PHYSICS

SECTION - A

1. A body of mass 500 g moves along X – axis such that it's velocity varies with displacement x according to the relation $v = 10\sqrt{x}\, m/s$. The force acting on the body is

(1) 5 N (2) 166 N

(3) 25 N (4) 125 N

2. Three force $F_1 = 10N, F_2 = 8N, F_3 = 6N$ are acting on a particle of mass 5 kg. The forces F_2 and F_3 are applied perpendicularly so that particle remains at rest. If the force F_1 is removed, then the acceleration of the particle is

(1) $0.5\, ms^{-2}$ (2) $4.8\, ms^{-2}$

(3) $2\, ms^{-2}$ (4) $7\, ms^{-2}$

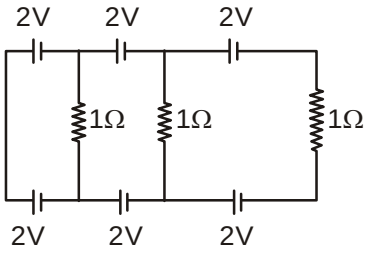
3. The position vector of a particle related to time t is given by $\vec{r} = (10t\hat{i} + 15t^2\hat{j} + 7\hat{k})$ m

The direction of net force experienced by the particle is

(1) Positive X – axis (2) Positive Z – axis

(3) Positive Y – axis (4) In x – y plane

4. In the below circuit, the current in each resistance is



(1) 0.25 A (2) 0.5 A

(3) 0 A (4) 1 A

5. A body of mass M at rest explodes into three pieces, in the ratio of masses 1 : 1 : 2. Two smaller pieces fly off perpendicular to each other with velocities of 30 ms^{-1} and 40 ms^{-1} respectively. The velocity of the third piece will be :

(1) $15\, ms^{-1}$ (2) $25\, ms^{-1}$

(3) $35\, ms^{-1}$ (4) $50\, ms^{-1}$

6. A particle of mass 0.3 kg is subjected to a force $F = -kx$ with $k = 15\, Nm^{-1}$. What will be its initial acceleration, if it is released from a point 20 cm away from the origin ?

(1) 3 ms^{-2} (2) 15 ms^{-2}

(3) 5 ms^{-2} (4) 10 ms^{-2}

7. A person is standing in an elevator. In which situation, he, experiences weight loss ?

(1) When the elevator moves upward with constant acceleration

(2) When the elevator moves downward with constant acceleration

(3) When the elevator moves upward with uniform velocity

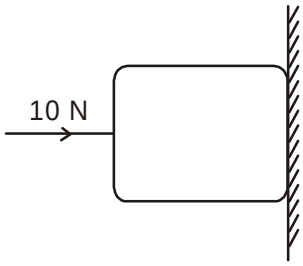
(4) When the elevator moves downward with uniform velocity

8. A body of mass 10 kg is moving with an initial speed of 20 m/s. The body stops after 5 s due to friction between body and the floor. The value of the coefficient of friction is (Take, acceleratoin due to gravity g = 10 ms^{-2})

(1) 0.3 (2) 0.5

(3) 0.4 (4) 0.2

9. A horizontal force of 10 N is necessary to just hold a block stationary against a wall. The cefficient of friction between the block and the wall is 0.2. The weight of the block is



(1) 20 N (2) 50 N

(3) 100 N (4) 2 N

10. A vehicle of mass 200 kg is moving along a levelled curved road of radius 70 m with angular velocity of 0.2 rad/s. The centripetal force acting on the vehicle is

(1) 560 N (2) 2240 N

(3) 14 N (4) 2800 N

11. A car is moving on a horizontal curved road with radius 50 m. The approximate maximum speed of car will be, if friction coefficent between tyres and road is 0.34. [Take, g = 10 ms^{-2}].

(1) 17 ms^{-1} (2) 3.4 ms^{-1}

(3) 13 ms^{-1} (4) 22.4 ms^{-1}

12. A car is moving with a constant speed of 20 m/s in a circular horizontal track of radius 40 m. A bob is suspended from the roof of the car by a massless string. The angle made by the string with the vertical will be (Take, g = 10 m/s^2)

(1) $\frac{\pi}{3}$ (2) $\frac{\pi}{2}$

(3) $\frac{\pi}{4}$ (4) $\frac{\pi}{6}$

13. A stone of mass m, tied to string is being whirled in a vertical circle with a uniform speed. The tension in the string is

(1) the same throughout the motion

(2) minimum at the highest position of the circular path

(3) minimum at the lowest position of the circular path

(4) minimum when the rope is the horizontal position.

14. The magnetic lines of force inside a bar magnet

(1) are from North – pole to South – pole of the magnet

(2) do not exist

(3) depend upon the area of cross – section of the bar magnet

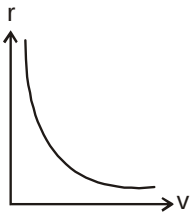
(4) are from south – pole to North – pole of the magnet

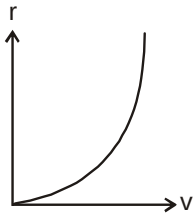
15. Potential energy as a function of r is given by $U = \frac{A}{r^{10}} - \frac{B}{r^5}$, where r is the interatomic distance, A and B are positive constants. The equilibrium distance between the two atoms will be

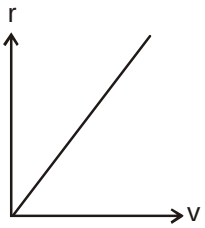
(1) $\left(\frac{A}{B}\right)^{1/5}$ (2) $\left(\frac{B}{A}\right)^{1/5}$

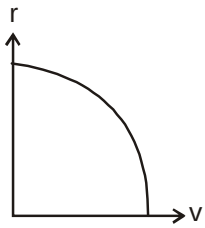
(3) $\left(\frac{2A}{B}\right)^{1/5}$ (4) $\left(\frac{B}{2A}\right)^{1/5}$

16. A particle of mass m moves in a circular orbit under the central potential field, $U(r) = \frac{-C}{r}$, where C is a positive constant. The correct radius – velocity graph of the particle's motion is

(1) 

(2) 

(3) 

(4) 

17. A force acts on a 2 kg object, so that its position is given as a function of time as $x = 3t^2 + 5$. What is the work done by this force in first 5 seconds

(1) 850 J (2) 900 J

(3) 950 J (4) 875 J

18. A spring of force constant 800 N/m has an extension of 5 cm. The work done in extending it from 5 cm to 15 cm is

(1) 16 J (2) 8 J

(3) 32 J (4) 24 J

19. A uniform chain of length 3 m and mass 3 kg overhangs a smooth table with 2 m laying on the table. If k is the kinetic energy of the chain in joule as it completely slips off the table, then the value of k is ..... (Take, g = 10 m/s^2)

(1) 40 J (2) 45 J

(3) 55 J (4) 60 J

20. Sand is being dropped from a stationary dropper at a rate of 0.5 kgs^{-1} on a conveyor belt moving with a velocity of 5 ms^{-1}. The power needed to keep the belt moving with the same velocity will be

(1) 1.25 W (2) 2.5 W

(3) 6.25 W (4) 12.5 W

21. A pendulum bob has a speed of 3 m/s at its lowest position. The pendulum is 50 cm long. The speed of bob when the length makes an angle of 60° to the vertical will be .....m/s (Take, g = 10 m/s^2)

(1) 1 (2) 2

(3) 4 (4) 6

22. A wire of resistance 160Ω is melted and drawn into a wire one – fourth of its length. The new resistance of the wire will be

(1) 16Ω (2) 640Ω

(3) 10Ω (4) 40Ω

23. Given below are two statements.

Statement I : The equivalent resistance of resistor in a series combination is smaller than least resistance used in the combination.

Statement II : The resistivity of the material is independent of temperature.

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

(1) Statement I is false but Statement II is true
(2) Statement I is true but statement II is false
(3) Both Statement I and Statement II are true
(4) Both statement I and Statement II are false

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

Assertion (A) Alloys such as constantan and manganin are used in making standard resistance coils.

