ENGLISH

Form Number : _____

ALLEN CAREER INSTITUTE KOTA (RAJASTHAN)

path to success

CLASSROOM CONTACT PROGRAMME

(Academic Session : 2019-2020)

MHT-CET: ENTHUSE COURSE

Test Type : ONLINE TEST – 06 **Test Pattern : MHT-CET**

TEST DATE : 28-09-2020

PCB GROUP Paper code: CET2012FSPCB928 **Roll No-** | | | | | | | | |

FULL SYLLABUS:

Important Instructions

Do not open this Test Booklet until you are asked to do so.

1. Immediately fill in the form number on this page of the Test Booklet with *Blue/Black Ball Point Pen. Use of pencil is strictly prohibited*.

2. The candidates should not write their Form Number anywhere else (except in the specified space)on the Test Booklet/Answer Sheet.

3. The test is of **3 hours** duration.

4. The Test Booklet consists of **200** questions. The maximum marks are **200.** Duration 180 minutes

5. Question Paper Format :

Physics (50 Questions) Chemistry (50 Questions) carrying 1 mark each questions and **Biology (100 Questions) carrying 1 mark each**.

Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Marking scheme: Phy chem. +1 for correct answer and 0 if not Attempted. **No** negative marking.

Bio +1 for correct answer and 0 if not Attempted. **No** negative marking.

6. Use **Blue/Black Ball Point Pen only** for writting particulars/marking responses on **Side–1** and **Side–2** of the Answer Sheet. **Use of pencil is strictly prohibited.**

7. No candidate is allowed to carry any textual material, printed or written, bits of papers, mobile phone any electronic device etc, except the Identity Card inside the examination hall/room.

8. Rough work is to be done on the space provided for this purpose in the Test Booklet only.

9. On completion of the test, the candidate must hand over the Answer Sheet to the invigilator on duty in the Room/Hall. **However, the candidate are allowed to take away this Test Booklet with them.**

10. Do not fold or make any stray marks on the Answer Sheet.

Your Hard Work Leads to Strong Foundation

SECTION – A- PHYSICS

1. Dimensional formula for electromotive force is same as that for

a) Potential **b)** Current **c)** Force **d)** Energy

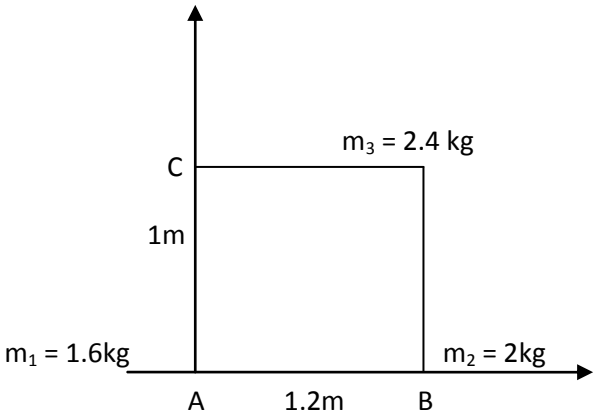
2. If the sum of two unit vectors is a unit vector then magnitude of difference in two unit vectors is

a) $\sqrt{2}$ **b)** $\sqrt{3}$ **c)** $1/\sqrt{2}$ **d)** $\sqrt{5}$

3. A ball is allowed to fall from a height of 8cm. If the ball is perfectly elastic. How much it rise after rebound

a) 8cm **b)** 1 cm **c)** 0.5 cm **d)** 0

4. Three point masses m_1, m_2 and m_3 are placed at the corners of a thin massless rectangular sheet (1.2 m x 1m) as shown. Centre of mass will be located at the point.



a) (0.8, 0.6)m **b)** (0.6, 0.8)m **c)** (0.4, 0.4)m **d)** (0.5, 0.6)m

5. A 30 kg block rests on a rough horizontal surface. A force of 200 N is applied on the block The block acquires a speed of 4 m/s. Starting from the rest in 2 second what is the value of coefficient of friction?

a) $\frac{10}{3}$ **b)** $\frac{\sqrt{3}}{10}$ **c)** 0.47 **d)** 0.184

6. If ${}_a\mu_g$ = 3/2 and c = $3\times10^8 m/s$, then velocity of light in glass will be

a) $1.5\times10^8\ m/s$ **b)** $4.5\times10^8\ m/s$ **c)** $2\times10^8 m/s$ **d)** $2.33\times10^8 m/s$

7. A ray of light is incident on the surface of separation of a medium at an angle 45^0 and is refracted in the medium at an angle 30^0. What will be the velocity of light in the medium

a) $1.96\times10^8 m/s$ **b)** $2.12\times10^8 m/s$ **c)** $3.86\times10^8 m/s$ **d)** $3.33\times18^8 m/s$

8. Two similar plano-convex lenses are combined together in three different ways as shown in the adjoining figure. The ratio of the focal length in three cases will be

a) 2:2:1 **b)** 1:1:1 **c)** 1:2:2 **d)** 2:1:1

9. A point object is placed at a distance of 10 cm and its image is formed at a distance of 20 cm from a concave mirror. If the object is moved by 0.1 cm towards the mirror, the image will shift by

a) 0.4 cm away from the mirror **b)** 0.4 cm towards the mirror

c) 0.8 cm away from the mirror **d)** 0.8 cm towards the mirror

10. A straight wire of diameter 0.4 mm carrying a current of 2A is replaced by another wire of 0.8 mm diameter and carrying the same current. The magnetic field at the same distance from the wire is

a) one half of the first value **b)** twice the first value

c) not changed **d)** thrice the first value

11. A current I flows along the length of an infinitely long, straight, thin-walled pipe. Then

a) the magnetic field at all points inside the pipe is constant

b) the magnetic field at any point inside the pipe is zero

c) the magnetic field is zero only on the axis of the pipe

d) the magnetic field is different at different points inside the pipe.

12. A helium nucleus makes a full rotation in a circle of radius 0.8 metre in two seconds. The value of the magnetic field B at the centre of the circle will be

a) $\frac{10^{-19}}{\mu_0}$ **b)** $10^{-19}\mu_0$ **c)** $2\times10^{-10}\mu_0$ **d)** $\frac{2\times10^{-10}}{\mu_0}$

13. The ratio of magnetic induction at a point along the axis of a circular coil of radius 'a' at a distance 'x' to a point where x tends to zero is [x >> a]

a) x^3 / a^3 **b)** a^3 / x^3 **c)** $2a^3/x^2$ **d)** $2x^3/a^2$

14. At a certain place, the horizontal component of earth's magnetic field is $\sqrt{3}$ times the vertical component. The angle of dip at that place is

a) 30^0 **b)** 60^0 **c)** 45^0 **d)** 90^0

15. The angle of dip at a place is 37^0 and the vertical component of the earth's magnetic field is 6×10^{-5} T. The earth's magnetic field at this place is $\left(\tan 37^o = \frac{3}{4}\right)$.

a) 7×10^{-5} T **b)** 6×10^{-5} T **c)** 5×10^{-5} T **d)** 10^{-4} T

16. The torque required to keep a magnet at a uniform field is 2×10^{-5} Nm. The magnetic force on each pole if the magnetic length is 20 cm is

a) 2×10^{-3} N **b)** 2×10^{-4} N **c)** 4×10^{-4} N **d)** 4×10^{-6} N

17. If α is angular acceleration, ω is angular velocity and 'a' is the centripetal acceleration then which of the following is true?

a) $\alpha = \frac{\omega a}{v}$ **b)** $\alpha = \frac{v}{\omega a}$ **c)** $\alpha = \frac{av}{\omega}$ **d)** $\alpha = \frac{a}{\omega v}$

18. Radius of the curved road on national highway is R width at the road is b. The outer edge of the road is raised by h with respect to inner edge so that a car with velocity v can pass safely over it. The value of h is

a) $\frac{v^2b}{Rg}$ **b)** $\frac{v}{Rgb}$ **c)** $\frac{v^2R}{bg}$ **d)** $\frac{v^2b}{R}$

19. A stone drop from height 'h' reaches to earth surface in 1 sec If the same stone taken to moon and drop freely then it will reach from the surface of the moon in the time?

a) $\sqrt{6}$ sec **b)** 9 sec **c)** $\sqrt{3}$ sec **d)** 6 sec

20. The value of gravitational acceleration g at a height h above the earth is surface is g/4 then

a) h = R **b)** $h=\frac{R}{2}$ **c)** $h=\frac{R}{3}$ **d)** $h=\frac{R}{4}$

21. A 3kg particle moves with constant speed of 2 m/s in the X-Y plane in the Y direction along the line x = 4m. The angular momentum (in kg-m^2 – s^{-1})relative to the origin and the torque about the origin needed to maintain this motion are respectively

a) 12, 0 **b)** 24, 0 **c)** 0, 24 **d)** 0, 12

22. If the velocity is $\vec{v}=3\hat{i}+2\hat{j}+4\hat{k}$ and the position vector is $\vec{r}=-\hat{i}+3\hat{j}-2\hat{k}$ for a body of mass m, the angular momentum $\vec{L}=$

a) $m\left(12\hat{i}-4\hat{j}+7\hat{k}\right)$ **b)** $m\left(8\hat{i}-6\hat{j}+10\hat{k}\right)$ **c)** $m\left(16\hat{i}-2\hat{j}-11\hat{k}\right)$ **d)** $m\left(18\hat{i}-2\hat{j}-11\hat{k}\right)$

23. Two linear S.H.Ms of equal amplitude A and angular frequencies ω and 2ω are impressed on a particle along the axes x and y respectively. If the initial phase difference between them is $\pi/2$, the resultant path followed by the particle is

a) $y^2 = x^2(1 - x^2/A^2)$ **b)** $y^2 = 2x^2(1- x^2/A^2)$ **c)** $y^2 = 4x^2(1- x^2/A^2)$ **d)** $y^2 = 8x^2(1- x^2/A^2)$

24. A body of mass 5 gram is executing S.H.M. about a fixed point O. with an amplitude of 10 cm, its maximum velocity is 100 cm/s. Its velocity will be 50cmis^{-1} at a distance (in cm)

a) 5 **b)** $5\sqrt{2}$ **c)** $5\sqrt{3}$ **d)** $10\sqrt{2}$

25. A steel ring of radius r and cross-sectional area A is fitted on to a wooden disc of radius R(R> r). If Young's modulus be Y, then the force with which the steel ring is expanded, is

a) $AY\frac{R}{r}$ **b)** $AY\left[\frac{R-r}{r}\right]$ **c)** $\frac{Y}{A}\left[\frac{R-r}{r}\right]$ **d)** $\frac{Yr}{AR}$

26. The work done in increasing the length of a one metre long wire of cross-sectional area 1 mm^2 through 1 mm will be (Y = 2 x 10^{11}Nm^{-2})

a) 0.1J **b)** 5J **c)** 10J **d)** 250J

27. 1000 drops of a liquid of surface tension S and radius r join together to form a big single drop. The energy released raised the temperature of the drop. If ρ be the density of the liquid and c be the specific heat, the rise in temperature would be

a) S/(Jr $c\rho$) **b)** 10S/(Jr $c\rho$) **c)** 100 S/(Jr$c\rho$) **d)** $\frac{2.7s}{Jr\rho c}$

28. Soap solution bubble having radius $\frac{1}{\sqrt{\pi}}$ cm is expanded to a bubble of radius $\frac{2}{\sqrt{\pi}}$ cm. If the surface tension of soap solution is 30 dyne/cm, the work done is

a) 180 ergs **b)** 360 ergs **c)** 720 ergs **d)** 960 ergs

29. The linear density of a vibrating string is 1.3×10^{-4} kg/m. The equation of a transverse wave propagating through this string is y = 0.021 sin $(x+30t)$, where x and y are in metre and t is in second. The approximate tension in the string is

a) 0.48 N **b)** 0.12 N **c)** 1.20 N **d)** 4.80 N

30. Two wires made up of same material are of equal lengths but their radii are in the ratio 1:2. On stretching each of these two strings by the same tension, the ratio between the fundamental frequencies is

a) 1:2 **b)** 2:1 **c)** 1:4 **d)** 4:1

31. A box contains n molecules of a gas. How will the pressure of the gas be affected if the number of molecules is made $2n$.

a) Pressure will decrease **b)** Pressure will remain unchanged

c) Pressure will be doubled **d)** Pressure will become three times

32. N molecules, each of mass m, of gas A and 2N molecules, each of mass $2m$, of gas B are contained in the same vessel which is maintained at a temperature T. The mean square velocity of molecules of B type is denoted by V_2 and the mean square velocity of A type is denoted by V_1, then $\frac{V_1}{V_2}$ is

a) 2 **b)** 1 **c)** 1/3 **d)** 2/3

33. A glass slab of thickness 4cm contains the same number of waves as X cm of water column when both are traversed by the same monochromatic light. If the refractive indices of glass and water (for that light) are 5/3 and 4/3 respectively, the value of X will be

a) 9/20 **b)** 20/9 **c)** 5/4 **d)** 5 cm

34. Light travels with velocities $2\times10^8\ ms^{-1}$ and $2.5\times10^8\ ms^{-1}$ through two different media. The critical angle of the two media is

a) $\sin^{-1}\left(\frac{1}{5}\right)$ **b)** $\sin^{-1}\left(\frac{4}{5}\right)$ **c)** $\sin^{-1}\left(\frac{1}{2}\right)$ **d)** $\sin^{-1}\left(\frac{2}{3}\right)$

35. In Young's experiment the wavelength of red light is 7.8 x 10^{-5} cm and that of blue light is 5.2 x 10^{-5} cm. The value of n for which $(n + 1)^{th}$ blue bright band coincides with n^{th} red band is

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

36. Two straight narrow slits separated by a distance 0.08 mm are illuminated by a source of light of wavelength 5460 $\mathring{A}$. If the fringes are measured with a micrometer eyepiece it is found that 20 fringes occupy a distance of 10.92 mm. The distance of eye piece from the slits is

a) 0.8 m **b)** 1.6 m **c)** 0.08 m **d)** 0.5 m

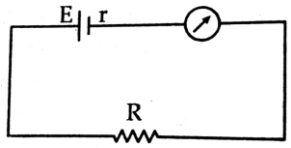
37. Four condensers having capacities $2pF$, $3pF$,$4pF$ and 6 pF are connected in series. The equivalent capacity of the combinations is

a) 8.0 pF **b)** 0.8 pF **c)** 1.8 pF **d)** 0.4 pF

38. Capacitance of a capacitor made by a thin metal foil is $2\,\mu F$. If the foil is folded with paper of thickness 0.15 mm and dielectric constant of paper is 2.5, width of paper is 40 mm then length of foil will be

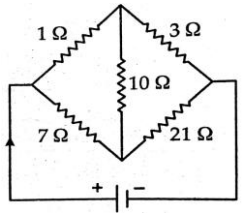
a) 0.34 m **b)** 1.33 m **c)** 13.4 m **d)** 339 m

39. A battery of e.m.f. 10 V and internal resistance 3 Ω is connected to a resistor as shown in the figure. If the current in the circuit is 0.5 A, then what is the resistance of the resistor?



a) 13 Ω **b)** 15 Ω **c)** 17 Ω **d)** 19 Ω

40. In the circuit shown, the current drawn from the battery is 4 A. If 10 Ω resistor is replaced by 20 Ω resistor, the current drawn from the circuit will be



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

41. A coil having effective area A, is held with its plane normal to a magnetic field of induction B. The magnetic induction is quickly reduced to 25% of its initial value in 2s. Then e.m.f induced across the coil will be

a) $\frac{3AB}{8}$ **b)** $\frac{3\,AB}{4}$ **c)** $\frac{AB}{4}$ **d)** $\frac{AB}{2}$

42. Dimensions of magnetic flux is

a) $\left[M^1L^2T^{-2}A^1\right]$ **b)** $\left[M^1L^1T^{-2}A^{-1}\right]$ **c)** $\left[M^1L^1T^{-2}A^1\right]$ **d)** $\left[M^1L^2T^{-2}A^{-1}\right]$

43. The time taken by a photoelectron to come out of the photosensitive surface after the photon strikes is approximately

a) $10^{-16}s$ **b)** $10^{-1}s$ **c)** $10^{-4}s$ **d)** $10^{-10}s$

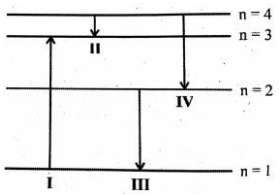
44. If the threshold frequency for photoemission on a metal corresponds to a wavelength $5000\ ^0\text{A}$, then its work function is

a) 10 J **b)** $16\times10^{-14}J$ **c)** $4\times10^{-10}J$ **d)** $4\times10^{-19}J$

45. The shortest wavelength of Lyman series is $912\ \overset{0}{\text{A}}$. That of Paschen series is

a) $8460\,\overset{0}{\text{A}}$ **b)** $8208\,\overset{0}{\text{A}}$ **c)** $8415\,\overset{0}{\text{A}}$ **d)** $8430\,\overset{0}{\text{A}}$

46. The diagram shows the energy levels for an electron in a certain atom . Which transition shown in the diagram represents the emission of a photon with maximum energy?



a) IV **b)** III **c)** II **d)** I

47. Choose the false statement from the following .

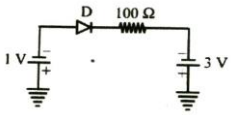
a) The conductivity of a semiconductor increase with increase in temperature

b) In conductors the valence and conduction bands overlap in most of the cases

c) Substances with energy gap of the order of 10 eV are insulators

d) The resistivity of a semiconductor increases with increase in temperature

48. What is the current through an ideal p-n junction diode shown below?



a) zero **b)** 10 mA **c)** 20 mA **d)** 50 mA

49. An electron oscillating with a frequency of $3\times10^{6}Hz$, would generate

a) X-rays **b)** Ultraviolet rays **c)** Radio waves **d)** Microwaves

50. When an electromagnetic waves enter the ionised layer of ionosphere, the motion of electron cloud produces a space current and the electric field has its own capacitative displacement current, then

a) the space current is in phase of displacement current

b) the space current lags behind the displacement current by a phase 180^0

c) the space current lags behind the displacement current by a phase 90^0

d) the space current leads the displacement current by a phase 90^0

SECTION – B- CHEMISTRY

51. The percentage of Se in peroxidise anhydrous enzyme is ____.

a) 1.568×10^{4} **b)** 1.568×10^{3} **c)** 15.68 **d)** 3.136×10^{4}

52. 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What will be the percentage purity of magnesium carbonate in the sample?

a) 60 **b)** 84 **c)** 75 **d)** 96

53. The volume of 1 g each of methane (CH_4), ethane (C_2H_6), propane (C_3H_8) and butane (C_4H_{10}) was measured at 350 K and 1 atm. What is the volume of butane?

a) $495\ cm^3$ **b)** $600\ cm^3$ **c)** $900\,cm^3$ **d)** $1700\,cm^3$

54. Which is the best description of the behaviour of bromine in the reaction given below

$H_2O + Br_2 \rightarrow HOBr + HBr$

a) Oxidised only. **b)** Reduced only.

c) Proton acceptor only. **d)** Both oxidised and reduced.

55. Which of the following contributes towards the extra stability of lyophilic colloids?

a) Hydration **b)** Charge **c)** Colour **d)** Tyndall effect

56. In NH_3, bond angle is less than tetrahedral bond angle due to_____.

a) Bond pair repulsion **b)** lone pair repulsion

c) bond pair-lone pair repulsion **d)** none of these

57. Heavy water (D_2O) is _____.

a) A product of oxygen and isotope of hydrogen

b) Water of mineral springs

c) A product of heavier isotope of hydrogen and heavier isotope of oxygen

d) Ordinary water containing dissolved salts of heavy metals

58. The correct order of increasing ionic character is

a) $BeCl_2 < MgCl_2 < CaCl_2 < BaCl_2$ **b)** $BeCl_2 < MgCl_2 < BaCl_2 < CaCl_2$

c) $BeCl_2 < BaCl_2 < MgCl_2 < CaCl_2$ **d)** $BaCl_2 < CaCl_2 < MgCl_2 < BeCl_2$

59. The compound formed in the positive test for nitrogen with the Lassaigne's solution of an organic compound is

a) $Fe_4[Fe(CN)_6)_3$ **b)** $Na_3[Fe(CN)_6]$ **c)** $Fe(CN)_3$ **d)** $Na_4[Fe(CN)_5\ NOS]$

60. Both CH_4 and C_2H_6 can be prepared in one step by the reaction of

a) CH_3Br **b)** CH_3CH_2OH **c)** CH_3OH **d)** CH_3COCH_3

61. For an ionic crystal of the general formula AX and coordination number 6, the value of radius ratio will be_____

a) Greater than 0.73 **b)** In between 0.73 and 0.41

c) In between 0.41 and 0.22 **d)** Less than 0.22

62. A solid AB has rock salt structure. If the edge length is 520 pm and radius of A^+ is 80 pm, the radius of anion B^- would be_____.

a) 440 pm **b)** 220 pm **c)** 360 pm **d)** 180 pm

63. Which one of the following aqueous solutions will exhibit highest boiling point?

a) 0.015 M urea **b)** 0.01 M KNO_3 **c)** 0.01 M Na_2SO_4 **d)** 0.015 M glucose

64. The freezing point of equimolal aqueous solution will be highest for _____.

a) $C_6H_5NH_3^-Cl^-$ **b)** $Ca(NO_3)_2$ **c)** $La(NO_3)_3$ **d)** $C_6H_{12}O_6$

65. After adding non-volatile solute, freezing point of water decreases to -0.186 ^0C. Calculate ΔT_b *if* $K_f = 1.86$ K kg mol^{-1} and $K_b = 0.521\ K\ kg\ mol^{-1}$.

a) 0.521 K **b)** 0.0521 K **c)** 1.86 K **d)** 0.0186 K

66. For the process $H_2O(l)(1\,bar, 373\,K) \rightarrow H_2O(g)$ (1 bar, 373 K), the correct set of thermodynamic parameters is

a) $\Delta G = 0,\ \Delta S = +ve$ **b)** $\Delta G = 0, \Delta S = -ve$

c) $\Delta G = +ve, \Delta S = 0$ **d)** $\Delta G = -ve, \Delta S = +ve$

67. For an adiabatic process,_____.

a) $\Delta U = -W$ **b)** $q = 0$ **c)** W = 0 **d)** $\Delta U = 0$

68. L.atm is equal to _____.

a) 12.2 cal **b)** 20.2 cal **c)** 24.2 cal **d)** 28.2 cal

69. From the solution of which of the following one Faraday of electricity will liberate one gram atom of metal?

a) NaCl **b)** $BaCl_2$ **c)** $CuSO_4$ **d)** $AlCl_3$

70. When 1 F of electricity is passed through acidified water, O_2 evolved is_____

a) 11.2 dm^3 **b)** 5.6 dm^3 **c)** 22.4 dm^3 **d)** 1.0 dm^3

71. The atomic weight of Fe is 56. The weight of Fe deposited from $FeCl_3$ solution by passing 0.6 faraday of electricity is____ .

a) 5.6 g **b)** 11.2 g **c)** 22.4 g **d)** 33.6 g

72. The rate of the reaction A →Products, at the initial concentration of 3.24 x 10^{-2}M is nine times its rate at another initial concentration of 1.2 x 10^{-3}M. The order of reaction is _____

a) $\frac{1}{2}$ **b)** $\frac{3}{4}$ **c)** $\frac{3}{2}$ **d)** $\frac{2}{3}$

73. The rate constant of a first order reaction is 3 x10^{-6} per second. If the initial concentration is 0.10 M, the initial rate of reaction is _____.

a) 3 x10^{-5} ms^{-1} **b)** 3 x10^{-6} ms^{-1} **c)** 3 x10^{-8} ms^{-1} **d)** 3 x10^{-7} ms^{-1}

74. Aluminothermic process is used for the extraction of metal whose oxides are

a) Fusible **b)** Not easily reduced by carbon

c) Not easily reduced by Hydrogen **d)** Strongly basic

75. Which of the following statement is not correct about Ellingham Diagram

a) ΔG increases with increase in Temp. **b)** It consists of plots of ΔG Vs Temp.

c) Selection of reducing a agent **d)** It expresses Kinetic of reduction

76. Which is the most easily liquefiable rare gas?

a) Xe **b)** Kr **c)** Ar **d)** Ne

77. Noble gases are sparingly soluble in water due to

a) dipole-dipole interaction **b)** dipole-induced dipole interaction

c) induced dipole-induced dipole interaction **d)** hydrogen bonding

78. Ammonium dichromate on heating gives _____.

a) chromium oxide and ammonia **b)** chromic acid and nitrogen

c) chromium oxide and nitrogen **d)** chromic acid and ammonia

79. $CrO_4^{2-}(\text{yellow})$- changes to $Cr_2O_7^{2-}(\text{orange})$ in PH = x & vice versa in pH = y. x & y are

a) 6, 5 **b)** 6, 8 **c)** 8, 9 **d)** 7, 7

80. The correct order of decreasing second Ionization Enthalpy is

a) Cr > Mn > V > Ti **b)** V > Mn > Cr > Ti **c)** Mn > Cr > Ti > V **d)** Ti > V > Cr > Mn

81. The IUPAC name of $[Ni(PPh_3)_2Cl_2]^{2+}$ is

a) bis-dichlorido(triphenylphosphine)nickel(II)

b) dichlorido *bis* (triphenylphosphine)nickel(IV)

c) dichlorido triphenylphosphine nickel (II)

d) triphenylphosphine nickel(II) dichloride

82. In which case EAN of Cr is maximum?

a) $[Cr(CN)_6]^{3+}$ **b)** $[Cr(H_2O)_4(NH_3)_2]^{3+}$ **c)** $[Cr(H_2O)_4(C_2O_4)]^{+}$ **d)** EAN is equal in all of the above

83. Which one of the following is a Swarts reaction?

a) $CH_3Br + NaI \xrightarrow{\text{Acetone}} CH_3I + NaBr$ **b)** $CH_3Cl + NaI \xrightarrow{\text{Acetone}} CH_3I + NaCl$

c) $CH_3Br + AgF \longrightarrow CH_3F + AgBr$ **d)** $2CH_3Cl + 2Na \xrightarrow{\text{Dryether}} CH_3 \cdot CH_3 + 2NaCl$

84. Which halide does not get hydrolysed by sodium hydroxide?

a) Vinyl chloride **b)** Methyl chloride

c) Ethyl chloride **d)** Isopropyl chloride

85. The hydrolysis of optically active 2-bromobutane with aqueous NaOH result in the formation of

a) (+) butan -2-ol **b)** (-) butan -2-ol **c)** $(\pm)$ butan -1-ol **d)** $(\pm)$ butan -2-ol

86. Catalytic dehydrogenation of a primary alcohol gives a/an

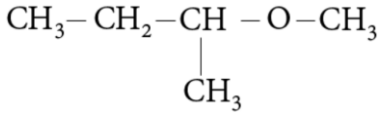
a) Secondary alcohol **b)** aldehyde **c)** ketone **d)** ester

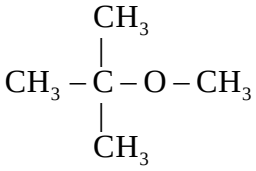
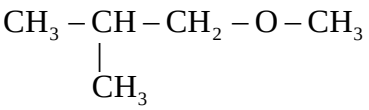
87. In the reaction given below, the product C is

$$CaC_2 \xrightarrow{H_2O} A \xrightarrow[HgSO_4]{Dil.H_2SO_4} B \xrightarrow{H_2/Ni} C$$

a) C_2H_5OH **b)** CH_3CHO **c)** CH_3OH **d)** CH_3COOH

88. Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI?

a) $CH_3 - CH_2 - CH_2 - CH_2 - O - CH_3$ **b)** 

c)  **d)** 

89. Identify X in the following sequence of reaction $CH_3COOH \xrightarrow{NH_3} X \xrightarrow{\Delta} Y \xrightarrow{P_2O_5} Z$

a) CH_4 **b)** CH_3CHO **c)** CH_3CN **d)** $CH_3COO^-NH_4^+$

90. $RCOOH \xleftarrow{H_3O^+} X \xrightarrow{[H]} RCH_2NH_2$. Identify the X in the above reaction.

a) Alkane nitrile **b)** Alkyl isonitrile **c)** Adoxime **d)** Alkyl nitrile

91. The correct order of acidity for the following is

a) HCN > $ClCH_2COOH$ > HCOOH > CH_3COOH

b) HCN> HCOOH > $ClCH_2COOH$ > CH_3COOH

c) $ClCH_2COOH$ > HCOOH > CH_3COOH > HCN

d) $ClCH_2COOH$ > HCl > HCOOH > CH_3COOH

92. Liebermann's nitroso reaction is used to distinguish

a) Primary amines **b)** Secondary amines **c)** Tertiary amines **d)** All of these

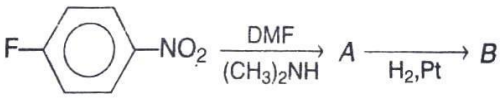
93. Ethylcyanide can be converted into ethylamine by

(I) $\xrightarrow{Sn/HCl}$

(II) $\xrightarrow{H_3O^+}$ $\xrightarrow{NH_3,\Delta}$ $\xrightarrow{KOBr,\Delta}$

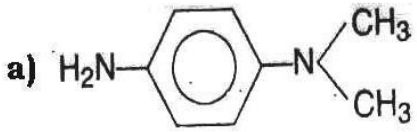
a) Only I **b)** Only II **c)** Both (a) and (b) **d)** None of these

94.

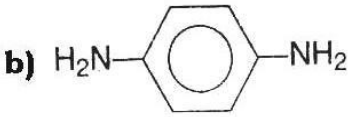


In the above sequence, B is

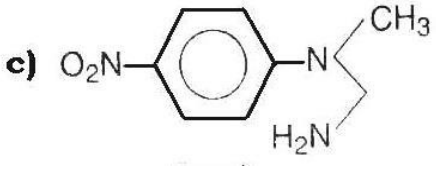
a)



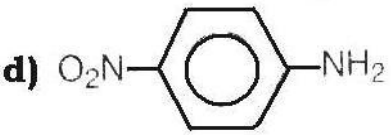
b)



c)



d)



95. The main difference between fat and oil is that

a) oils possess low molecular weights **b)** oils are the glycerides of fatty acids

c) oils have low melting point **d)** All of these

96. A distinctive and characteristic functional group fats is

a) a peptide group **b)** an ester group **c)** an alcoholic group **d)** a ketonic group

97. Orlon is prepared from polymerization of

a) $CH_3 - CH = CH_2$ **b)** $CF_2 = CF_2$ **c)** $CH_2 = CH - CN$ **d)** $CH_2 = CH - Cl$

98. What type of polymer is represented by the following segment

$$-\overset{\overset{O}{\|}}{C}-CH_2-CH_2-\overset{\overset{O}{\|}}{C}-O-CH_2-CH_2-CH_2-O-$$

a) Polyamide **b)** Polyester **c)** Polyolefin **d)** Polyethylene

99. The main cause of depression is

a) low level of noradrenalin **b)** high level of noradrenalin

c) low level of HCl in stomach **d)** high level of HCl in stomach

100. Overdose of tranquilizers may causes

a) nausea **b)** hypotension **c)** Coma **d)** All of these

SECTION- C – BIOLOGY

101. What is true about endoplasmic reticulum ?

a) ER membrane is 80-100Å thick

b) ER consists of 70% phospholipids

c) ER vesicles are free of ribosomes

d) All of the above

102. A modified form of SER found in striated muscles is

a) neuroplas **b)** dictyoplasmic reticulum **c)** sarcoplasmic reticulum **d)** desmotubule ma

103. During fruit ripening, chloroplast change into .....

a) amyloplast **b)** aleuroplast **c)** elaioplast **d)** chromoplast

104. The kingdom-Monera includes

a) Unicellular photosynthetic organisms

b) Prokaryotic organism with incipient nucleus

c) non-photosynthetic multicellular organisms

d) true nucleate unicellular organisms

105. As per Whittaker's classification, an organism processing eukaryotic cell structure, multicellular organisation with a cell wall and nuclear membrane showin heterotrophic nutrition can be placed under the kingdom

a) Monera **b)** Protista **c)** Plantae **d)** Fungi

106. Glands are formed of

a) Secretory epithelial cells **b)** Transitional epithelial cells

c) Stratified epithelial cells **d)** Pseudostratified epithelial cells

107. Epithelia are involved in all the following except

a) Protection **b)** secretion **c)** connection **d)** absorption

108. Each molecule of fat has

a) one glycerol molecule

b) one fatty acid molecule

c) one glycerol molecule and three fatly acid molecules

d) All of the above

109. Nucleoside is composed of

a) ribose as pentose sugar **b)** phosphoric acid

c) nitrogenous base **d)** both a) and c)

110. Marasmus differs from Kwashiorkor in

a) Absence of oedema **b)** Matchstick legs **c)** Protruded belly **d)** Anaemia

111. Which 'enzyme' initiates the digestion of proteins ?

a) Trypsin **b)** Pepsin **c)** Amino peptidase **d)** Carboxypeptidase

112. Water potential is used to measure

a) water stress **b)** water deficit **c)** Both a) and b) **d)** None of these

113. High tensile strength to water is due to

a) adhesion only **b)** cohesion only **c)** Both a) and b) **d)** None of these

114. The phloem sap mainly consists of

a) potassium ions **b)** glucose **c)** sucrose **d)** starch

115. The difference between right and left lung is

a) Right lung has two fissures and left has one

b) