MOCK TEST PAPER 3

General Instructions: **Same as Mock Test Paper 1**

PHYSICS

Section A

1. A particle is moving in a straight line with a constant acceleration. It changes its velocity from 10 m/s to 20 m/s, while passing through a distance 135 m in t seconds. The value of t is:

(a) 10 **(b)** 1.8 **(c)** 12 **(d)** 9

2. The current density at every point in a uniform conductor is 6×10^8 Am^{-2}. The drift velocity of electrons in the conductor is 2×10^{-4} ms^{-1}. The carrier charge density is:

(a) 3×10^{12} cm^{-3} **(b)** 2×10^{18} cm^{-3}

(c) 0.5×10^8 cm^{-3} **(d)** None of these

3. Two Simple Harmonic Motions of angular frequency 100 and 1000 $rads^{-1}$ have the same displacement amplitude. The ratio of their maximum acceleration is:

(a) $1 : 10^4$ **(b)** $1 : 10$ **(c)** $1 : 10^2$ **(d)** $1 : 10^3$

4. A block of mass 10 kg, moving in x direction with a constant speed of 10 m/s, is subjected to a retarding force $F = 0.1\ x$ J/m during its travel from $x = 20$ m to 30 m. Its final KE will be:

(a) 250 J **(b)** 475 J **(c)** 450 J **(d)** 275 J

5. The fundamental frequency of a closed organ pipe of length 20 cm is equal to the second overtone of an organ pipe open at both the ends. The length of organ pipe open at both the ends is:

(a) 80 cm **(b)** 100 cm **(c)** 120 cm **(d)** 140 cm

6. A thin prism of angle 15° made of glass of refractive index $\mu_1 = 1.5$ is combined with another prism of glass of refractive index $\mu_2 = 1.75$. The combination of the prisms produces dispersion without deviation. The angle of the second prism should be:

(a) 7° **(b)** 10° **(c)** 12° **(d)** 5°

7. A body of mass (4 m) is lying in x-y plane at rest. It suddenly explodes into three pieces. Two pieces, each of mass (m) move perpendicular to each other with equal speeds (v). The total kinetic energy generated due to explosion is:

(a) mv^2 **(b)** $\frac{3}{2}mv^2$ **(c)** $2mv^2$ **(d)** $4mv^2$

8. 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):

(a) $4\pi\varepsilon_0 F d^2/e^2$ **(b)** $\sqrt{\frac{4\pi\varepsilon_0 F e^2}{d^2}}$

(c) $\sqrt{4\pi\varepsilon_0 F d^2/e^2}$ **(d)** $4\pi\varepsilon_0 F d^2/q^2$

9. The number of photoelectrons emitted for light of frequency ν (higher than the threshold frequency ν_0) is proportional to:

(a) Frequency of light (ν) **(b)** $\nu - \nu_0$

(c) Threshold frequency (ν_0) **(d)** Intensity of light

10. During an isothermal expansion, a confined ideal gas does –150 J of work against its surrounding. This implies that:

(a) 150 J of heat has been added to the gas

(b) 150 J of heat has been removed from the gas

(c) 300 J of heat has been added to the gas

(d) No heat is transferred because the process is isothermal

11. The speed of a homogenous solid sphere after rolling down an inclined plane of vertical height h from rest without sliding is :

(a) $\sqrt{10gh/7}$ **(b)** $\sqrt{gh}$

(c) $\sqrt{6gh/5}$ **(d)** $\sqrt{4gh/3}$

12. A particle of mass M is moving in a horizontal circle of radius R with uniform speed v. When it moves from one point to a diametrically opposite point, its:

(a) kinetic energy changes by $\frac{Mv^2}{4}$

(b) momentum does not change

(c) momentum changes by 2Mv

(d) kinetic energy changes by Mv^2

13. A closed organ pipe has length 'l'. The air in it is vibrating in 3rd overtone with maximum amplitude 'a'. The amplitude at a distance of $l/7$ from closed end of the pipe is equal to :

(a) a **(b)** $a/2$ **(c)** $\frac{a\sqrt{3}}{2}$ **(d)** zero

14. A wind with speed 40 m/s blows parallel to the roof of a house. The area of the roof is 500 m^2. Assuming that the pressure inside the house is atmospheric pressure, the force exerted by the wind on the roof and the direction of the force will be (Pair = 1.2 kg/m^3)

(a) 4.8×10^5 N, downwards **(b)** 4.8×10^5 N, upwards

(c) 2.4×10^5 N, upwards **(d)** 2.4×10^5 N, downwards

15. If a unit positive charge is taken from one point to another over an equipotential surface, then:

(a) Work is done on the charge

(b) Work is done by the charge

(c) Work done is constant

(d) No work is done

16. Error in the measurement of radius of a sphere is 2%. Then error in the measurement of volume is -

(a) 2% **(b)** 4% **(c)** 8% **(d)** 6%

17. If a vector $2\hat{i}+3\hat{j}+8\hat{k}$ is perpendicular to the vector $4\hat{j}-4\hat{i}+\alpha\hat{k}$. Then the value of α is:

(a) –1 **(b)** 1/2 **(c)** $-1/2$ **(d)** 1

18. The wave described by $y = 0.25 \sin(10\pi x - 2\pi t)$, where x and y are in metres and t in seconds, is a wave travelling along the:

(a) –ve x direction with amplitude 0.25 m and wavelength $\lambda = 0.2$ m

(b) –ve x direction with frequency 1 Hz

(c) +ve x direction with frequency 2π Hz and wavelength $\lambda = 0.2$ m

(d) +ve x direction with frequency 1 Hz and wavelength $\lambda = 0.2$ m

19. In the propagation of electromagnetic waves the angle between the direction of propagation and plane of polarisation is:

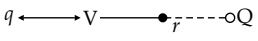
(a) 0° **(b)** 45° **(c)** 90° **(d)** 180°

20. The energy of a photon is $E = h\nu$ and the momentum of photon $p = h/\lambda$, then the velocity of photon will be:

(a) E/p **(b)** Ep

(c) $(Ep)^2$ **(d)** 3×10^8 m/s

21. A charged particle q is shot with speed v towards another fixed charged particle Q. It approaches Q upto a closest distance r and then returns. If q were given a speed $2v$. The closest distance of approach would be



(a) r **(b)** $2r$ **(c)** $r/2$ **(d)** $r/4$

22. A length L of wire carries a steady current I. It is bent first to form a circular plane coil of one turn. The same length is now bent more sharply to give a double loop of smaller radius. The magnetic field at the centre caused by the same current is:

(a) A quarter of its first value

(b) Unaltered

(c) Four times of its first value

(d) A half of its first value

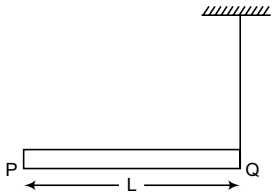
23. A student measures the terminal potential difference (V) of a cell (of emf ε and internal resistance r) as a function of the current (I) flowing through it, The slope, and intercept, of the graph between V and I, then, respectively, equal:

(a) $-r$ and ε **(b)** r and $-\varepsilon$ **(c)** $-\varepsilon$ and r **(d)** ε and $-r$

24. A body of mass m = 2.526 kg is moving with an acceleration 2.00 ms^{-2} along x-axis, the motion being in the direction of acceleration. The accelerating force on the body is reported as:

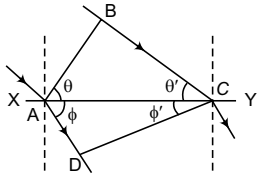
(a) 5.052 N **(b)** 5.00 N **(c)** 5.05 N **(d)** 5.52 N

25. A rod PQ of Mass M and length L is hinged at end P. The rod is held horizontally by a massless string tied to point Q as shown in the figure. When the string is cut, the initial acceleration of the rod is:



(a) g/L **(b)** $2g$/L **(c)** $2g$/3L **(d)** $3g$/2L

26. In the adjoining diagram, a wavefront AB, moving in air is incident on a plane glass surface XY. Its position CD after refraction through a glass slab is shown also along with the normals drawn at A and D. The refractive index of glass with respect to air (μ = 1) will be equal to:



(a) $\sin\theta/\sin\theta'$ **(b)** $\sin\theta/\sin\phi'$ **(c)** $\sin\phi'/\sin\theta$ **(d)** AB/CD

27. The molar specific heat at constant pressure of an ideal gas is $\frac{5}{2}R$. The ratio of specific heat at constant pressure to that of constant volume is

(a) 7/5 **(b)** 5/3 **(c)** 5/7 **(d)** 3/5

28. In a gravitational field, if a body is bound with the earth, then total mechanical energy has:

(a) positive **(b)** zero **(c)** negative

(d) may be positive, negative or zero

29. As the object moves from infinity to focus, then which is true, about the image formed by a single concave mirror?

(a) Always real and speed of image continuously increases

(b) Always real and speed is initially smaller and finally larger than object speed

(c) Initially real and moving with speed smaller than object speed but later on image becomes virtual and moving with speed of object

(d) Always virtual and speed is less than object

30. A permanent magnet is made from which one of the following substances?

(a) Diamagnetic **(b)** Paramagnetic

(c) Ferromagnetic **(d)** Electromagnetic

31. In the Young's double-silt experiment, the intensity of light at a point on the screen where the path difference is λ is K, (λ being the wave length of light used). The intensity at a point where the path difference is λ/4, will be:

(a) K **(b)** K/4 **(c)** K/2 **(d)** Zero

32. **Statement I**: A man carrying a load on his head and walking in a street, does not do any work against the force of gravity.

Statement II: When a body moves with an uniform velocity, no work is done.

(a) Statement I is true, Statement II is true and Statement II is the correct explanation of Statement I

(b) Statement I is true, Statement II is true, but Statement II is not the correct explanation of Statement I

(c) Statement I is true, Statement II is false

(d) Statement I is false, Statement II is true

33. Two identical glass (μ_g = 3/2) equiconvex lenses of focal length f each are kept in contact. The space between the two lenses is filled with water (μ_w = 4/3). The focal length of the combination is:

(a) $f/3$ **(b)** f **(c)** $4f/3$ **(d)** $3f/4$

34. The contribution in the total current flowing through a semiconductor due to electrons and holes are 3/4 and 1/4. If the drift velocity of the electron is 5/2 times that of holes at this temperature, then the ratio of concentration of electrons and holes is:

(a) 6:5 **(b)** 5:6 **(c)** 3:2 **(d)** 2:3

35. The curvature of a trajectory of a proton moving in a magnetic field depends on:

(a) Charge **(b)** Momentum

(c) Magnetic field **(d)** All of these

Section B

36. A vehicle of mass m is moving on a rough horizontal road with momentum p. If the coefficient of friction between the tyres and the road be μ, then the stopping distance is:

(a) $\frac{p}{2\mu mg}$ **(b)** $\frac{p^2}{2\mu mg}$ **(c)** $\frac{p}{2\mu m^2 g}$ **(d)** $\frac{p^2}{2\mu m^2 g}$

37. A beam of light of λ = 600 nm from a distant source falls on a single slit 1 mm wide and the resulting diffraction pattern is observed on a screen 2 m away. The distance between first dark fringes on either side of the central bright fringe is:

(a) 1.2 cm **(b)** 1.2 mm **(c)** 2.4 cm **(d)** 2.4 mm

38. A particle travels in a circle of radius 25 cm at speed that uniformly increases. If the speed changes from 5 m/s to 10 m/s in 2 s, then the angular acceleration will be (in rad s^{-2})

(a) 20 **(b)** 10 **(c)** 5 **(d)** 15

39. If a body describes a circular motion under inverse square field, the time taken to complete one revolution T is related to the radius of the circular orbit as:

(a) $T \propto r$ **(b)** $T \propto r^2$ **(c)** $T^2 \propto r^3$ **(d)** $T \propto r^4$

40. A galvanometer having a coil resistance of 60 Ω shows full scale deflection when a current of 1.0 amp passes through it. It can be converted into an ammeter to read currents upto 5.0 amp by:

(a) putting in series a resistance of 15 Ω

(b) putting in series a resistance of 240 Ω

(c) putting in parallel a resistance of 15 Ω

(d) putting in parallel a resistance of 240 Ω

41. The electric potential V varies with x according to relation $V = 5 + 4x^2$. The force experienced by a negative charge of 2×10^{-6} C located at x = 0.5 m is

(a) 2×10^{-6} N **(b)** 4×10^{-6} N

(c) 6×10^{-6} N **(d)** 8×10^{-6} N

42. A short bar magnet of length 4 cm has a magnetic moment of 4 J T^{-1}. What is the magnitude of magnetic field at a distance of 2 m from the centre of the magnet on its equatorial line?

(a) 10^{-7} T **(b)** 5×10^{-8} T **(c)** 10^{-6} T **(d)** 10^{-7} T

43. If a hydrogen atom at rest emits a photon of wavelength λ, the recoil speed of the atom of mass m is given by

(a) $\frac{h}{m\lambda}$ **(b)** $\frac{mh}{\lambda}$ **(c)** 10^{-6} T **(d)** 10^{-7} T

44. The orbital speed of the electron in the ground state of hydrogen atom is v. What will be its orital speed when it is excited to the energy state –3.4 eV?

(a) $2v$ **(b)** $\frac{v}{2}$ **(c)** $\frac{v}{4}$ **(d)** $\frac{v}{8}$

45. If the potential difference between the plates of a capacitor is increased by 20%, the energy stored in the capacitor increases by exactly

(a) 20% **(b)** 22% **(c)** 40% **(d)** 44%

46. A particle executes S.H.M. between x = –A and x = +A. The time taken for it to go from 0 to $\frac{A}{2}$ is T_1 and from $\frac{A}{2}$ to A is T_2. Then

(a) $T_1 < T_2$ **(b)** $T_1 > T_2$ **(c)** $T_1 = T_2$ **(d)** $T_1 = 2T_2$

47. A spring has a natural length of 50 cm and a force constant of 2×10^3 N/m. A body of mass 10 kg is suspended from it and spring is stretched. If the body is pulled down to a length of 8 cm and released, it executes SHM. Find the net force on the body at its lowermost position.

(a) 20 N **(b)** 40 N **(c)** 60 N **(d)** 80 N

48. A hospital uses an ultrasonic scanner of frequency 3.2 MHz to locate tumor in tissues. What is the wavelength of ultrasonic waves in a tissue in which the speed of wave is 1.6 km/s?

(a) 0.25 mm **(b)** 0.5 mm **(c)** 0.75 mm **(d)** 10 mm

49. The angle between the vectors $\vec{A} = 3\hat{i} + 4\hat{j} + 5\hat{k}$ and $\vec{B} = 6\hat{i} + 8\hat{j} + 10\hat{k}$ is

(a) Zero **(b)** 45° **(c)** 90° **(d)** 120°

50. Two monoatomic ideal gases 1 and 2 of molecular masses M_1 and M_2 are enclosed in separate containers kept at same temperature. The ratio of speed of sound in gas 1 to that in gas 2 is

(a) $\sqrt{\frac{M_1}{M_2}}$ **(b)** $\sqrt{\frac{M_2}{M_1}}$ **(c)** $\frac{M_1}{M_2}$ **(d)** $\frac{M_2}{M_1}$

CHEMISTRY

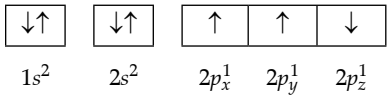
Section A

51. Which one is a wrong statement ?

(a) Total orbital angular momentum of electron in 's' orbital is equal to zero.

(b) An orbital is designated by three quantum numbers while an electron in an atom is designated by four quantum numbers.

(c) The electronic configuration of N atom is



(d) The value of m for dz^2 is zero.

52. Boric acid is an acid because its molecule:

(a) Contains replaceable H^+ ion.

(b) Gives up a proton.

(c) Accepts OH^- from water releasing proton.

(d) Combines with proton from water molecule.

53. Name the gas that can readily decolourise acidified $KMnO_4$ solution.

(a) CO_2 **(b)** SO_2 **(c)** NO_2 **(d)** P_2O_5

54. In which case is the number of molecules of water maximum?

(a) 18 mL of water **(b)** 0.18 g of water

(c) 0.00224 L of water vapours at 1 atm and 273 K

(d) 10^{-3} mol of water

55. The molar conductivity of a 0.5 mol/dm^3 solution of $AgNO_3$ with electrolytic conductivity of 5.76×10^{-3} S cm^{-1} at 298 K is :

(a) 2.88 S cm^2/mol **(b)** 11.52 S cm^2/mol

(c) 0.086 S cm^2/mol **(d)** 28.8 S cm^2/mol

56. Pick out the correct statement with respect to $[Mn(CN)_6]^{3-}$.

(a) It is sp^3d^2 hybridized and octahedral.

(b) It is sp^3d^2 hybridized and tetrahedral.

(c) It is d^2sp^3 hybridized and octahedral.

(d) It is dsp^2 hybridized and square planar.

57. The decreasing order of the ionization potential of the following elements is

(a) Ne > Cl > P > S > Al > Mg

(b) Ne > Cl > P > S > Mg > Al

(c) Ne > Cl > S > P > Mg > Al

(d) Ne > Cl > S > P > Al > Mg

58. Which of the following element cannot be detected by Lassaigne's test?

(a) Sulfur **(b)** Fluorine

(c) Nitrogen **(d)** None of the above

59. Which of the following is paramagnetic?

(a) CO **(b)** O_2^- **(c)** CN^- **(d)** NO^+

60. 0.1 molal aqueous solutions of an electrolyte AB3 is 90% ionized. The boiling point of solution at 1 atm is (K_b = 0.52 K kg/mol)

(a) 273.19 K **(b)** 374.92 K **(c)** 376.4 K **(d)** 373.19 K

61. Maximum number of orbitals in 6th shell is:

(a) 3 **(b)** 6 **(c)** 18 **(d)** 36

62. $KMnO_4$ can be prepared from K_2MnO_4 as per reaction,

$$3MnO_4^{2-} + 2H_2O \longrightarrow 2MnO_4^- + MnO_2 + 4OH^-$$

The reaction can go to completion by removing OH^- ions by adding:

(a) HCl **(b)** KOH **(c)** CO_2 **(d)** SO_2

63. If 10 kJ work is done on the system then 2 kcal heat is released by the system then change in internal energy is (1 cal = 4.2 J)

(a) 1.6 J **(b)** 1.6 cal **(c)** 1600 cal **(d)** 1600 J

64. Which of the following pair does not obey law of multiple proportion?

(a) CO and CO_2 **(b)** N_2O and NO

(c) CH_4 and CO_2 **(d)** SO_2 and SO_3

65. The dissociation constants for acetic acid and HCN at 25°C are 1.5×10^{-5} and 4.5×10^{-10}, respectively. The equilibrium constant for the equilibrium, $CN^- + CH_3COOH \longrightarrow HCN + CH_3COO^-$ would be:

(a) 3.0×10^5 **(b)** 3.0×10^{-5} **(c)** 3.0×10^{-4} **(d)** 3.0×10^4

66. Out of the following 0.10 m aqueous solutions, which one will exhibit the largest freezing point depression?

(a) KCl **(b)** $C_6H_{12}O_6$ **(c)** $Al_2(SO_4)_3$ **(d)** K_2SO_4

67. The central dogma of molecular genetics states that the genetic information flows from:

(a) Amino acids → Proteins → DNA

(b) DNA → Carbohydrates → Proteins

(c) DNA → RNA → Proteins

(d) DNA → RNA → Carbohydrates

68. A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction, which element undergoes maximum change in the oxidation number?

(a) S **(b)** H **(c)** Cl **(d)** C

69. The following acids have been arranged in the order of decreasing acidic strength, identify the correct order:

(I) HOCI **(II)** HOBr **(III)** HOI

(a) I > II > III **(b)** II > I > III

(c) III > II > I **(d)** I > III > II

70. Which one of the following statement for the order of a reaction is incorrect?

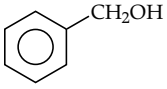
(a) Order is not influenced by stoichiometric coefficient of the reactants.

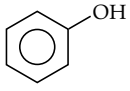
(b) Order of reaction is sum of power to the concentration terms of reactants to express the rate of reaction.

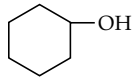
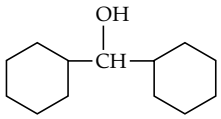
(c) Order of reaction is always whole number.

(d) Order can be determined only experimentally.

71. Which of the following compounds has the most acidic nature?

(a) 

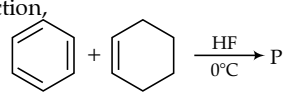
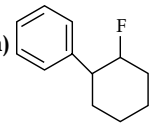
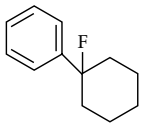
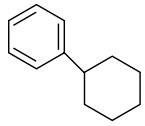
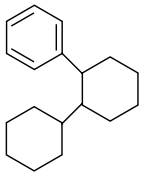
(b) 

(c)  **(d)** 

72. For the reversible reaction
$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ + heat
the equilibrium shifts in forward direction:
(a) By increasing the concentration of $NH_3(g)$.
(b) By decreasing the pressure.
(c) By decreasing the concentration of $N_2(g)$ and $H_2(g)$.
(d) By increasing pressure and decreasing temperature.

73. Number of optical isomers of fructose is:
(a) 8 **(b)** 2 **(c)** 16 **(d)** 4

74. Which of the following reactions is an example of nucleophilic substitution reaction?
(a) $R - X + KOH \longrightarrow ROH + KX$
(b) $2RX + 2Na \longrightarrow R - R + 2NaX$
(c) $RX + H_2 \longrightarrow RH + HX$
(d) $RX + Mg \longrightarrow RMgX$

75. In the given reaction,

the product P is:
(a)  **(b)** 
(c)  **(d)** 

76. The most suitable method of separation of 1 : 1 mixture of *ortho*- and *para*-nitrophenols is:
(a) sublimation **(b)** chromatography
(c) crystallisation **(d)** steam distillation

77. Equal volumes of three acid solutions of pH 3, 4 and 5 are mixed in a vessel. What will be the H+ ion concentration in the mixture?
(a) 1.11×10^{-4} M **(b)** 3.7×10^{-4} M
(c) 3.7×10^{-3} M **(d)** 1.11×10^{-3} M

78. Which of the following compounds with molecular formula, C_5H_{10} yields acetone on ozonolysis?
(a) 2-methyl-2-butene **(b)** 3-methyl-1-butene
(c) Cyclopentane **(d)** 2-methyl-1-butene

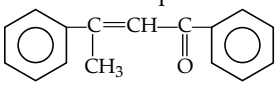
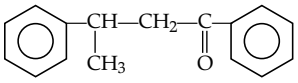
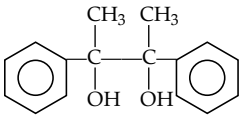
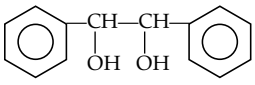
79. For the reaction $N_2 + 3H_2 \longrightarrow 2NH_3$, if $\frac{d[NH_3]}{dt} = 2 \times 10^{-4}$ mol L^{-1} s^{-1}, the value of $\frac{-d[H_2]}{dt}$ would be:
(a) 3×10^{-4} mol L^{-1} s^{-1} **(b)** 4×10^{-4} mol L^{-1} s^{-1}
(c) 6×10^{-4} mol L^{-1} s^{-1} **(d)** 1×10^{-4} mol L^{-1} s^{-1}

80. The correct statement regarding the basicity of arylamines is:
(a) arylamines are generally more basic than alkylamines because of aryl group.
(b) arylamines are generally more basic than alkylamines, because the nitrogen atom in arylamines is *sp*-hybridised.
(c) arylamines are generally less basic than alkylamines because the nitrogen lone pair electrons are delocalised by interaction with the aromatic ring π-electron system.
(d) arylamines are generally more basic than alkylamines because the nitrogen lone-pair electrons are not delocalized by interaction with the aromatic ring π-electron system.

81. Standard free energies of formation (in kJ/mol) at 298 K are –237.2, –394.4 and –8.2 for $H_2O(l)$, $CO_2(g)$ and pentane (g), respectively. The value of E°cell for the pentane-oxygen fuel cell is:
(a) 1.968 V **(b)** 2.0968 V **(c)** 1.0968 V **(d)** 0.0968 V

82. The vapour pressure of two liquids P and Q are 80 and 60 torr, respectively. The total vapour pressure of solution obtained by mixing 3 moles of P and 2 moles of Q would be:
(a) 140 torr **(b)** 20 torr **(c)** 68 torr **(d)** 72 torr

83. In which of the following reactions, standard, reaction changes (ΔS°) is positive and standard Gibbs energy change (ΔG°) decreases sharply with increasing temperature?
(a) $C_{(graphite)} + \frac{1}{2} O_2(g) \rightarrow CO(g)$
(b) $CO(g) + \frac{1}{2} O_2(g) \rightarrow CO_2(g)$
(c) $Mg(s) + \frac{1}{2} O_2(g) \rightarrow MgO(s)$
(d) $\frac{1}{2} C_{(graphite)} + \frac{1}{2} CO_2(g) \rightarrow \frac{1}{2} O_2(g)$

84. Acetophenone when reacted with a base, C_2H_5ONa, yields a stable compound which has the structure :
(a) 
(b) 
(c) 
(d) 

85. Match List I with List II

List I	List II
(a) $Cis[CrCl_2(ox)_2]^{3-}$	**(i)** Ionisation isomerism
(b) $[Co(NH_3)_5SO_4]Br$	(ii) Geometrical isomerism
(c) $[Co(en)_2Cl_2]$	(iii) Linkage isomerism
(d) $[Co(NH_3)_5(NO_2)^{2+}$	(iv) Optical isomerism

Choose the correct answer from the options given below.
(a) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
(b) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
(c) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)
(d) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

Section B

86. Correct decreasing order of electronegativity of the C, B, Si and P is
(a) P > Si > B > C **(b)** C > B > Si > P
(c) C > P > B > Si **(d)** Si > P > C > B

87. Benzamide on treatment with $POCl_3$ gives
(a) Aniline **(b)** Benzonitrile
(c) Chlorobenzene **(d)** Benzylamine

88. Strong heating of $KMnO_4$ produces
(1) K_2MnO_4 **(2)** MnO_2
(3) O_2 **(4)** All of these

89. Calculate the energy in kcal/mol of P—P bond if the heat of atomisation of $PH_3(g)$ is 228 kcal/mol and that of $P_2H_4(g)$ is 355 kcal/mol.
(a) 51 **(b)** 102 **(c)** 204 **(d)** 26

90. The correct increasing order of acidic character of following oxoacids of chlorine is:
(a) $HClO < HClO_2 < HClO_3 < HClO_4$
(b) $HClO_4 < HClO_3 < HClO_2 < HClO$
(c) $HClO_2 < HClO_4 < HClO_3 < HClO$
(d) $HClO_3 < HClO < HClO_4 < HClO_2$

91. Given below are two statements:

Statement I:

The nitration of benzoic acid gives *o*- and *p*-nitro benzoic acid

Statement II:

The COOH group in benzene deactivates the *o*- and *p*-positions more than the *m*-positions.

Choose the correct answer from the options given below.
(a) Statement I is incorrect but statement II is true.
(b) Both statement I and statement II are true.
(c) Both statement I and statement II are false.
(d) Statement I is correct but statement II is false.

92. Match List I with List II

List I	List II
(a) Work done during free expansion of ideal gas	**(i)** zero when $T \to 0$
(b) Work done in isothermal reversible expansion	**(ii)** $\Delta G < 0$
(c) Entropy of all perfectly crystalline substances	**(iii)** zero
(d) Criteria of spontaneity	**(iv)** $-nRT \ln \frac{V_2}{V_1}$

Choose the correct answer from the options given below.
(a) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
(b) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
(c) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)
(d) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

93. Which of the following compounds will have optically active isomers:
(a) 1-Bromo-3-butene **(b)** butyne
(c) Isobutyl alcohol **(d)** butanal

94. Which of the following coordination complex will produce a white precipitate on treatment with $AgNO_3$?
(a) $[Co(NH_3)_6]Cl_3$ **(b)** $[Co(NH_3)_3Cl_3]$
(c) $K_2[Pt(en)_2Cl_2]$ **(d)** $[Fe(en)_2Cl_4]$

95. Choose the incorrect statement among the given options.
(a) The latent heat of vaporisation of a substance is greater than that of fusion.
(b) The internal energy of an ideal gas is a function of its temperature.
(c) The specific heat capacity of a substance is greater in the solid state than in the liquid state.
(d) The specific heat capacity of a substance is greater in the liquid state than in the solid state.

96. D-glucose and D-galactose are:
(a) Enantiomers **(b)** Anomers
(c) Epimers **(d)** None of these

97. Given below are two statements

Statement I: The ionisation energy of Cu is more than that of K though both have a 4*s* configuration.

Statement II: The 18 electron shell of Cu shields nuclear charge more effectively than the shell of K.

Choose the correct answer from the options given below:
(a) Statement I is incorrect but statement II is true.
(b) Both statements I and II are true.
(c) Both statement I and statement II are false.
(d) Statement I is correct but statement II is false.

98. Which of the following is the correct IUPAC name nomenclature of the complex, $[Pt(py)_4]\,[PtCl_4]$?
(a) Tetrakis pyridine platinium (II) tetrachloroplatinate (II)
(b) Tetrapyridine tetrachlorodiplatinium (IV)
(c) Tetrachlorotetra pyridine diplatinum (II)
(d) Tetrakis (pyridine) platinum (IV) tetrachloroplatinum (IV)

99. Calculate the heat of formation of methane from the following data:
(i) $CH_4(g) + 2O_2(g) \to CO_2(g) + H_2O(g)$
$\Delta H = -890.65$ kJ mol^{-1}
(ii) $H_2(g) + \frac{1}{2} O_2(g) \to 2H_2O(l)$
$\Delta H = -285.84$ kJ mol^{-1}
(iii) $C(\text{graphite}) + O_2(g) \to CO_2(g)$
$\Delta H = -393.51$ kJ mol^{-1}
(a) +74.84 kJ mol^{-1} **(b)** –74.84 kJ mol^{-1}
(c) +333.68 kJ mol^{-1} **(d)** –333.68 kJ mol^{-1}

100. The partial hydrolysis of XeF_4 at low temperature gives:
(a) XeO_3 **(b)** XeF_2 **(c)** $XeOF_2$ **(d)** $XeOF_4$

BOTANY

Section A

101. Methanogens belong to:
(a) Eubacteria **(b)** Archaebacteria
(c) Dinoflagellates **(d)** Slime moulds

102. Which of the following is not used mainly as biocontrol agent?
(a) *Trichoderma* **(b)** Baculoviruses
(c) Dragonflies **(d)** *Anabaena*

103. A plant with genotype AABbCC is selfed F_2 phenotypic ratio would be:
(a) 9 : 3 : 3 :1 **(b)** 27 : 9 : 9 : 9 : 3 : 3 : 3
(c) 1 : 1 **(d)** 3 : 1

104. In five kingdom classification, *Chlamydomonas* and *Chlorella* have been included in :
(a) Protista **(b)** Monera **(c)** Plantae **(d)** Algae

105. Which of the following is not a characteristic feature during mitosis in somatic cells?
(a) Synapsis **(b)** Spindle fibres
(c) Disappearance of nucleolus
(d) Centromere of the chromosome

106. Gene regulation governing lactose operon of *E. coli* that involves the lac *i* gene product is:
(a) Possible and inductable because it can be induced by lactose.
(b) Negative and inducible because repressor protein prevents transcription.
(c) Negative and repressible because repressor protein prevents transcription.
(d) Feedback inhibition because excess of β-galactosidase can switch off transcription.

107. Middle lamella is composed of:
(a) Calcium pectate **(b)** Phosphoglycerides
(c) Muramic acid **(d)** Hemicellulose

108. Hormone antagonist to gibberellins is:
(a) IAA **(b)** ABA **(c)** Zeatin **(d)** Ethylene

109. Which one of the following is correct about a country with growing population?
(a) Pre-reproductive individuals are more than the reproductive individuals.
(b) Pre-reproductive individuals are less than the reproductive individuals.
(c) Reproductive and pre-reproductive individuals are equal in number.
(d) Reproductive individuals are less than the post-reproductive individuals.

110. A bacterium is multiplying in a cup and takes 36 minutes to fill one-fourth of the cup with its population. Calculate the time by which cup will be completely filled with bacterial population?
[Hint: Generation time = 1 minute]
(a) 108 minutes **(b)** 48 minutes
(c) 38 minutes **(d)** 60 minutes

111. Which of the given organisms reproduce asexually by non-motile spores?
(a) *Laminaria* **(b)** *Polysiphonia*
(c) *Chara* **(d)** *Volvox*

112. Which of the given is smallest living organism and can survive without oxygen?
(a) *Mycoplasma* **(b)** *Trypanosoma*
(c) *Paramecium* **(d)** *Euglena*

113. Which of the given has maximum value of respiratory quotient under aerobic respiration?
(a) Malic acid **(b)** Oxalic acid
(c) Glucose **(d)** Tripalmitin

114. Stems modified into flat green organs performing the functions of leaves are known as:
(a) Scales **(b)** Cladodes
(c) Phyllodes **(d)** Phylloclades

115. The correct sequence of cell organelles during photorespiration is:
(a) Chloroplast, peroxisome, mitochondria
(b) Chloroplast, vacuole, peroxisome
(c) Chloroplast, Golgi bodies, mitochondria
(d) Chloroplast, rough endoplasmic reticulum, dictyosome

116. *Cry II Ab* and *Cry I Ab* produce toxins when introduced into plants which help to control against:
(a) Cotton Boll worm and Cotton Borer respectively
(b) Corn Borer and Cotton Boll worm respectively
(c) Cotton Boll worm and Corn Borer respectively
(d) Tobacco bud worm and Nematoda respectively

117. Prophase I differs from prophase of mitosis as in the former stage:
(a) Condensation of chromatin takes place.
(b) DNA replication takes place.
(c) Pairing of homologous chromosome occurs.
(d) Nuclear membrane disappears.

118. If alien DNA is inserted within the lacZ gene of pUC8, the recombinants will be:
(a) Ampicillin susceptible **(b)** Tetracycline resistant
(c) Blue coloured
(d) Ampicillin resistant and white coloured

119. Parthenocarpic fruits:
(a) Are also called false fruits
(b) Are developed without fertilisation
(c) Have a lot of tiny seeds
(d) Have thalamus as edible part

120. Prions include:
(a) ssRNA and proteins **(b)** Capsid and RNA
(c) Wrongly folded proteins
(d) dsRNA and carbohydrates

121. The important site for the formation of glycoproteins and glycolipids is:
(a) Vacuoles **(b)** Plastids
(c) Lysosome **(d)** Golgi apparatus

122. Which of the following biomolecules is common to respiration mediated breakdown?
(a) Acetyl CoA **(b)** Glucose 6-phosphate
(c) Fructose 1,6-biphosphate **(d)** Pyruvic acid

123. Which of the following is correct for K-selected species?
(a) Large number of progeny with large size.
(b) Small number of progeny with small size.
(c) Small number of progeny with large size.
(d) Large number of progeny with small size.