Reason (R) : Constantan and manganin have very small value of temperature coefficient of resistance.

In the light of the above statements, choose the correct answer from the opttions given below.

(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

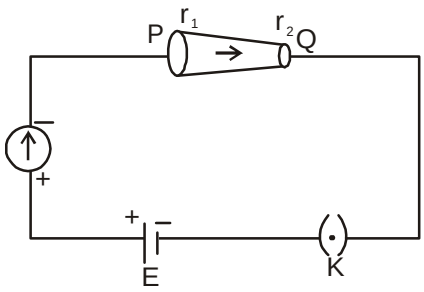
(4) (A) is false but (R) is true.

25. An aluminium wire is stretched to make its length 0.4% larger. Then, percentage change in resistance is

(1) 0.4 % (2) 0.2 %

(3) 0.8% (4) 0.6 %

26. In the given figure, a battery of emf E is connected across a conductor PQ of length *l* and different area of cross – sections having radii r_1 and $r_2(r_2 < r_1)$.



Choose the correct option as one moves from P to Q

(1) Drift velocity of electron increases
(2) Electric field decreases

(3) Electric current decreases

(4) All of the above

27. A current through a wire depends on time as $i = \alpha_0 t + \beta t^2$, where $\alpha_0 = 20\,A/s$ and $\beta = 8\,As^{-2}$. Find the charge crossed through a section of the wire in 15 s.

(1) 260 C (2) 2100 C

(3) 11250 C (4) 2250 C

28. A circuit to verify Ohm's law uses ammeter and voltmeter in series or parallel connected correctly to the resistor. In the circuit,

(1) ammeter is always used in parallel and voltmeter in series

(2) Both ammeter and voltmeeter must be connected in parallel

(3) ammeter is always connected in series and voltmeter in parallel

(4) Both ammeter and voltmeter must be connected in series

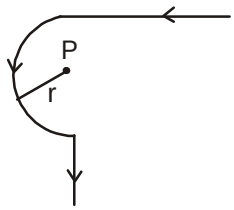
29. A soft ferromagnetic material is placed in an external magnetic field.The magnetic domains

(1) decrease in size and changes orintation
(2) increase in size but no change orientation

(3) may increase or decrease in size and change its orientation

(4) have no relation with external magnetic field

30. Find the magnetic field at the point P in figure. The curved portion is a semicircle connected to two long straight wires.



(1) $\frac{\mu_0 i}{2r}\left(\frac{1}{2}+\frac{1}{2\pi}\right)$ (2) $\frac{\mu_0 i}{2r}\left(1+\frac{1}{\pi}\right)$

(3) $\frac{\mu_0 i}{2r}\left(\frac{1}{2}+\frac{1}{\pi}\right)$ (4) $\frac{\mu_0 i}{2r}\left(1+\frac{2}{\pi}\right)$

31. Two ions having same mass have charges in the ratio 1 : 2. They are projected normally in a uniform magnetic field with their speeds in the ratio 2 : 3. The ratio of the radii of their circular trajectories is

(1) 1 : 4 (2) 4 : 3

(3) 3 : 1 (4) 2 : 3

32. A charged particle moves through a magnetic field perpendicular to its direction. Then,

(1) the momentum changes but the kinetic energy is constant

(2) both momentum and kinetic energy of the particle are not constant

(3) both momentum and kinetic energy of the particle are constant

(4) kinetic energy changes but the momentum is constant

33. Two parallel, long wires are kept 0.20 m apart in vacuum, each carrying current of x A in the same direction. If the force of attraction per metre of each wire is $2\times10^{-6}N$, then the value of x is approximately

(1) 1 (2) 2.4

(3) 1.4 (4) 2

34. A square loop is carrying a steady current I and the magnitude of its magnetic dipole moment is m. If this square loop is changed to a circular loop and it carries the same current, the magnitude of the magnetic dipole moment of circular loop (in A – m) will be

(1) $\frac{4m}{\pi}$ (2) $\frac{3m}{\pi}$

(3) $\frac{2m}{\pi}$ (4) $\frac{m}{\pi}$

35. The current sensitivity of a galvanometer can be increased by

A. decreasing the number of turns

B. increasing the magnetic field

C. decreasing the area of the coil

D. decreasing the torsional constant for the spring

Choose the most appropriate answer from the options given below.

(1) B and C only (2) C and D only

(3) A and C only (4) B and D only

SECTION - B

36. Statement I : A cyclist is moving on an unbanked road with a speed of $7\,kmh^{-1}$ and takes a sharp circular turn along a path of radius of 2 m without reducing the speed. The static friction coefficient is 0.2. The cyclist will not slip and pas the curve ($g = 9.8\ m/s^2$)

Statement – II : If the road is banked at an angle is 45°, cyclist can cross the curve of 2 m radius with the speed of 18.5 kmh^{-1} without slipping. In the light of the above statements, choose the correct answer from the options given below.

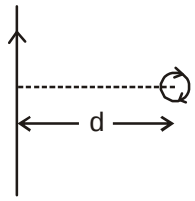
(1) Statement I is false and statement II is true

(2) Statement I is true and Statement II is false

(3) Both statement I and Statement II are false

(4) Both statement I and Statement II are true

37. An infinitely long current – carrying wire and a small current – carrying loop are in the plane to the paper as shown. The radius of the loop is a and distance of its centre from the wire is d(d>>a). If the loop applies a force F on the wire, then



(1) $F \propto \left(\frac{a^2}{d^3}\right)$

(2) F = 0

(3) $F \propto \left(\frac{a}{d}\right)$ (4) $F \propto \left(\frac{a}{d}\right)^2$

38. A particle of mass m and charge q is in an electric and magnetic field is given by $\vec{E} = 2\hat{i} + 3\hat{j}, \vec{B} = 4\hat{j} + 6\hat{k}$. The charged particle is shifted from the origin to the point $P(x = 1; y = 1)$ along a straight path. The magnitude of the total work done is :

(1) (0.35) q (2) (0.15) q

(3) (2.5) q (4) 5 q

39. The magnetic field at the center of current carrying circular loop is B_1. The magnitude field at a distance of $\sqrt{3}$ times radius of the given circular loop from the centre on its axis is B_2. The value of $\frac{B_1}{B_2}$ will be

(1) 9 : 4 (2) $12:\sqrt{5}$

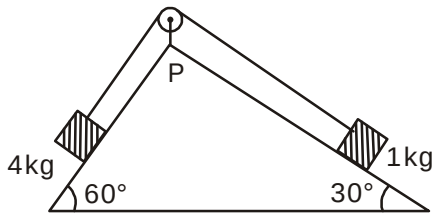
(3) 8 : 1 (4) $5:\sqrt{3}$

40. In a conductor, if the number of conduction electrons per unit volume is $8.5\times10^{28}m^{-3}$ and mean free time is 25 fs(femto second), it's approximate resistivity is (Take, $m_e = 9.1\times10^{-31}$ kg)

(1) $10^{-7}\Omega-m$ (2) $10^{-5}\Omega-m$

(3) $10^{-6}\Omega-m$ (4) $10^{-8}\Omega-m$

41. As per given figure, a weightless pulley P is attached on doubble inclined frictionless surfaces. The tension in the string (massless) will be (if g = 10 m/s^2)



(1) $4(\sqrt{3}+1)N$ (2) $(4\sqrt{3}+1)N$

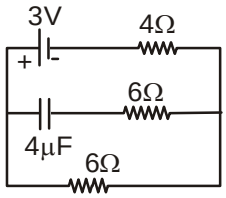
(3) $(4\sqrt{3}-1)N$ (4) $4(\sqrt{3}-1)N$

42. A cell of emf 90 V is connected across series combination of two resistors each of 100Ω resistance. A voltmeter of resistance 400Ω is used to measure the potential difference across one resistor. The reading of the voltmeter will be

(1) 45 V (2) 40 V

(3) 80 V (4) 90 V

43. In the network shown below, the charge accumulated in the capacitor in steady state will be



(1) $12\mu C$ (2) $4.8\mu C$

(3) $7.2\mu C$ (4) $10.3\mu C$

44. In a large building, there are 15 bulbs of 40 W, 5 bulbs of 100 W, 5 fans of 80 W and 1 heater of 1 kW. The voltage of the electric mains is 220 V. Then, the minimum current should be

(1) 8 A (2) 10 A

(3)11.4 A (4) 14 A

45. A battery of 3.0 V is connected to a resistor dissipating 0.5 W of power. If the terminal voltage of the battery is 2.5 V, the power dissipated within the internal resistance is

(1) 0.072 W (2) 0.125 W

(3) 0.50 W (4) 0.10 W

46. A hollow cylindrical conductor has length of 3.14 m, while its inner and outer diameters are 4mm and 8 mm respectively. The resistance of the conductor is $n\times10^{-3}\Omega$.

