
89. Electrode potential for Mg electrode varies according to the equation

$$E_{Mg^{2+}|Mg} = E^{\Theta}_{Mg^{2+}|Mg} - \frac{0.059}{2}\log\frac{1}{[Mg^{2+}]}$$

1) 

2) 

3) 

4) 

90. Maximum amount of a solid solute that can be dissolved in a specified amount of given liquid solvent does not depend upon .....

i. Temperature ii. Nature of solute
iii. Pressure iv. Nature of Solvent
1) i. and iii. 2) Onlyii.
3) ii. & iv. 4) Only iii.

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91. A segment of double stranded DNA has 120 adenine and 120 cytosine bases. The total number of nucleotides present in the segment is
1) 120 2) 240
3) 60 4) 480

92. Schwann proposed cell theory in
1) 1836-37 2) 1838-39
3) 1901- 02 4) 1938-39

93. **Assertion :** The order for mango is sapindales.
Reason : Wheat belongs to the class dicotyledonae.
1) If both Assertion and Reason are True and the Reason is a correct explanation of the Assertion.
2) If both Assertion and Reason are True but Reason is not a correct explanation of the Assertion.
3) If Assertion is True but the Reason is False.
4) If Assertion is False but the Reason is True.

94. The correct order of chemical composition of living tissues/cells in term of percent of the total cellular mass is :
1) Nucleic acid > Proteins > H_2O > Carbohydrate > Ions > Lipid
2) H_2O > Proteins > Nucleic acid > Carbohydrate > Lipid > Ions
3) H_2O > Proteins > Carbohydrate > Nucleic acid > Lipid > Ions
4) Lipid > Ions > Carbohydrate > H_2O > Proteins > Nucleic acid

95. **Statement-I :** Polar solutes may move across the membrane by the process of simple diffusion along the concentration gradient.
Statement-II : Many molecules can move briefly across the membrane without any requirement of energy and this is called the passive transport.
1) Statement-I is correct but Statement-II is incorrect.
2) Statement-I is incorrect but Statement-II is correct.
3) Both Statements-I and Statement-II are correct.
4) Both Statements-I and Statement-II are incorrect.

96. An onion root tip has 14 chromosomes in each cell. How many chromosomes the cell would have at G_1-phase ?
1) 28 2) 14
3) 62 4) 7

97. Which of the following 'suffixes' used for units of classification in plants indicates a taxonomic category of 'family'?
1) — Ales 2) — Onae
3) — Aceae 4) — Ae

98. The released energy obtained by oxidation is stored as
1) A concentration gradient across a membrane
2) ADP
3) ATP
4) NAD^+

99. Identify the incorrect match following
1) Solananaceae - Family comprising genus Solanum +Petunia + Datura
2) Carnivora - Order comprising only family Felidae
3) Panthera - Genus comprising species *leo, tigris, pardus*
4) Felidae - Family comprising genera Panthera and Felis

100. Which of them are not extrinsic factors for growth of plants ?
1) Light, O_2
2) Temperature, CO_2
3) Nutrient, water
4) Growth regulator and genetic factor

101. Match column-I with column-II :

	Column-I		Column-II
a.	Centriole	(i)	Foldings in mitochondria
b.	Chlorophyll	(ii)	Thylakoids
c.	Cristae	(iii)	Nucleic acids
d.	Ribozymes	(iv)	Basal body of cilia and flagella

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

102. Read the data given bellow and finds out how many of them are genus and class
Nigrum, Leo, Panthera, Solanum, Petunia, Felis, melongena, solanaceae, falidae, and Primata, carnivora mammalia
1) Five & two
2) Four & one
3) Three & two
4) Six & one

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103. **Assertion (A) :** Photorespiration is a waste process.
Reason (R) : During photorespiration, neither ATP nor NADPH is formed.
1) If both A and R are true and R is the correct explanation of A
2) If both A and R are true, but R is not the correct explanation of A
3) If A is true, but R is false
4) If A is false, but R is true

104. Fills in the blanks with appropriate option given below
a) Felidae and Canidae placed in order ___X___
b) Mango belongs to Family ___Y___
c) Lion tiger and leopards belongs to genus ___Z___
1) X-Carnivora , Y- Anacardiaceae, Z- Panthera
2) X-Mammalia, Y- Anacardiaceae, Z- Felis
3) X-Diptera, Y- Poaceae, Z- Felis
4) X- Felidae, Y- Mangifera, Z- Panthera

105. Match Column-I with Column-II and choose the correct option.

Column-I	Column-II
(a) Acidic	(i) Valine
(b) Basic	(ii) Lysine
(c) Neural	(iii) Glutamic acid
(d) Aromatic	(iv) Tyrosine, phenylalanine, tryptophan

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

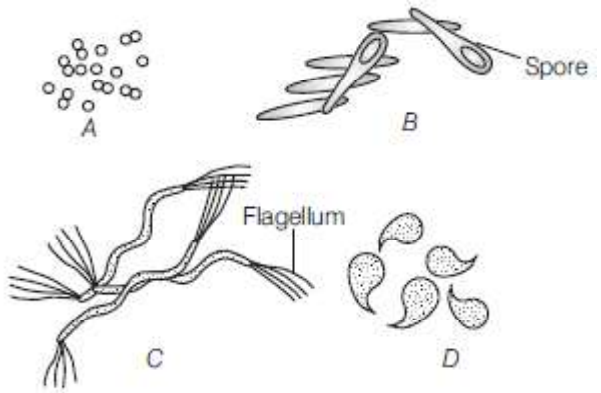
106. Read the statements given below and find out how many of them are correct ?
a) Each different type of plant and animal we see represent species
b) Local name vary from place to place within same country
c) Biological name very form place to place within same country
d) Living organism do exist in extraordinary habitat
e) Binomial nomenclature system is given by R.H Whittaker
1) Four 2) Three
3) Two 4) One

107. **Statement-I :** Ripe fruits become soften due to dissolution of middle lamella.
Statement-II : Middle lamella is made up of calcium or magnesium silicate.
1) Statement-I is correct but Statement-II is incorrect.
2) Statement-I is incorrect but Statement-II is correct.
3) Both Statements-I and Statement-II are correct.
4) Both Statements-I and Statement-II are incorrect.

108. Calvin cycle can be described under three stages. These stages are
I. Carboxylation of CO_2 into stable organic intermediate.
II. Ligation reactions leading to the formation of RuBisCO.
III. Reduction reactions leading to the formation of glucose.
IV. Regeneration of CO_2acceptor molecule.
Choose the correct option.
1) II, III and IV
2) I, III and IV
3) I, II and IV
4) I, II and III

109. Read the following statements and choose the right option.
(a) Right end of polysaccharide is called reducing end while left end is called non-reducing end.
(b) Starch can hold I_2 molecules in its helical secondary structure but cellulose being non-helical, cannot hold I_2.
(c) Starch and glycogen are branched molecule.
(d) Starch in plant and glycogen in animal are store houses of energy.
1) (a) and (d) are correct
2) (b) and (c) are correct
3) Only (d) is correct
4) All are correct

110. Bacteria are grouped under four categories based on their shape. Refer to the given figure. Identify A, B, C and D.



1) A–Vibrio, B–Cocci, C–Bacilli, D–Spirilla
2) A–Cocci, B–Bacilli, C–Spirilla, D–Vibrio
3) A–Bacilli, B–Spirilla, C–Vibrio, D–Cocci
4) A–Spirilla, B–Vibrio, C–Cocci, D–Bacilli

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111. In the eukaryotes, ……A…… takes place within the chloroplasts, whereas the breakdown of complex molecules to yield energy takes place in the ……B…… and in the ……C…… .
1) A–photosynthesis, B–cytoplasm, C–mitochondria
2) A–respiration, B–cytoplasm, C–mitochondria
3) A–respiration, B–chloroplast, C–cytoplasm
4) A–photosynthesis, B–chloroplast, C–cytoplasm

112. **Assertion :** The cells of epidermis bear a number of hairs.
Reason : The root hairs are unicellular elongation of the epidermal cells and help absorb water and minerals from the soil.
1) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
2) If both the assertion and the reason are true but the reason is not a correct explanation of the assertion.
3) If the assertion is true but the reason is false.
4) If the assertion is false but the reason is true.

113. Which of the following conditions would be favoured by thermoacidophiles ?
1) Hot and alkaline
2) Snow and acidic
3) Hot and sulphur spring
4) Gut of cows

114. Photosynthesis is an important process for life on earth because
1) it is the primary source of all food on earth
2) it is responsible for the release of oxygen
3) it is the only natural process responsible for the utilisation of sunlight
4) All of the above

115. Some of the cyanobacteria can fix atmospheric nitrogen in their specialised cells called
1) akinetes 2) heterocyst
3) endospores 4) homocyst

116. Which of the following statements is/are incorrect ?
(a) Nearly 1/3rd of all enzymes require the presence of metal ions for catalytic function.
(b) Metal ions form coordinate bond with side chain at active site of metalloenzyme and at the same time form one or more coordinate bonds with the substrate.
(c) NAD and NADH (co-enzymes) contain niacin (vitamin).
(d) Coenzyme are organic compounds but their association with the apoenzyme is only transient, usually occurring during catalysis.
1) All of these 2) Only (c) and (d)
3) Only (d) 4) None of these

117. PS-I is located on the
1) non-appressed part of grana thylakoids
2) stroma thylakoids
3) stroma
4) Both (1) and (2)

118. Which of the following bacteria play an important role in the recycling of nutrients like nitrogen, phosphorus, iron and sulphur ?
1) Chemoheterotrophic bacteria
2) Chemosynthetic autotrophic bacteria
3) Parasitic bacteria
4) Saprophytic bacteria

119. In non-cyclic photophosphorylation,
1) only ATP is synthesised.
2) last electron acceptor is ferrodoxin.
3) NADP reductase activity requires H^+ from stroma.
4) there is involvement of only PS I.

120. In which of the following organisms the cell wall is composed of two thin overlapping shells, which fit together like a soap-case ?
1) Diatoms 2) Golden algae
3) Slime moulds 4) *Gonyaulax*

121. Finer/structural details of the cell were revealed by :
1) Light microscope
2) Phase contrast microscope
3) Dark field microscope
4) Electron microscope

122. 'Bakanae' (foolish seedling) disease of rice seedlings, was caused by *Gibberella fujikuroi*, which is a
1) fungi 2) protozoan
3) bacteria 4) virus

123. Diatomaceous earth is used for all except
1) filtration of oils
2) filtration of syrups
3) cleaning agent in metal polishes
4) gobar gas production

124. Incomplete breakdown of sugar in anaerobic respiration forms
1) glucose and carbon dioxide
2) alcohol and carbon dioxide
3) water and carbon dioxide
4) fructose and water

125. Which one of the following organisms is scientifically incorrectly named and incorrectly described ?
1) *Plasmodium falciparum*–A protozoan pathogen causing the most serious type of malaria
2) *Trypanosoma gambiense*–The parasite of sleeping sickness
3) Diatoms–Very good pollution indicators
4) *Gonyaulax* A chrysophyte, which shows bioluminescence

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126. **Assertion :** A coenzyme or metal ions that is very tightly bound to enzyme protein is called prosthetic group.
Reason : A complete, catalytically active enzyme together with its bound prosthetic group is called apoenzyme.
1) Both assertion and reason are true and reason is the correct explanation of the assertion.
2) Both assertion and reason are true but reason is not the correct explanation of the assertion.
3) Assertion is true but the reason is false.
4) Both assertion and reason are false.

127. Which of the following options describe the coenocytic condition in fungus ?
1) Uninucleate hypha without septum
2) Multinucleate hypha without septum
3) Multicellular hypha
4) Multiciliate hypha

128. When two molecules of acetyl Co-A enter the TCA cycle, net gain at the end of this cycle is
1) $2NADH_2 + 2FADH_2 + 1$ GTP
2) $3NADH_2 + 2FADH_2 + 2$ GTP
3) $6NADH_2 + 2FADH_2 + 2$ GTP
4) $3NADH_2 + 1FADH_2 + 4$ GTP

129. Arachidonic acid has
1) 20 carbons excluding carboxyl carbon.
2) 20 carbons including carboxyl carbon.
3) 16 carbons excluding carboxyl carbon.
4) 16 carbons including carboxyl carbon.

130. During meiosis, DNA replication occurs
1) thrice, during interphase, M-phase and cytokinesis
2) twice, i.e. during interphase and M-phase
3) once during S-phase
4) once during prophase

131. Which of the following is the correct sequence of Class → Mycelium → Fruiting body observed in the kingdom–Fungi ?
1) Phycomycetes → Septate, coenocytic → Not present
2) Ascomycetes → Aseptate and branched → Ascocarp
3) Basidiomycetes → Aseptate and branched → Basidiocarp
4) Deuteromycetes → Septate and branched → Not present

132. The cell cycle of mammalian cell and yeast, respectively, takes about
1) 24 hrs, 90 min
2) 60 min each
3) 30 min, 24 days
4) 90 min, 24 hrs

133. All the given fungi belong to Deuteromycetes, except
1) *Alternaria* 2) *Colletotrichum*
3) *Trichoderma* 4) *Ustilago*

134. Cell is the fundamental structural and functional unit of all living organisms. This is clear by the fact that :
1) All cells arise by the fusion of two cells
2) All cells are totipotent
3) Subcellular components can regenerate a complete cell
4) Anything less than a complete structure of a cell does not ensure independent living

135. Which of the following groups of diseases is caused by viruses ?
1) Mumps, smallpox, herpes, influenza
2) AIDS, diabetes, herpes, tuberculosis
3) Anthrax, cholera, tetanus, tuberculosis
4) Cholera, tetanus, smallpox, influenza

136. The arena of cellular activities is
1) Nucleus 2) Cytoplasm
3) Mitochondria 4) Microbodies

137. Phylogenetic system of classification is also known as
1) Artificial system of classification
2) Hutchinson's system of classification
3) Natural system of classification
4) Whittaker's system of classification

138. The living matter is mainly composed of
1) carbon, nitrogen, sulphur and oxygen.
2) carbon, hydrogen, calcium, oxygen and sodium.
3) carbon, hydrogen, oxygen, nitrogen, phosphorus and sulphur.
4) carbon, hydrogen, oxygen, sodium and potassium.

139. **Assertion (A) :** Lycopodium and Selaginella are heterosporous.
Reason (R) : In heterosporous condition, two kinds of spores are produced by the plant.
1) If both A and R are true and R is the correct explanation of A.
2) If both A and R are true, but R is not the correct explanation of A.
3) If A is true, but R is false.
4) If A is false, but R is true.

140. Which option is incorrect about Krebs' cycle?
1) It is also called citric acid cycle
2) The intermediate compound, which links glycolysis with Krebs' cycle is malic acid
3) It occurs in mitochondria
4) It starts with six carbon compound

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141. White blood corpuscles have
1) Rounded cells 2) Columnar cells
3) Polygonal cells 4) Amoeboid cells

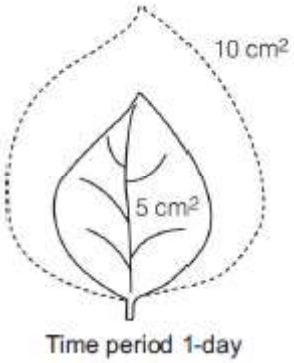
142. Algae include unicellular forms like ...A..., filamentous forms like ...B... and colonial forms like ...C... . Here, A, B and C refer to
1) A–Chlamydomonas, B–Volvox, C–Ulothrix
2) A–Ulothrix, B–Volvox, C–Chlamydomonas
3) A–Volvox, B–Ulothrix, C–Chlamydomonas
4) A–Chlamydomonas, B–Ulothrix, C–Volvox

143. Canary grass experiment for phototropism was first conducted by
1) Went 2) Darwin and Darwin
3) Cousins 4) Kurosawa

144. An alga, which can be employed as food for human being is
1) *Ulothrix* 2) *Chlorella*
3) *Spirogyra* 4) *Polysiphonia*

145. If the chromosome number in the leaf of *Funaria* is 20, what will be the chromosome number in the spores ?
1) 10 2) 40
3) 20 4) 5

146. In the given figure, find out the absolute and relative growth rate and choose the correct option.



	Absolute Growth Rate (AGR)	Relative Growth Rate (RGR)
1)	1 cm^2	1 cm^2
2)	100 cm^2	5 cm^2
3)	5 cm^2	100 cm^2
4)	0.5 cm^2	100 cm^2

147. Select the correct sequential arrangement of reproductive structures in pteridophytes.
1) Sporophyll → Strobili → Sporangia → Spore mother cell → Spores
2) Strobili → Sporophyll → Sporangia → Spores
3) Spores → Sporophyll → Sporangia → Strobili
4) Spores → Sporangia → Sporophyll → Strobili

148. Read the given statements regarding a cell organelle.
(A) It contains water, sap, excretory products and other unwanted materials.
(B) It is bounded by a single membrane called tonoplast.
(C) In plant cells, it can occupy upto 90% of cellular volume.
The above features are attributed to
1) lysosome 2) vacuole
3) peroxisome 4) mitochondrion.

149. PEPCase has an advantage over RuBisCO. The advantage is
1) RuBisCO combines with O_2, but PEPCase does not
2) RuBisCO combines with NO_2, but PEPCase does not
3) RuBisCO conserves energy, but PEPCase does not
4) PEPCase is present in both mesophyll cells and bundle sheath cells, but RuBisCO is not

150. In gymnosperms, the pollen chamber represents
1) a cell in the pollen grain in which the sperms are formed
2) a cavity in the ovule in which pollen grains are stored after pollination
3) an opening in the megagametophyte through which the pollen tube approaches the egg
4) the microsporangium in which pollen grains develop

151. Match Column-I with Column-II and select the correct option.

Column-I	Column-II
(a) OEC	(i) Primary e^- acceptor
(b) NADP reductase	(ii) Photolysis of H_2O
(c) Succinyl CoA	(iii) Outer surface of thylakoid membrane
(d) Phaeophytin	(iv) Chlorophyll synthesis

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

152. **Assertion (A) :** Bryophytes are a class of kingdom–Plantae.
Reason (R) : Algae, fungi, lichens and mosses are included in bryophytes.
1) If both A and R are true and R is the correct explanation of A.
2) If both A and R are true, but R is not the correct explanation of A.
3) If A is false, but R is false.
4) If A is false, but R is true.

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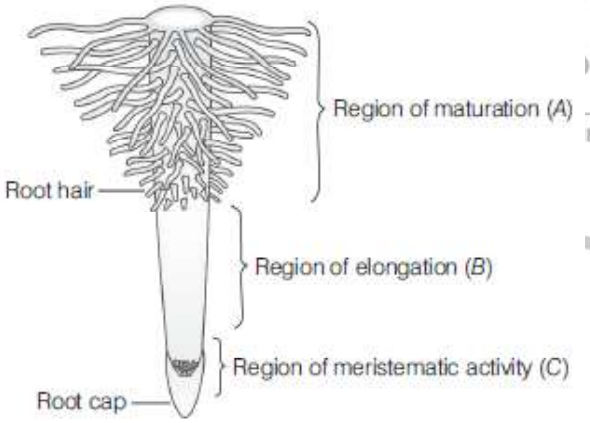
153. Which of the following is incorrect regarding photosystem ?
1) There are two photosystems (PS I and PS II).
2) PS I and PS II are named in sequence of their discovery.
3) Light harvesting complex (LHC) is made up of hundreds of pigment molecules which are bounded proteins.
4) Each photosystem has all the pigments (except one molecule of chlorophyll *b*).