124. An organic substance essential for activity of an enzyme is:
(a) Apoenzyme **(b)** Holoenzyme
(c) Isoenzyme **(d)** Coenzyme

125. Downstream processing of desired product does not involve:
(a) Isolation of product.
(b) Purification of expressed protein.
(c) Marketing of extracted product.
(d) Expression of foreign gene.

126. How many plants among *Indigofera*, *Sesbania*, *Salvia*, *Allium*, Aloe, mustard, groundnut, radish, gram and turnip have stamens with different lengths in their flowers?
(a) Three **(b)** Four **(c)** Five **(d)** Six

127. Major site for synthesis of lipids is:
(a) Symplast **(b)** SER
(c) RER **(d)** Nucleoplasm

128. Ecotone is:
(a) Polluted area **(b)** The bottom of a lake
(c) A zone of transition in between two communities
(d) A zone of developing community

129. The primary structure of a polypeptide has:
(a) Interchain disulphide bonds
(b) Peptide bonds
(c) H-bonds
(d) Glycosidic bonds

130. Water soluble pigments found in plant cell:
(a) Anthocyanins **(b)** Xanthophylls
(c) Chlorophylls **(d)** Carotenoids

131. Endosperm is completely consumed by the developing embryo in:
(a) Pea and groundnut **(b)** Maize and castor
(c) Castor and groundnut **(d)** Maize and pea

132. During anaphase-I of meiosis:
(a) Homologous chromosomes of a pair separate.
(b) Non-homologous chromosomes separate.
(c) Sister chromatids separate.
(d) Non-sister chromatids of homologous chromosome separate by splitting of Centromere.

133. The sequence of nitrogen bases of the coding strand of DNA in a transcription unit is:
5′ – ATGAATG – 3′
The sequence of bases in its RNA transcript will be:
(a) 5′ – AUGAAUG – 3′ **(b)** 5′ – UACUUAC – 3′
(c) 5′ – CAUUCAU – 3′ **(d)** 5′ – GUAAGUA – 3′

134. Lecithin does not contain:
(a) Fatty acid **(b)** Carotene **(c)** Glycerol **(d)** Choline

135. Inverted omega-shaped organization of vascular bundles is seen in:
(a) Cycas stem **(b)** Cycas rachis
(c) Cycas leaflet **(d)** Cycas root

Section B

136. The length of different internodes in a culm of sugarcane is variable because of:
(a) Intercalary meristem.
(b) Shoot apical meristem.
(c) Size of lamina of lower node.
(d) All of the above.

137. Which of the following processes is NOT associated with the endomembrane system in eukaryotic cells?
(a) Protein synthesis in the rough endoplasmic reticulum
(b) Lipid synthesis in the smooth endoplasmic reticulum
(c) Protein sorting and packaging in the Golgi apparatus
(d) ATP synthesis in the mitochondria

138. The productivity of oceans is ___A___ billion tons and for terrestrial ecosystem is ___B___ billion tons.
(a) A – 155, B – 115 **(b)** A – 15, B – 55
(c) A –55, B – 115 **(d)** A –55, B –15

139. Which of the following cell organelles is responsible for the detoxification of drugs and poisons in eukaryotic cells?
(a) Golgi apparatus **(b)** Peroxisome
(c) Lysosome **(d)** Endoplasmic reticulum

140. Biochemical oxygen demand may not be good index for water bodies receiving effluents from:
(a) Sugar industry **(b)** Domestic sewage
(c) Dairy industry **(d)** Petroleum industry

141. Which of the following is correct statement for intercalary meristem?
(a) It lies at tip of root apex.
(b) It lies at base of stem always.
(c) It is primary meristem.
(d) It helps in increasing the girth of the plant.

142. Bakane disease in rice is associated with the discovery of which plant growth regulator?
(a) cytokinins **(b)** gibberellins
(c) auxins **(d)** ethylene

143. Choose the correct statement.
(a) Unisexual flowers occurs in china rose.
(b) Monoecious conditions in lower plants is absent.
(c) Pollen tube can carry both male or female gametes.
(d) In lower plants, both male and female gametes may be motile.

144. What is the proportion of photosynthetically active radiation (PAR) in total incident solar radiation?
(a) Less than 50% **(b)** More than 50%
(c) Only 1-5% **(d)** 100%

145. Certain plants have the ability to follow different pathways in response to environment leading to formation of different kinds of structures. This is known as:
(a) Differentiation **(b)** Redifferentiation
(c) Development **(d)** Plasticity

146. Out of the given options, which gives one correct example each of homologous organs and analogous organs?

Homologous Organs	Analogous Organs
(a) Thorns of *Bougainvillea* and tendrils of cucurbita	Sweet potato and potato

(b) Sweet potato and potato	Thorns of *Bougainvillea* and tendrils of cucurbita
(c) Leaves of *Opuntia* and peepal	Tendril of pea and spines of barberry
(d) Thorns of *Pyracantha* and barberry	Leaves of *Opuntia* and peepal

147. We know that Mendel selected 14 true – breeding pea plant varieties as pairs for conducting experiments. Those varieties were similar except for one character with contrasting trait. Among the options given below, choose the correct number of traits related to stem, flower, position and seed, respectively.
(a) 2, 2, 2, 1 **(b)** 1, 2, 2, 2 **(c)** 2, 2, 1, 2 **(d)** 1, 1, 2, 3

148. In respect to the nitrogenous base pairing in DNA, what does A and B represent in the given representation?

Adenine = 'A'

'B' ≡ Cytosine

(a) 'A' – Uracil, 'B' – Thymine
(b) 'A' – Thymine, 'B' – Purine
(c) 'A' – Thymine, 'B' – Guanine
(d) 'A' – Pyrimidine, 'B' – Uracil

149. Study the following table carefully and select the correct options for 1, 2, 3 and 4.

Classes of Algae	Common Name	Major Pigments	Stored Food
Chlorophyceae	Green algae	1	2
Phaeophyceae	3	Chlorophyll-a,c, fucoxanthin	Mannitol, Laminarin
Rhodophyceae	Red algae	Chlorophyll-a, d, phycoerythrins	4

	1	2	3	4
(a)	Flavoxanthin	Laminarin	Yellow alage	Fats
(b)	Phycocyanin	Mannitol	Blue algae	Carbohydrates
(c)	Allophycocyanin	Floridean starch	Purple algae	Sugar
(d)	Chlorophyll-a, b	Starch	Brown algae	Floridean starch

150. How many of the books listed in the box written by Carl Linnaeus?

Systema Naturae, Species Plantarum, On the Origin of Species, Micrographia, The Descent of Man

(a) 1 **(b)** 2 **(c)** 3 **(d)** 4

ZOOLOGY

Section A

151. Metagenesis refers to:
(a) Presence of a segmented body and parthenogenetic mode of reproduction
(b) Presence of different morphic forms.
(c) Alternation of generation between asexual and sexual phases of an organism.
(d) Occurrence of a drastic change in form during post-embryonic development.

152. Osteoporosis is an age-related disease of skeletal system may occur due to the:
(a) Immune disorder affecting neuromuscular junction leading to fatigue.
(b) High concentration of Ca^{++} and Na^{+}.
(c) Decreased level of oestrogen.
(d) Accumulation of uric acid leading to inflammation of joints.

153. Which of the following set of diseases is caused by bacteria?
(a) Cholera and tetanus **(b)** Typhoid and small pox
(c) Tetanus and mumps **(d)** Herpes and influenza

154. Which one of the following groups of animals is bilaterally symmetrical and triploblastic?
(a) Aschelminthes (Round worm)
(b) Ctenophores
(c) Sponges
(d) Coelenterates (Cnidarians)

155. The H-zone in the skeletal muscle fibre is due to:
(a) The absence of myofibrils in the central portion of A-band.
(b) The central gap between myosin filaments in the A-band.
(c) The central gap between actin filaments extending through myosin filaments in the A-band.
(d) Extension of myosin filaments in the central portion of the A-band.

156. Volume of air that remains in lungs after a normal expiration is termed as:
(a) Residual volume **(b)** Tidal volume
(c) Functional residual capacity **(d)** Expiratory capacity

157. Select the flying mammal:
(a) *Macropus* **(b)** *Pteropus*
(c) *Balaenoptera* **(d)** *Ornithoryhnchus*

158. Which of the following joints would allow no movement?
(a) Fibrous joint **(b)** Cartilaginous joint
(c) Synovial joint **(d)** Ball and socket joint

159. Cells present in the interstitial spaces of testes secrete which hormone?
(a) Androgens **(b)** Progesterone
(c) FSH **(d)** LH

160. Photosensitive compound in the human eye is made up of:
(a) Opsin and retinal **(b)** Opsin and retinol
(c) Transducin and retinene **(d)** Guanosine and retinol

161. Match **Column - A** with **Column - B** and select the option having correct match.

Column - A	Column - B
(i) Physical barriers	**(a)** Skin & mucous membrane

Column - A	Column - B
(ii) Physiological barriers	**(b)** NK cells and neutrophils
(iii) Cytokine barriers	**(c)** Acid in stomach and tears in eye
(iv) Cellular barriers	**(d)** Interferons

(a) i - a, ii - b, iii - c, iv - d **(b)** i - a, ii - c, iii - d, iv - b
(c) i - a, ii - d, iii - c, iv - b **(d)** i - d, ii - c, iii - b, iv - a

162. Aquatic animals are mostly ammonotelic because:
(a) Ammonia helps in checking inflow of water into body.
(b) Excretion of ammonia requires large amount of water which is available to these animals.
(c) Water contains less nitrogen.
(d) They all have protonephric kidney.

163. Match **column I** with **column II** and select the correct option.

	Column I	Column II
A.	Syphilis	HPV
B.	Genital herpes	*Haemophilus ducreyi*
C.	Genital warts	*Treponema pallidum*
D.	Chancroid	HSV-2

Choose the correct option.
(a) A-(ii), B-**(i)**, C-(iii), D-(iv) **(b)** A-(iv), B-(iii), C-**(i)**, D-(ii)
(c) A-(iii), B-(ii), C-(iv), D-**(i)** **(d)** A-(iii), B-(iv), C-**(i)**, D-(ii)

164. If a colourblind woman marries a normal man then what is the probability of their son being colourblind?
(a) 0% **(b)** 25% **(c)** 75% **(d)** 100%

165. Normally, the largest amount of urea would be carried by which of the following blood vessels in mammals?
(a) Hepatic vein **(b)** Hepatic portal vein
(c) Hepatic artery **(d)** Renal vein

166. Select the option that correctly represents the set of animals and their respective taxon.

(a)	*Pterophyllum, Betta, Carchardon*	Osteichthyes
(b)	*Ichthyophis, Hyla, Salamander*	Amphibia
(c)	*Calotes, Chelone, Columba*	Reptilia
(d)	*Delphinus, Aptenodytes, Pteropus*	Mammalia

167. Name the chronic respiratory disorder caused mainly by cigarette smoking:
(a) Respiratory alkalosis **(b)** Emphysema
(c) Asthma **(d)** Respiratory acidosis

168. Which one of the following animals has two separate circulatory pathways?
(a) Frog **(b)** Lizard **(c)** Whale **(d)** Shark

169. Injury to adrenal cortex is not likely to affect the secretion of which one of the following?
(a) Adrenaline **(b)** Cortisol **(c)** Aldosterone
(d) Both androstenedione and dehydroepiandrosterone

170. Which is the particular type of drug that is obtained from the plant whose one flowering branch is shown here?

(a) Hallucinogen **(b)** Depressant
(c) Stimulant **(d)** Pain-killer

171. What is the role of the male frog during amplexus?
(a) Fertilisation of eggs **(b)** Protection of eggs
(c) Transport of eggs **(d)** Courtship behavior

172. Identify the numbers of incorrect statements from the following:
(a) Open circulation is a feature of Annelids.
(b) Antibodies against AB antigens can cross the placental barriers.
(c) Angina can be observed in individuals of only old age group.
(d) Cardiac output in a healthy individual in average is 5 litres/min.
(a) 1 **(b)** 2 **(c)** 3 **(d)** 4

173. Which of the following is not the component of IVF?
(a) GIFT **(b)** ZIFT **(c)** IUT **(d)** ICSI

174. A female has two X chromosomes, one carrying allele for colour blindness and other for haemophilia, and this female marries to a colour blind man. What is the percentage of offsprings to get affected by both disorders?
(a) 0% **(b)** 50% **(c)** 25% **(d)** 100%

175. Commonly used vectors for human genome sequencing are:
(a) T-DNA **(b)** BAC vectors
(c) Expression vector **(d)** T/C cloning vector

176. Human egg is:
(a) Mesolecithal **(b)** Microlecithal
(c) Alecithal **(d)** Megalecithal

177. Match the items given in **Column I** with those in **Column II** and select the correct option given below:

Column I	Column II
(A) Tricuspid valve	**(i)** Between left atrium and left ventricle
(B) Bicuspid valve	(ii) Between right ventricle and pulmonary artery
(C) Semilunar valve	(iii) Between right atrium and right ventricle

	A	B	C
(a)	**(i)**	(ii)	(iii)
(b)	**(i)**	(iii)	(ii)
(c)	(iii)	(i)	(ii)
(d)	(ii)	(iii)	(i)

178. HIV that causes AIDS, first starts destroying:
(a) B-lymphocytes **(b)** leucocytes
(c) Helper T-lymphocytes **(d)** Thrombocytes

179. Damage to heart muscles due to insufficient O_2 supply causing death of myocardium is called:
(a) Heart attack **(b)** Heart failure
(c) Cardiac arrest **(d)** Pulmonary embolism

180. The controlling factor for breathing rate is:

(a) O_2 and H^+ concentration
(b) Temperature of blood
(c) O_2 level in arterial blood
(d) CO_2 level in arterial blood

181. Involuntary striated muscle fibres are found exclusive in _____
(a) Myometrium **(b)** Pylorus
(c) Blood vessel **(d)** Myocardium

182. Otolith organ consists of:
(a) Saccule and utricle
(b) Semi-circular canals and saccule
(c) Semi-circular canals and utricle
(d) Semi-circular canals and bony ossicles

183. Which of the following is incorrect for angiotensin II?
(a) It is a powerful vasoconstrictor.
(b) It activates adrenal cortex to release aldosterone.
(c) It activates PCT to absorb more Na^+ from filtrate.
(d) It decreases BP.

184. Which of the following pairs is incorrectly matched?
(a) Nucleotide - Thymidylic acid
(b) Pyrimidine - Adenine
(c) Nucleoside - Guanosine
(d) Purine - Guanine

185. Which of the following is the correct order of placement of phyla in classification?
(a) Ctenophora → Annelida → Echinodermata → Porifera
(b) Platyhelminthes → Arthropoda → Hemichordata → Coelenterata
(c) Aschelminthes → Mollusca → Chordata → Ctenophora
(d) Ctenophora → Platyhelminthes → Aschelminthes → Annelida

Section B

186. What is the role of Leydig cells?
(a) nourishment of sperms
(b) to give motility to sperms
(c) synthesis of testosterone
(d) to undergo spermatogenesis

187. In which disease is the genital organs grossly affected due to infective helminth?
(a) Ascariasis **(b)** Ring worm
(c) Scabies **(d)** Filariasis

188. Out of the following combinations which individual will have maximum genetically active DNA?
(a) 44+XX **(b)** 44+XY
(c) 44+XYY **(d)** Down's syndrome

189. Which of the following does not disturb Hardy-Weinberg equilibrium?
(a) Gene flow **(b)** Genetic drift
(c) Natural selection **(d)** Random mating

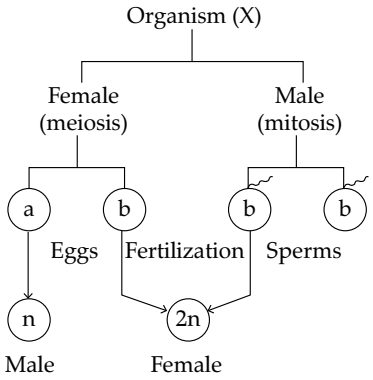
190. The factor that may decrease the process of oxygenation is:
(a) Increase in blood circulation.
(b) Macrocytic anaemia.
(c) Increase in blood volume.
(d) Increase in haemoglobin levels.

191. Product of sexual reproduction generally generates:
(a) Longer viability of seeds
(b) Prolonged dormancy
(c) New genetic combination leading to variation
(d) Large biomass

192. The maximum amount of electrolytes and water (70–80%) from the glomerular filtrate is reabsorbed in which part of the nephron?
(a) Ascending limb of loop of Henle
(b) Distal convoluted tubule
(c) Proximal convoluted tubule
(d) Descending limb of loop of Henle

193. Select the correct options to fill up the blanks:
(i) Heroin is commonly called as _____
(ii) Morphine is extracted from the _____ of poppy plant
(iii) Lysergic Acid Diethylamide is most powerful _____
(iv) Cocaine interferes with the transport of _____ neurotransmitter.
(a) (i) Smack; (ii) latex; (iii) hallucinogen; (iv) dopamine
(b) (i) coke; (ii) seed; (iii) psychedelic drug; (iv) serotonin
(c) (i) sugar; (ii) stem; (iii) pain-killer; (iv) adrenaline
(d) (i) crack; (ii) nectar; (iii) sedative; (iv) epinephrine

194. Refer to the given figure and choose the correct option for X.



(a) Birds **(b)** Moths
(c) Honeybees **(d)** Grasshoppers

195. Which of the following is correct statement for DNA fingerprinting?
(a) Alec Jacob initially developed DNA fingerprinting.
(b) Restriction enzymes are not required in DNA fingerprinting.
(c) DNA fingerprinting also known as DNA typing.
(d) Scientist who developed DNA fingerprinting used a satellite DNA as probe that shows very low degree of polymorphism.

196. Complete the following by choosing correct option for 'A', 'B' and 'C'.

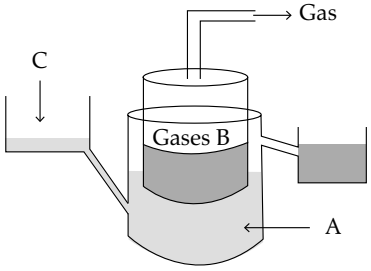
Cenozoic era	Quaternary Tertiary

Mesozoic era	'C'
	Jurrasic
	Triassic

'A'	Permian
	'B'
	Devonian
	Silurian

(a) 'A' – Cambrian era, 'B' – Ordovician, 'C' – Carboniferous
(b) 'A' – Cambrian era, 'B' – Ordovician, 'C' – Paleozoic
(c) 'A' – Paleozoic era, 'B' – Carboniferous, 'C' – Missic
(d) 'A' – Paleozoic era, 'B' – Carboniferous, 'C' – Cretaceous

197. This is a diagrammatic representation of biogas plant. What do A, B, C represent respectively.



(a) A - Gas holder, B - $CH_4 + CH_3 + CO_2$, C - Slurry
(b) A - Sludge tank, B - $NH_4 + CO_2 + H_2$, C - Cow dung
(c) A - Digester, B - $CH_4 + CO_2 + H_2$, C - Cattle dung + Water
(d) A - Inlet, B - $SO_2 + CO_2 + H_2$, C - Leftover slurry

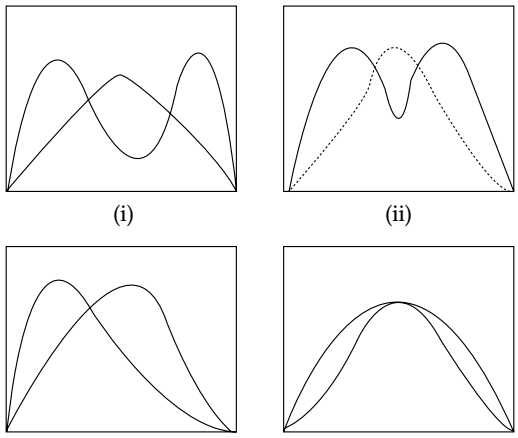
198. Match the column and choose the correct option:

Column A	**Column B**
(Amino Acids)	(Codons)
(i) Arginine	1. AGG
(ii) Tryptophan	2. UGG
(iii) Cysteine	3. GAA
(iv) Glutamic acid	4. GAG
	5. UGU
	6. GUG

(a) i - 1; ii - 2; iii - 5; iv - 3, 4 **(b)** i - 2; ii - 5; iii - 1, 6; iv - 3, 4
(c) i - 2; ii - 5; iii - 1, 3; iv - 4 **(d)** i - 2; ii - 1; iii - 3, 4; iv - 5

199. Select the incorrect statement.
(a) Human euthenics is known as the improvement of human race through hereditary qualities.
(b) Polygenic character is not controlled by multiple alleles.
(c) Genes at more than one locus are called as polygenes
(d) Spliceosome is formed during post-transcriptional changes in eukaryotes.

200. Refer the graphs below and choose the correct type of natural selection.



(a) **(i)** - Stabilising, (ii) - Directional, (iii) - Disruptive, (iv) - Stabilising
(b) **(i)** - Disruptive, (ii) - Disruptive, (iii) - Directional, (iv) - Stabilising
(c) **(i)** - Directional, (ii) - Disruptive, (iii) - Stabilising, (iv) - Directional
(d) **(i)** - Disruptive; (ii) - Stabilising, (iii) - Directional, (iv) - Stabilising