If the resistivity of the material is $2.4\times10^{-8}\Omega-m$.

The value of n is .....

(1) 2 (2) 6

(3) 10 (4) 20

47. A body of mass 2 kg is initially at rest. It starts moving unidirectionally under the influence of a source of constant power P. Its displacement in 4sec. is $\frac{1}{3}\alpha^2\sqrt{P}\,metre$. The value of α will be ....

(1) 4 (2) 8

(3) 10 (4) 16

48. A stone tied to a string of length L is whirled in a vertical circle with the other end of the string at the centre. At a certain instant of time, the stone is at its lowest position and has a speed u. The magnitude of change in its velocity, as it reaches a position where the string is horizontal, is $\sqrt{x(u^2 - gL)}$. The value of x is

(1) 3 (2) 2

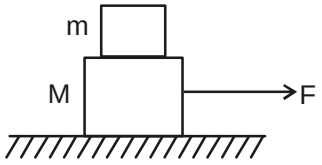
(3) 1 (4) 5

49. A body of mass 200 g is tied to a spring of spring constant 12.5 N/m, while the other end of spring is fixed at point O. If the body moves about O in a circular path on a smooth horizontal surface with constant angular speed 5 rad/s, then the ratio of extension in the spring to its natural length will be

(1) 2 : 5 (2) 1 : 2

(3) 2 : 3 (4) 1 : 1

50. A system of two blocks of mass m = 2 kg and M = 8 kg is placed on a smooth table as shown in figure. The coefficient of static friction between two blocks is 0.5. The maximum horizontal force F that can be applied to the block of mass M, so that the blocks move together will be



(1) 9.8 N (2) 39.2 N

(3) 49 N (4) 78.4 N

CHEMISTRY

SECTION - A

51. During the kinetic study of the reaction $2A + B \rightarrow C + D$ following results were obtained

Run	[A](mol L^{-1})	[B](mol L^{-1})	Initial rate of formation of D (mol L^{-1} min^{-1})
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Based on the above data which one of the following is correct ?

(1) rate = k $[A]^2$ [B] (2) rate = k [A] [B]

(3) rate = k $[A]^2$ $[B]^2$ (4) rate = k [A] $[B]^2$

52. Half life of a first order reaction is 4s and the initial concentration of the reactant is 0.12 M. The concentration of the reactant left after 16s is

(1) 0.0075 M (2) 0.06 M

(3) 0.03 M (4) 0.015 M

53. The reaction A $\rightarrow$ B follows first order kinetics. The time taken for 0.8 mole of A to produce 0.6 mole of B is 1 hour. What is the time taken for conversion of 0.9 mole of A to produce 0.675 mole of B?

(1) 2 hours (2) 1 hour

(3) 0.5 hour (4) 0.25 hour

54. Consider the reaction, 2A + B $\rightarrow$ products. When concentration of B alone was doubled, the half-life did not change. When the concentration of A alone was doubled, the rate increased by two times. The unit of rate constant for this reaction is

(1) s^{-1} (2) L mol^{-1} s^{-1}

(3) no unit (4) mol L^{-1} s^{-1}

55. Activation energy of a chemical reaction can be determined by

(1) evaluating rate constant at standard temperature

(2) evaluating velocities of reaction at two different temperatures

(3) evaluating rate constants at two different temperatures

(4) changing concentration of reactants

56. If half-life of a substance is 5 yrs, then the total amount of substance left after 15 years, when initial amount is 64 grams is

(1) 16 grams (2) 2 grams

(3) 32 grams (4) 8 grams.

57. The activation energy for a hypothetical

reaction, A $\rightarrow$ Product, is 12.49 kcal/mole. If temperature is raised from 295 to 305, the rate of reaction increased by

(1) 60% (2) 100%

(3) 50% (4) 20%

58. Standard electrode potential for Sn^{4+} / Sn^{2+} couple is + 0.15 V and that for the Cr^{3+} / Cr couple is – 0.74 V. These two couples in their standard state are connected to make a cell. The cell potential will be

(1) + 1.19 V (2) + 0.89 V

(3) + 0.18 V (4) + 1.83 V

59. Which of the following statement is not correct about an inert electrode in a cell ?

(1) It does not participate in the cell reaction.

(2) It provides surface either for oxidation or for reduction reaction.

(3) It provides surface for conduction of electrons.

(4) It provides surface for redox reaction.

60. What is the standard cell potential E° for an electrochemical cell in which the following reaction takes place spontaneously ?

$Cl_2(g) + 2Br^- \rightarrow Br_2(aq) + 2Cl^- \Delta G° = -50.6\,kJ$

(1) 1.2 V (2) 0.53 V

(3) 0.26 V (4) –0.53 V

61. The resistance of 0.01 N solution of an electrolyte was found to be 220 ohm at 298 K using a conductivity cell with a cell

constant of 0.88cm^{-1}. The value of equivalent conductance of solution is –

(1) 400 mho cm^2 g eq^{-1}

(2) 295 mho cm^2 g eq^{-1}

(3) 419 mho cm^2 g eq^{-1}

(4) 425 mho cm^2 g eq^{-1}

62. The specific conductance of a 0.1 N KCl solution at 23°C is 0.012 $ohm^{-1}cm^{-1}$. The resistance of cell containing the solution at the same temperature was found to be 55 ohm.

The cell constant will be

(1) 0.142 cm^{-1} (2) 0.66 cm^{-1}

(3) 0.918 cm^{-1} (4) 1.12 cm^{-1}

63. Molar conductivities (Λ_m°) at infinite dilution of NaCl, HCl and CH_3COONa are 126.4, 425.9 and 91.0 S cm^2 mol^{-1}respectively. Λ_m° for CH_3COOH will be

(1) 425.5 S cm^2 mol^{-1}

(2) 180.5 S cm^2 mol^{-1}

(3) 290.8 S cm^2 mol^{-1}

(4) 390.5 S cm^2 mol^{-1}

64. An electrolytic cell contains a solution of Ag_2SO_4 and has platinum electrodes. A current is passed until 1.6 gm of O_2 has been liberated at anode. The amount of silver deposited at cathode would be

(1) 107.88 gm (2) 1.6 gm

(3) 0.8 gm (4) 21.60 gm

65. How many moles of Pt may be deposited on the cathode when 0.80 F of electricity is passed through a 1.0 M solution of Pt^{4+} ?

(1) 1.0 mol (2) 0.20 mol

(3) 0.40 mol (4) 0.80 mo

66. **Assertion** : On increasing dilution, the specific conductance keep on increasing.

Reason : On increasing dilution, degree of ionisation of weak electrolyte increases

(1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.

(2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion

(3) Assertion is correct, reason is incorrect

(4) Assertion is incorrect, reason is correct

67. Which of the following is the electron deficient molecule?

(1) C_2H_6 (2) B_2H_6

(3) SiH_4 (4) PH_3

68. Which of the following compounds does not follow the octet rule for electron distribution?

(1) PCl_5 (2) PCl_3

(3) H_2O (4) PH_3

69. A pair of compound which have odd electrons in the group NO, CO, ClO_2, N_2O_5, SO_2 and O_3 are

(1) NO and ClO_2 (2) CO and SO_2

(3) ClO_2 and CO (4) SO_2 and O_3

70. Which of the following statements is incorrect

(1) The formation of ionic compounds depend upon the ease of formation of the positive and negative ions from the respective neutral atoms.

(2) Formation of ionic compounds depend upon arrangement of the positive and negative ions in the solid.

(3) Formation of positive ion involves addition of electron(s) while that of negative ion involves removal of electron(s).

(4) None of these

71. Which one of the following pairs of molecules will have permanent dipole moments for both members ?

(1) NO_2 and CO_2 (2) NO_2 and O_3

(3) SiF_4 and CO_2 (4) SiF_4 and NO_2

72. Arrange the following in increasing order of covalent character (i) NaCl, (ii) RbCl,

(iii) $MgCl_2$, (iv) $AlCl_3$?

(1) (i), (ii), (iii), (iv) (2) (iv), (ii), (i), (iii)

(3) (ii), (i), (iii), (iv) (4) (iii), (i), (ii), (iv)

73. Among the following molecules : SO_2, SF_4, ClF_3 , BrF_5 and XeF_4, which of the following shapes does not describe any of the molecules mentioned ?

(1) Bent

(2) Trigonal bipyramidal

(3) See-saw

(4) T-shape

74. Pick out the incorrect statement from the following

(1) sp hybrid orbitals are equivalent and are at an angle of 180° with each other

(2) sp^2 hybrid orbitals are equivalent and bond angle between any two of them is 120°

(3) sp^3d^2 hybrid orbitals are equivalent and are oriented towards corners of a regular octahedron

(4) sp^3d^3 hybrid orbitals are not equivalent

75. According to molecular orbital theory which of the following statement about the magnetic character and bond order is correct regarding O_2^+

(1) Paramagnetic and Bond order < O_2

(2) Paramagnetic and Bond order > O_2

(3) Diamagnetic and Bond order < O_2

(4) Diamagnetic and Bond order > O_2

76. The boiling point of p-nitrophenol is higher than that of o-nitrophenol because

(1) NO_2 group at p-position behave in a different way from that at o-position.

(2) intramolecular hydrogen bonding exists in p-nitrophenol

(3) there is intermolecular hydrogen bonding in p-nitrophenol

(4) p-nitrophenol has a higher molecular weight than o-nitrophenol.

77. Match Column-I (molecule) with Column-II (type of hybridisation) and choose the correct option from the codes given below.

Column-I (Molecule)	Column-II (Type of hybridisation)
(A) SF_6	(p) sp^3d
(B) PF_5	(q) sp^3
(C) BCl_3	(r) sp^3d^2
(D) C_2H_6	(s) sp^2

(1) A – (r), B – (p), C – (s), D – (q)

(2) A – (r), B – (p), C – (q), D – (s)

(3) A – (p), B – (r), C – (q), D – (s)

(4) A – (p), B – (r), C – (s), D – (q)

78. **Assertion :** The lesser the lattice enthalpy more stable is the ionic compound.

Reason : The lattice enthalpy is greater, for ions of highest charge and smaller radii.

(1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.

(2) Assertion is correct, reason is correct; reason

is not a correct explanation for assertion

(3) Assertion is correct, reason is incorrect

(4) Assertion is incorrect, reason is correct.

79. In the given reaction

$CH_3CH_2CH=CHCH_3 \xrightarrow{X}$

$CH_3CH_2COOH + CH_3COOH$

The X is

(1) C_2H_5ONa

(2) Conc. HCl +Anhy.$ZnCl_2$

(3) Anh. $AlCl_3$

(4) $KMnO_4/OH^-$

80. In the following sequence of reactions, the alkene affords the compound 'B'

$CH_3-CH=CH-CH_3 \xrightarrow{O_3} A \xrightarrow[Zn]{H_2O} B$.

The compound B is

(1) CH_3CH_2CHO (2) CH_3COCH_3

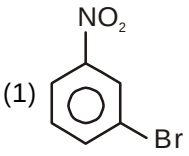
(3) $CH_3CH_2COCH_3$ (4) CH_3CHO

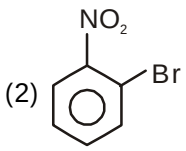
81. Isopropyl alcohol is obtained by reacting which of the following alkenes with conc. H_2SO_4 and H_2O

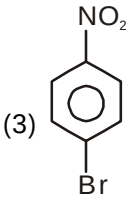
(1) Ethylene (2) Propylene

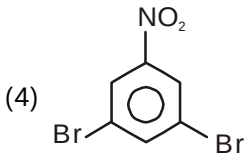
(3) 2-methyl propene (4) Isoprene

82.  $\xrightarrow[H_2SO_4]{HNO_3}$ A $\xrightarrow[FeBr_2]{Br_2}$ B. The compound B is

(1) 

(2) 

(3) 

(4) 

83. The strongest ortho - para and strongest meta - directing groups respectively are

(1) $-NO_2$ and $-NH_2$ (2) $-CONH_2$ and $-NH_2$

(3) $-NH_2$ and $-CONH_2$ (4) $-NH_2$ and $-NO_2$

84. Match the following reactants in Column I with the corresponding reaction products in Column II and choose the correct option from the codes given below.

Column - I	**Column - II**
(A) Benzene + $Cl_2 \xrightarrow{AlCl_3}$	(p) Benzoic acid
(B) Benzene + $CH_3Cl \xrightarrow{AlCl_3}$	(q) Methyl phenyl ketone
(C) Benzene + $CH_3COCl \xrightarrow{AlCl_3}$	(r) Toluene
(D) Toluene $\xrightarrow{KMnO_4/NaOH}$	(s) Chlorobenzene

(1) A – (s), B – (r), C – (q), D – (p)

(2) A – (s), B – (r), C – (p), D – (q)

(3) A – (r), B – (s), C – (p), D – (q)

(4) A – (r), B – (s), C – (q), D – (p)

85. **Assertion : 1**–Butene on reaction with HBr in the presence of a peroxide produces

1-bromobutane.

Reason : It involves the free radical mechanism.

(1) Assertion is correct, reason is correct; reason is a correct explanation for assertion.

(2) Assertion is correct, reason is correct; reason is not a correct explanation for assertion

(3) Assertion is correct, reason is incorrect

(4) Assertion is incorrect, reason is correct.

SECTION - B

86. Which of the following compounds can yield only one monochlorinated product upon free radical chlorination?

(1) Propane

(2) 2, 2-Dimethylpropane

(3) 2-Methylpropane

(4) n-Butane

87. Correct order of stability is :

(1) cis -2- butene > 1-butene > trans -2-butene

(2) trans-2-butene > cis-2-butene > 1-butene

(3) 1-butene > cis-2-butene > trans-2- butene

(4) cis-2-butene > trans-2-butene > 1-butene

88. Predict the product C obtained in the following reaction of butyne-1

$$CH_3CH_2 - C \equiv CH + HCl \rightarrow B \xrightarrow{HI} C$$

(1) $CH_3 - CH_2 - CH_2 - \underset{\displaystyle Cl}{\overset{\displaystyle I}{\underset{|}{\overset{|}{C}}}} - H$

(2) $CH_3 - CH_2 - \underset{}{\overset{\displaystyle I}{\overset{|}{CH}}} - CH_2Cl$

(3) $CH_3CH_2 - \underset{\displaystyle Cl}{\overset{\displaystyle I}{\underset{|}{\overset{|}{C}}}} - CH_3$

(4) $CH_3 - \underset{\displaystyle Cl}{\underset{|}{CH}} - C - CH_2CH_2I$

89. Identify the alkyne in the following sequence of reactions.

$$Alkyne \xrightarrow[Lindlar's catalyst]{H_2} A \xrightarrow{Ozonolysis} \underset{only}{B} \xleftarrow[Process]{Wacker}$$

$CH_2 = CH_2$

(1) $H_3C - C \equiv C - CH_3$

(2) $H_3C - CH_2 - C \equiv CH$

(3) $H_2C = CH - C \equiv CH$

(4) $HC \equiv C - CH_2 - C \equiv CH$

90. The type of hybridization in xenon atom and the number of lone pairs present on xenon atom in xenon hexafluoride molecule are respectively

(1) sp^3d^3 , one (2) sp^3d^3 , two

(3) sp^3d^2 , two (4) sp^3d^2 , zero

91. Arrange the following in increasing order of bond length

(i) N_2 (ii) N_2^+

(iii) N_2^{2+}

(1) (ii), (i) and (iii) (2) (ii), (iii) and (i)

(3) (iii), (ii) and (i) (4) (i), (ii) and (iii)

92. In O_2^-, O_2 and O_2^{-2} molecular species, the total number of antibonding electrons respectively are

(1) 7, 6, 8 (2) 1, 0, 2

(3) 6, 6, 6 (4) 8, 6, 8

93. The hypothetical reaction $A_2 + B_2 \rightarrow 2AB$; follows the following mechanism

$A_2 \xrightarrow{Fast} A + A,$

$A + B_2 \xrightarrow{Slow} AB + B, A + B \xrightarrow{Fast} AB$.

The order of the overall reaction is

(1) 0 (2) 1

(3) 2 (4) 3/2

94. A substance 'A' decomposes by a first order reaction starting initially with [A] = 2.00 M and after 200 min, [A] becomes 0.15 M. For this reaction $t_{1/2}$ is

(1) 53.72 min (2) 50.49 min

(3) 48.45 min (4) 46.45 min

95. In a 1st order reaction, reactant concentration C varies with time t as :

(1) $\frac{1}{C}$ increases linearly with t

(2) log C decreases linearly with t

(3) C decreases with $\frac{1}{t}$

(4) log C decreases with $\frac{1}{t}$

96. In a zero-order reaction for every 10° rise of temperature,the rate is doubled. If the temperature is increased from10°C to 100°C, the rate of the reaction will become :

(1) 256 times (2) 512 times

(3) 64 times (4) 128 times

97. For a cell reaction involving two electron change, the standard EMF of the cell is 0.295 V at 25°C. The equilibrium constant of the reaction at 25°C will be:

(1) 29.5×10^{-2} (2) 10

(3) 1×10^{10} (4) 2.95×10^{-10}

98. A 0.5 M NaOH solution offers a resistance of 31.6 ohm in a conductivity cell at room temperature. What shall be the approximate molar conductance of this NaOH solution if

cell constant of the cell is 0.367 cm^{-1}

(1) 234 S cm^2 $mole^{-1}$

(2) 23.2 S cm^2 $mole^{-1}$

(3) 4645 S cm^2 $mole^{-1}$

(4) 5464 S cm^2 $mole^{-1}$

99. When electric current is passed through acidified water,112 ml of hydrogen gas at STP collected at the cathode in 965 seconds. The current passed in amperes is

(1) 1.0 (2) 0.5

(3) 0.1 (4) 2.0

100. On passing current through two cells, connected in series containing solution of $AgNO_3$ and $CuSO_4$, 0.18 g of Ag is deposited. The amount of the Cu deposited is:

(1) 0.529 g (2) 10.623 g

(3) 0.0529 g (4) 1.2708 g

BOTANY

SECTION - A

101. When Protoxylem Faces pericycle, it is called

(1) Endarch (2) Mesarch

(3) Exarch (4) Polyarch

102. _____ are one internode long runners, usually found in rosette plants at the ground/water level.

(1) Trailers (2) offsets

(3) Stolons (4) Rhizomes

103. Ginger is an underground stem. It is distinguished from root because

(1) It lacks chlorophyll

(2) It stores food

(3) It has nodes and internodes

(4) It has xylem and vessels

104. A conjoint and open vascular bundle will be observed in the transverse section of

(1) Monocot root (2) Monocot stem

(3) Dicot root (4) Dicot stem

105. Which one of the following statement is incorrect about parenchyma ?

(1) The cells are usually isodiametric

(2) Their cell wall are made up of cellulose

(3) The cells may either be closely packed or have intercellular spaces

(4) The cell wall are much thickened at the corners due to deposition of cellulose, hemicellulose & pectin.

106. Leaves of pteridophyta & bryophyta, both function similarly to assimilate food .The ploidy of these leaves can be respectively:

(1) n, n (2) 2n, n

(3) n, 2n (4) 2n, 2n

107. Which of the following is formed by the process of dedifferentiation ?

(1) Apical meristem

(2) intrafascicular cambium

(3) intercalary meristem

(4) Interfascicular cambium

108. Soyabean, Onion, Potato mustard, lupin, groundnut, sem, Trifolium, brinjal, Petunia.

How many plants belongs to family fabaceae ?

(1) Five (2) Six

(3) Eight (4) Four

109. Given figure represents which type of placentation

(1) Basal (2) Axile

(3) Free central (4) Marginal

110. Study the following four statements carefully and give the answer.

a. Roots have exarch and stems have endarch xylem.

b. Casparian strips are present in pericycle

c. Phloem parenchyma is present in most of monocotyledons

d. Vessels are present in Ephedra

(1) a, b and c are correct

(2) a, b and d are correct

(3) a & d are correct

(4) a, c and d are correct

111. **Assertion :** Genus comprises a group of related species which has more characters in common in comparison to species of other genera

Reason : Genera are aggregates of closely related species

(1) If both (A) and (R) are true but (R) is not the correct explanation of (A).

(2) If (A) is true but (R) is false.

(3) If both (A) and (R) are false.

(4) If both (A) and (R) are true and (R) is the correct explanation of (A)

112. Multicarpellary and apocarpous gynoecium occurs in

(1) Tomato & brinjal

(2) Lotus & Rose

(3) Salvia & mustard

(4) Dianthus & Primrose

113. Which of the following statements regarding growth is incorrect ?

(1) In animals growth is seen up to a certain age

(2) Increase in body mass is considered as growth

(3) Growth by cell division occurs continously throughout their life span in animals

(4) Increase in mass and number of individuals is the characteristic feature of animals growth

114. Which two points are known as the twin characteristics of growth ?

(i) Increase in mass (ii) Differentiation

(iii) Increase in number of individuals

(iv) Response to stimuli

(1) (i) & (iii) (2) (i) & (iv)

(3) (ii) & (iii) (4) (i) & (iii)

115. In majority of higher animals and plants, $\frac{X}{\quad}$ & $\frac{Y}{\quad}$ are mutually exclusive events . X & Y are

(1) growth, nutrition

(2) growth, reproduction

(3) nutrition, consciousness

(4) reproduction, consciousness

116. Taxa differs from 'Taxon' due to being

(1) a higher taxonomic category than Taxon

(2) lower taxonomic category than taxon

(3) the plural of taxon

(4) the singular of taxon

117. Which of the following 'suffixes' indicates a taxonomic category 'family' ?

(1) – Ales (2) – Onae

(3) – Aceae (4) – Ae

118. Which of the following statement is not correct for methanogens?

(1) They are archaebacteria

(2) They live in marshy area

(3) Methane is their preferred carbon source

(4) They are present in guts of several ruminant animals

119. Which of the following component enables archebacteria to survive in extreme conditions

(1) cell wall

(2) cell membrane

(3) membrane proteins

(4) ion exchange pumps

120. The Vast majority of bacteria are

(1) photosynthetic Autotrophs

(2) Chemosynthetic Autotrophs

(3) Heterotrophs

(4) both 1 & 2

121. _____ is the most common method of reproduction in bacteria

(1) Binary fission (2) Fungi

(3) Protista (4) Monera

122. Which of the following processes are involved in the reproduction of protists ?

(1) Binary fission & budding

(2) Cell fusion & zygote formation

(3) spore formation and cyst formation

(4) All of the above

123. Clamp connection is found in

(1) basidiomycetes (2) ascomycetes

(3) Saccharomyces (4) haplomyces

124. Fungi are filamentous with the exception of 'x' which is unicellular, Identify X

(1) Yeast (2) Albugo

(3) Mucor (4) Lichen

125. Yeast is not included in protozoans but are placed in fungi because

(1) It has no chlorophyll

(2) Yeast reproduce by fungal methods

(3) It has eukaryotic organisation

(4) Cell wall is made up of cellulose and reserve food material is starch

126. Fungi shows asexual reproduction by all of the following kind of spores excepts

(1) Conidia (2) Oospores

(3) Sporangiospores (4) Zoospores

127. Which of the following statement is incorrect

(1) TMV has a double stranded RNA molecule

(2) Most plants viruses are RNA viruses

(3) The bacteriophage has double stranded DNA

(4) Most animal viruses are DNA viruses

128. **Assertion A** : Chemosynthesis is an autotrophic nutrition.

Reason R :Chemoautotrophs contain chlorophyll pigments

(1) Both (A) & (R) are true but (R) is not the correct explanation of A

(2) A is correct but R is not correct

(3) A is not correct but R is correct

(4) Both (A) & (R) are correct and (R) is the correct explanation of A.

129. **Assertion A** : Each cell of the embryo sac is haploid in angiosperms

Reason R : In angiosperms, meiosis preceeds embryo sac formation

(1) Both (A) & (R) are true but (R) is not the correct explanation of A

(2) A is correct but R is not correct

(3) A is not correct but R is correct

(4) Both (A) & (R) are correct and (R) is the correct explanation of A

130. Select the incorrect pair

(1) Numerical taxonomy – All observable characteristics

(2) Cytotaxonomy – cytological information

(3) chemotaxomony – Chromosome number and structure

(4) Cladistic taxonomy – Origin from a common ancestor

131. Ulothrix can be described as

(1) non – motile colonial algae lacking zoospores

(2) filamentous alga lacking Flagellated reproductive stages

(3) membranous algae producing zoospores

(4) filamentous algae with flagellated reproductive stages

132. Mannitol is a stored food in

(1) chara (2) porphyra

(3) Fucus (4) Gracilaria

133. In bryophytes, male and female sex organs are called ____ and ____ respectively

(1) microsporangia, macrosporangia

(2) male strobili, female strobili

(3) antheridia, archegonia

(4) androecium, gynoecium

134. Which of the following statement can be assiged to the gametophytic phase in the alternation of generation life cycle ?

(1) Generation that produces the gametes

(2) The diploid generation

(3) Generation that produces the spores

(4) Generation that has xylem and phloem

135. The unique feature of bryophytes compared to other plant group is that

(1) They produce spores

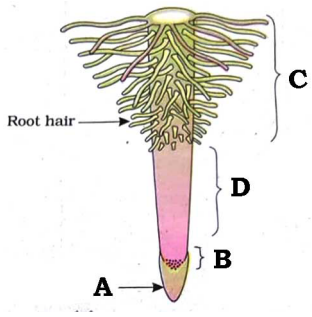
(2) They lack vascular tissue

(3) They lack roots

(4) Their sporophyte is attached to the gametophyte

SECTION - B

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



(1) The cells of the region B are large, thin walled & with dense cytoplasm

(2) The cells proximal to region B undergo gradual elongation and enlargement

(3) Cells of the region D rapidly differentiate and mature

(4) From region C, some of the epidermal cells form fine and delicate thread like stucture

137. Which of the following group of plants have underground stems?

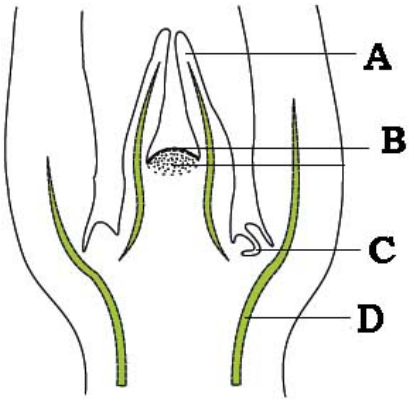
(1) Potato, ginger, turmeric, Euphorbia, Zaminkand

(2) Potato, ginger, turmeric, zaminkand, Colocasia

(3) Potato, citrus, opuntia, zaminkand, colocasia

(4) Potato, cucumber, watermelon, zaminkand, colocasia

138. Identify A, B and C in the given figure of shoot apical meristem



	A	B	C	D
(1)	Leaf Primordium	Shoot apical meristem	Axillary bud	Differentiating Vascular tissue
(2)	Leaf bud	Shoot apical meristem	Leaf primordium	Differentiating Vascular tissue
(3)	Leaf Primordium	Shoot apical meristem	Leaf bud	Protoderm
(4)	Terminal bud	intercalary meristem	Leaf primordium	Protoderm

139. How many of following statements are correct

(a) The leaflets are modified into pointed hard thorns in citrus and Bouganvillea

(b) leaf develops at node and bears a bud in axil

(c) A typical leaf consists of four main part

(d) Maize and sugarcane have prop roots

(e) In legumes seed is non endospermic

(f) Generally the fruit consists of a wall or pericarp and seeds

(1) Five (2) Four

(3) Three (4) Two

140. The X is small and situated in a groove at one end of the endosperm, it consists of one large and shield shaped cotyledon known as Y and a short axis with a plumue and a Z.Identify X, Y, Z.

	Y	Z	X
(1)	Embryo	Radicle	Scutellum
(2)	Scutellum	Radicle	Embryo
(3)	Radicle	Embryo	Scutellum
(4)	Embryo	Scutellum	Radicle

141. How many of the following statements are incorrect about Phloem :

(a) Phloem transports food materials, usually from leaves to the other parts of plant
(b) It is composed of sieve tube elements, companion cells, phloem parenchyma & phloem fibres

(c) The companion cells are specialized parenchymatous cells which are closely associated with phloem parenchyma

(d) The first formed primary phloem consists of narrow sieve tubes and referred to as protophloem

(e) Angiosperms have albuminous cells

(1) Four (2) three

(3) two (4) one

142. Match column I with column II and choose the correct option .

Column – I	**Column – II**
A. Bulliform cells	I. Initiation of lateral roots
B. Pericycle	II. Conduct food materials
C. Xylem	III. Grasses
D. Phloem	IV. Dicot leaf
	V. Conduct water and minerals

	A	**B**	**C**	**D**
(1)	III	V	IV	I
(2)	II	V	I	III
(3)	II	IV	I	III
(4)	III	I	V	II

143. Select the correct statements

(i) Each step or rank in hierarchy is called taxonomic category

(ii) species is a group of individual organisms with fundamental similarities capable of breeding among themselves

(iii) Reproduction is the production of progeny possessing features dissimilar to their parents

(iv) The fungi. the filamentous algae, the protonema of mosses all multiply by budding

(v) many organisms like mules, sterile worker bees do not reproduce

(vi) Reproduction is not an all inclusive defining characteristics of living organisms

(vii) Yeast and Hydra reproduce by budding

(1) Seven (2) Five

(3) three (4) one

144. Match Column I with column – II and choose the correct options

Column – I	**Column – II**
A. Puccinia	I. Yeast
B. Ustilago	II. Mushroom
C. Agaricus	III. Smut fungus
D. Saccharomyces	IV. Rust fungus

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

145. Match column I with column II and choose the correct option.

Column – I	Column – II
A. Plant virus	I. Mad cow disease
B. Animal virus	II. Potato spindle tuber
C. Viroids	III. Polio
D Prions	IV. Tobacco mosaic

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

146. The given characters are seen in which of the following group ?

(i) Unicellular, colonial, filamentous,marine or terrestrial forms

(ii) The colonies are surrounded by a gelatinous sheath

(iii) Some can fix nitrogen in specialized cells called heterocysts

(iv) often bloom in water bodies

(1) Archacebacteria (2) Cyanobacteria

(3) Chrysophytes (4) Dinoflagellates

147. Match the following

Classes	Examples
A. Psilopsida	I. Dryopteris, pteris
B. Lycopsida	II. Equisetum
C. Sphenopsida	III. Selaginella
D. Pteropsida	IV. Lycopodium
	V. Psilotum

	A	B	C	D
(1)	V	III	II	I
(2)	I	II	III	IV
(3)	IV	III	II	I
(4)	III	V	I	II

148. How many statements are correct about gemmae ?

(i) There are specialised structures by which asexual reproduction takes place in liver worts

(ii) They are green, multicellular and asexual buds

(iii) They develop in small receptacles called gemma cups

(iv) They detach from parent body and germinate to form new individuals

(1) two (2) three

(3) four (4) one

149. How many of the following statements are correct about bryophytes

(a) Sex organs in bryophytes are multicellular

(b) The antherozoid are released into water which swim through water to fuse with the egg to produce the zygote outside the body

(c) Immediate reduction division occurs in zygotes

(d) A multicellular body called a sporophyte is then produced

(e) The sporophyte is not free – living but attached to the photosynthetic gametophyte

(1) five (2) four

(3) three (4) one

150. Match column I with column II and choose the correct option :

Column – I (Group of plant kingdom)	Column – II (Examples)
A. Algae	I. Solanum tuberosum
B. Fungi	II. Equisetum
C. Angiosperms	III. Cycas
D. petridophyte	IV.Chlamydomonas
	V. Rhizopus

	A	B	C	D
(1)	V	II	I	IV
(2)	IV	V	I	II
(3)	III	II	V	I
(4)	IV	III	V	I

ZOOLOGY

SECTION - A

151. From which kind of host life cycle of plasmodium passes ?

(1) Male of Human and of *Anopheles* mosquito
(2) Human and female Anopheles mosquito
(3) Human and male Anopheles mosquito
(4) Male of Human and Male of Anopheles mosquito

152. At which time interferon is secreted ?

(1) When Lymphocyte become active

(2) When serotonin become active

(3) When antibody reacts with antigen in our body

(4) When our body cells are infected by virus then that cells secrete this chemical

153. Match the column – I and Column – II

	Column - I		Column - II
(P)	Cold	(i)	Rhino Virus
(Q)	Pneumonia	(ii)	HIV
(R)	AIDS	(iii)	*Salmonella typhi*
(S)	Typhoid	(iv)	*Haemophilus influenzae*
		(v)	*Plasmodium Vivax*

(1) P – i, Q – iv, R – ii, S – iii

(2) P – i, Q – iv, R – v, S – ii

(3) P – iii, Q – iv, R – ii, S – v

(4) P – iv, Q – ii, R – iii, S – i

154. In which of the following situation infection of AIDS do not occur ?

(1) Foetus of AIDS infected mother

(2) Utilization of clothes used by AIDS patient.

(3) Breast feeding to children by AIDS infected mother

(4) Utilization of syringe used by AIDS patient

155. Symptoms of AIDS appear when

(1) Virus attacks B – lymphocytes

(2) HIV multiplies in RBCs

(3) Bone marrow depression takes place

(4) Virus attacks helper T – cells causing their depletion resulting in immunodeficiency

156. Which immune response is involved in graft rejection ?

(1) Humoral immune response

(2) Cell mediated immune response

(3) β – lymphocyte mediated immune response

(4) Antibodies mediated immune response

157. Choose the mismatch.

(1) Opioids – Leaves of papaver somniferum

(2) Cannabinoids – Inflorescence of cannabis sativa

(3) Coca alkaloid – Erythroxylum Coca

(4) Morphine – Latex of poppy plant

158. Antitoxins provide which type of immunity ?

(1) Natural active acquired immunity

(2) Natural passive acquired immunity

(3) Artificial passive acquired immunity

(4) Artificial active acquired immunity

159. Computed tomography (CT) uses

(1) UV rays to view internal organs

(2) Strong magnetic fields to detect changes in the living tissue

(3) X – rays to generate a three – dimensional image of the internals of an object

(4) Gamma rays to generate a three – dimensional image of an object

160. Which of the following is correctly matched ?

(1) *Agrobacterium* – Production of insulin

(2) EcoRI – Plasmid vector

(3) Ligase – Molecular glue

(4) PBR322 – Enzyme

161. Which of the following is the most suitable method of introducing foreign DNA into a plant cell ?

(1) Biolistics (2) Microinjection

(3) Treatment with calcium chloride

(4) Heat shock method

162. Read the following statements which one of the following is incorrect ?

(1) GAATTC is the recognition site for EcoRI.

(2) In the restriction enzyme EcoRI, "CO" stands for coenzyme

(3) *Agrobacterium tumefaciens* is used for cloning genes in plants

(4) for transformation, micro – particles coated with DNA to be bombarded with gene gun are made up of gold or tungsten

163. Which of the following describes the role of selectable marker ?

(1) It is a vector used selectively for plants

(2) It is a clonning site for alien DNA

(3) It is the site where replication starts

(4) It helps in differentiating between transformants and non – transformants

164. Which of the following is not a correct statement about plasmids ?

(1) They are present in one or several copies
(2) It is an extrachromosomal DNA in bacteria

(3) They are linear single – stranded DNA fragments

(4) Plasmid can transfer from one cell to another and make several copies of itself

165. Which of the following is an incorrect statement regarding the enzymes used for recombinant DNA technology ?

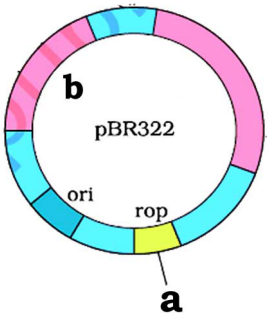
(1) Reverse transcriptase is used to form cDNA from mRNA

(2) DNA ligase helps in sealing gaps and acts as molecular glues

(3) DNA polymerase removes phosphate groups from the 5' end of double – stranded DNA and Prevents unwanted ligation

(4) Both (1) and (2)

166. Consider the diagram of the plasmid vector PBR 322 and identify "a" and "b"



(1) a = PVU II, b – amp^R

(2) a – EcoR I, b – tet^R

(3) a – Hind I, b – amp^R

(4) a – PVu II, b – tet^R

167. Read the following statements and choose the correct option.

(1) DNA ligase enzyme is also called molecular scalpel

(2) DNA moves towards the positive electrode during gel electrophoresis

(3) Microinjection is used to introduce alien DNA into plant cells

(4) Purified DNA precipitates out of solution after addition of chilled ethidium bromide

168. Identify the wrong statement about PCR technique

(1) Taq polymerase enzyme is obtained from Thermus aquaticus

(2) PCR technique was discovered by Kary Mullis

(3) The optimum temperature for the polymerisation step is 72°C

(4) Denaturation in PCR is done at 65°C

169. The primer used in the PCR technique should be

(1) Polynucleotide chain tagged with radioisotope

(2) formed of polypeptide

(3) Complementary to the 3'end sequence of the DNA segment to be amplified

(4) Complementary to the 5' end sequence of the DNA

170. Which of the following is not correctly matched for the organism and its cell wall degrading enzyme ?

(1) Algae – methylase

(2) Bacteria – lysozyme

(3) Plant cells – cellulase

(4) Fungi – chitinase

171. Match the columns :

	Column – I	**Column – II**
A.	Southern blotting	(i) Protein
B.	Northern blotting	(ii) RNA
C.	Western blotting	(iii) DNA
D.	Eastern blotting	(iv) carbohydrate, epitopes on proteins / lipids

(1) A – (iii), B – (ii), C – (i), D –(iv)

(2) A – (ii), B – (iii), C – (i), D –(iv)

(3) A – (ii), B – (iv), C – (i), D –(iii)

(4) A – (iv), B – (iii), C – (i), D –(ii)

172. Genetically modified organisms (GMOs)have been useful for

(1) Making crops more tolerent to abiotic stresses

(2) Reducing post – harvest losses

(3) Enhancing the nutritional value of food
(4) All of these

173. During the processing of the prohormone Proinsulin into the mature insulin

(1) A – peptide is removed

(2) B – peptide is removed form proinsulin

(3) C – peptide is removed from proinsulin

(4) C – peptide is added to proinsulin

174. The first clinical gene therapy was given in $\underline{(i)}$ to a $\underline{(ii)}$ year old girl with $\underline{(iii)}$ deficiency. Fill in the blanks with correct option.

	(i)	(ii)	(iii)
(1)	1990	4	adenosine deaminase
(2)	1997	6	Tyrosinase
(3)	1990	4	Phenylalanine hydroxylase
(4)	1953	7	Alkaline phosphatase

175. Eli Lilly, an American company prepared two DNA sequences corresponding to A and B, chains of human insulin and introduced them in plasmids of E.coli to produce insulin chains A and B were produced separately, extracted and combined by creating:

(1) Ionic bonds (2) Peptide bonds

(3) Disulphide bonds (4) H – bonds

176. What is not true amongst the following w.r.t first transgenic cow ?

(1) The 1st transgenic cow was called Rosie

(2) The milk produced was more balanced for humans than ordinary cow's milk

(3) The milk had a protein called human α – Lactalbumin

(4) The human protein content was 30 – 40 gm/litre of the milk

177. Which of the following can be the permanent cure to ADA deficiency ?

(1) Introducing functional ADA in adult cells

(2) The genes isolated from marrow cells producing ADA is introduced into cells at early embryonic stages

(3) By using immunosupressive medicines

(4) All of these

178. Which of the following is true for pneumonia ?

(1) A healthy person acquires infection by inhaling the droplets/aerosols released by an infected person

(2) In severe cases, the lips and finger may turn gray to bluish in colour

(3) spreads by blood transfusion

(4) Both (1) and (2)

179. The B – lymphocytes and T – lymphocytes provide which type of acquired immunity :

(1) Humoral immunity

(2) Cell mediated immunity

(3) Humoral immunity/antibody mediated immunity and cell mediated immunity respectively

(4) Antibody mediated immunity

180. Match the columns :

	Column - I		Column - II
(A)	First generation vaccine	(i)	DNA vaccines
(B)	Second generation vaccine	(ii)	Whole organisms vaccine
(C)	Third generation vaccine	(iii)	Subunit Vaccine of recombinant protein component or defined protein antigens

(1) A – ii, B – iii, C – i

(2) A – i, B – ii, C – iii

(3) A – ii, B – i, C – iii

(4) A – iii, B – i, C – ii

181. After an $Rh^{\oplus}$ baby is born to an $Rh^{\ominus}$ mother, the mother is treated with antibodies specific for the Rh factor. The purpose of this treatment is to :

(1) Protect her from the baby's red blood cells

(2) Protect her future $Rh^{\oplus}$ babies

(3) Prevent her from generating memory B – cells specific for the Rh factor

(4) Both (2) and (3)

182. **Assertion :** Cancer is contagious and cells can spread from one person to other.

Reason : Cancerous cells are highly differentiated cells.

(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 correct explanation of Assertion

(3) Assertion is true but Reason is false
(4) Both Assertion and Reason are false

183. **Assertion :** Opioids are the drugs which bind to specific opioid receptors present in our central nervous system.

Reason : Opioids also binds to the cells of gastrointestinal tract.

(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 correct explanation of Assertion

(3) Assertion is true but Reason is false
(4) Both Assertion and Reason are false

184. **Assertion :** Restriction enzymes cut the strand of DNA to produce sticky ends.

Reason : Stickiness of the ends facilitates the action DNA polymerase

(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 correct explanation of Assertion

(3) Assertion is true but Reason is false
(4) Both Assertion and Reason are false

185. **Assertion :** ADA – deficiency causes immunodeficiency

Reason : ADA is crucial for immune system to function.

(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 correct explanation of Assertion

(3) Assertion is true but Reason is false
(4) Both Assertion and Reason are false

SECTION - B

186. Which person is suffering from disease according to given sentences ?

(1) Paresh is suffering from vomitting
(2) Mahesh walks slowly and become tired

(3) There is appearance of scaly Lesions on skin of Naresh

(4) All of them suffer from disease

187. What is improper for ringworm disease.

(1) It is done by *Trichophyton* fungi

(2) It is done by secretion of serotonin chemical

(3) It is done by using infected persons comb

(4) By Constant itching the lesions get expanded

188. Match the column – I with column – II

Column – I	**Column – II**
(P) Primary lymphoid organ	(i) Thymus
(Q) MALT	(ii) Spleen
(R) Lobe like organ near the heart	(iii) Bone Marrow
(S) Organ like bean shape	(iv) Digestive tract
	(v) It constitutes 50% of lymphoid tissue

(1) P – iii, Q – v, R – i. S – ii

(2) P – ii, Q – i, R – v. S – iv

(3) P – iii, Q – iv, R – v. S – i

(4) P – v, Q – iv, R – i. S – ii

189. Which of the following human parasites require mosquito to complete their life cycle ?

(1) *Leishmani donovani* and *Plasmodium Vivax*
(2) *Ascaris Lumbricoides* and *Enterobius Vermicularis*

(3) *Wuchereria bancrofti* and *plasmodium ovale*

(4) *Wuchereria bancrofti* and *salmonella typhi*

190. Which of the following is not true for hepatitis – B vaccine produced by recombinant DNA technology ?

(1) Provide active immunity

(2) Produced from killed yeast

(3) Contains antigenic polypeptides

(4) Large scale production of Vaccine is possible by this approach

191. In which of the following organ, the lymphocytes interact with antigens, undergo proliferation and get differentiated into effector cells ?

(1) Primary lymphoid organ

(2) Thymus

(3) Bone Marrow

(4) Secondary lymphoid organ

192. Which of the following statements are correct regarding cancer ?

(i) Cancers of mesodermal origin are called carcinoma

(ii) Pap smear is used for detecting breast cancer

(iii) Malignant tumours are called neoplasms

(iv) Migration of cancer cells from the site of origin to other parts of the body forming secondary tumours is called metastasis

(1) (i) and (ii) (2) (i) and (iv)

(3) (ii) and (iii) (4) (iii) and (iv)

193. Which of the following enzymes is used to remove the phosphate group from the 5' end of DNA molecule, leaving a free 5' hydroxyl group, so that it cannot be ligated to another DNA fragment ?

(1) DNA polymerase

(2) DNA ligase

(3) Alkaline phosphatase

(4) Restriction endonuclease

194. The characteristics of molecular probe are

(i) short nucleotide sequences

(ii) Very long nucleotide sequence

(iii) ss DNA only

(iv) complimentary to a part of desired gene

(v) Double stranded

(vi) ss DNA or ssRNA

The correct option is

(1) i, iv, and vi (2) ii, iii, and vi

(3) i, ii, and vi (4) ii, iii, and v

195. When a dicot plant is infected by *Agrobacterium tumefaciens*, the T – DNA in Ti plasmid induces the plant to produce

(1) Multiple copies of plasmids

(2) Growth hormones such as auxins and cytokinins.

(3) Growth inhibitors such as abscisic acid
(4) Restriction endonucleases

196. During the formation of recombinant DNA, the plasmid vector is cleaved by

(1) Alkaline phosphate

(2) Exonuclease

(3) The same enzyme that cleaves the donor DNA

(4) An enzyme different than the one that cleaves the donor DNA

197. Which of the following can distinguish transformants from non – transformants ?

(1) Presence of alien DNA into the vector DNA results into insertional inactivation of selectable marker

(2) Presence of more than one recognition site in the vector DNA

(3) Antibiotic – resistance gene gets inactivated due to insertion of alien DNA

(4) Both (1) and (3)

198. Which of the following is an incorrect statement

(1) flavr savr is an example of transgenic tomato

(2) Bt brinjal was the first genetically modified plant commercially released in India

(3) In RNAi, genes are silenced using dsRNA

(4) Golden rice is a variety rich in β – carotene

199. Which of the following is an incorrect statement

(1) The first cloned mammal was a sheep
(2) The maximum number of existing transgenic animals are mice

(3) Tansgenic pigs are being developed for testing the safety of Polio vaccine

(4) Twenty – seven documented varieties of basmati rice are grown in India

200. GEAC makes decisions

(1) For creating GM foods and addressing their safety concerns

(2) Regarding validity of GM research

(3) Regarding safety of introducing GM organisms for Public services

(4) All of these