154. Glycolysis takes place in the cytoplasm of
1) all living cells 2) eukaryotic cells
3) anaerobic cells 4) most muscle cells

155. Which amongst the following options contains mismatched pair ?
1) Direct elongation of radicle – Primary roots
2) Root system originating from the stem's base– Fibrous roots
3) Roots not arising from the radicle–Stilt roots
4) Constitution of primary root and its branches – Tap root system

156. Which of the following options is correct with respect to the given figure showing different zones of a typical root ?



1) Part B mainly helps in absorption of water
2) Quiescent centre is present in part B
3) Part A is most suitable for anatomical studies of root
4) Differentiation of cells can be observed in part C

157. Perianth is the condition in which
1) calyx and corolla are not distinct
2) calyx is present, but corolla is absent
3) corolla is present, but calyx is absent
4) calyx and corolla are not present

158. Complete the paragraph given below by replacing A and B with correct terms.
Androecium is composed of A, which represents the male reproductive organ. It consists of a stalk and B, which is usually bilobed and each lobe has two chambers, the pollen sacs. The pollen grains are produced in pollen sacs.
1) A – stamens; B – anther
2) A – stigma; B – filament
3) A – axile; B – anther
4) A – stamens; B – filament

159. The tissues responsible for secondary growth in plants are
1) vascular cambium 2) cork cambium
3) lateral meristem 4) All of these

160. Which of the following is correct ?
1) Perigynous–Plum, peach, rose
2) Epigynous–Guava and cucumber
3) Hypogynous–Mustard and rose
4) Both (1) and (2)

161. Match the following columns.

	Column I (Features)		Column II (Phases of cell division)
A.	Separation of daughter chromosomes	1.	Interphase
B.	Division of cytoplasm	2.	Karyokinesis
C.	Phase between two successive M-phases	3.	S-phase
D.	Synthesis phase	4.	Cytokinesis

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

162. I. When carpels are free, they are called…A…as in lotus and rose.
II. When carpels are fused, they are called…B…as in mustard and tomato.
Here, A and B refer to
1) A–syncarpous; B–apocarpous
2) A–apocarpous; B–syncarpous
3) A–monocarpous; B–multicarpous
4) A–multicarpous; B–monocarpous

163. 'Apical dominance' in plants is the result of
1) cytokinin 2) auxin
3) gibberellin 4) $CH_2 - CH_2$

164. $\oplus \, ♂ \, K_{(5)}\overset{\frown}{C_{(5)}} \, A_5\underline{G}_{(2)}$ is the floral formula of
1) Brassica 2) Allium
3) Sesbania 4) Petunia

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165. The partial floral formula of a flower is $K_{(5)}C_5A_{(\infty)}\underline{G}_{(5)}$. Which of the following sets of information is conveyed here?
1) Gamosepalous, polypetalous, syncarpous and superior ovary
2) Polysepalous, polypetalous, syncarpous and inferior ovary
3) Gamosepalous, gamopetalous, polycarpous and superior ovary
4) Gamosepalous, polypetalous, syncarpous and inferior ovary

166. In order to enter the glycolytic pathway, sucrose is converted into glucose and fructose by the enzyme
1) invertase 2) zymase
3) isomerase 4) triose phosphatase

167. Read the following statements and find out the incorrect statement.
1) There are structural similarities and variations (differences) in the external morphology and internal structure of the larger living organisms, both plants and animals
2) Plants have cells as the basic unit which are organised into tissues and in turn the tissues are organised into organs
3) A tissue is a group of cells having a common origin and usually performing different functions
4) Axillary buds are present in the axils of leaves and are capable of forming a branch or a flower

168. How many characters for flower are correct from given characters ?
(i) In some flowers like lily, the calyx and corolla are not distinct and are termed as perianth.
(ii) Actinomorphic flower have bilateral symmetry or zygomorphic flower have radial symmetry.
(iii) Actinomorphic flower can be divided into two equal halves by any radial plane passing through the centre e.g., pea, gulmohur, bean, Cassia.
(iv) Zygomorphic flower can be divided into two similar halves by only one vertical plane e.g., mustard, datura, chilli.
(v) Asymmetric flower cannot be divided into two similar halves by any vertical plane passing through the centre, as in canna.
1) One 2) Two
3) Three 4) Four

169. The tissue present in the outer covering of a plant cell is
1) Ground tissue 2) Vascular tissue
3) Dermal tissue 4) None of the above

170. Which of the following options gives the correct sequences of events during mitosis ?
1) Condensation → nuclear membrane disassembly → crossing over → segregation → telophase
2) Condensation → nuclear membrane disassembly → arrangement at equator → centromere division → segregation → telophase
3) Condensation → crossing over → nuclear membrane disassembly → segregation → telophase
4) Condensation → arrangement at equator → centromere division → segregation → telophase

171. The cuticle is absent in :
1) Monocot leaf 2) Monocot stem
3) Dicot leaf 4) Dicot root

172. Anaphase Promoting Complex (APC) is a protein degradation machinery necessary for proper mitosis of animals cells. If APC is defective in a human cells, which of the following is expected to occur ?
1) Chromosomes will not condense
2) Chromosomes will be fragmented
3) Chromosomes will not segregate
4) Recombination of chromosome arms will occur

173. Read the following statements and choose the correct option/options.
Statement-I : Stomata are structures present in the epidermis of leaves.
Statement-II : Stomata regulate the process of transpiration and gaseous exchange.
1) Statement-I and Statement-II both are correct
2) Statement-I and Statement-II both are incorrect
3) Statement-I is correct and Statement-II is incorrect
4) Statement-I is incorrect and Statement-II is correct

174. Select the correct pair
1) Loose parenchyma cell srupturing the epidermis and forming a lens shaped opening in bark – Spongy parenchyma
2) Large colourless empty cells in the epidermis of grass leaves – Subsidiary cells
3) In dicot leaves, vascularbundles are surrounded by by large thick-walled cells – Conjunctive tissue
4) Cells of medullary rays that form part of cambial ring – Interfascicular cambium

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175. **Assertion :** (A) Diakinesis is the final stage of prophase-I.
Reason (R) : Terminalisation of chiasmata occurs in diakinesis.
1) If both A and R are true and R is the correct explanation of A
2) If both A and R are true, but R is not the correct explanation of A
3) If A is true, but R is false
4) If A is false, but R is true

176. The specialised epidermal cells present in the vicinity of guard cells are called
1) Bulliform cells
2) Subsidiary cells
3) Companion cells
4) Endodermal cells

177. Match column-I with column-II :

	Column-I		Column-II
a.	Vessels	(i)	Cells are living, with thin cellulosic cell walls
b.	Tracheids	(ii)	Cells possess highly thickened walls with obliterated central lumen
c.	Xylem fibres	(iii)	Individual members are interconnected through perforation in their common walls
d.	Xylem Parenchyma	(iv)	Elongated tube-like cells with thick, lignified walls and tapering ends

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

178. Choose the correct statements regarding cell cycle.
I. M-phase is also called the resting phase becauseDNA replication does not occur during this phase.
II. Interphase is the time during which the cell is preparing for division.
III. The interphase is divided into four prominent phases, i.e.G_0, G_1, S and G_2-phases.
IV. Interphase represents the phase between the two successive M-phases.
The option with correct statements is
1) I and IV 2) II and III
3) I and III 4) II and IV

179. Match column-I with column-II :

	Column-I		Column-II
a.	Stele	(i)	Innermost layer of cortex
b.	Endodermis	(ii)	Suberin
c.	Casparian strips	(iii)	All the tissues outer to vascular cambium
d.	Bark	(iv)	All the tissues inner to endodermis

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

180. Which of the following statements is incorrect ?
1) Lipids are strictly macromolecules.
2) Palmitic acid has 16 carbons including carboxyl carbon.
3) Oils have low melting point and hence remain as oil in winters.
4) Arachidonic acid is an unsaturated fatty acid.

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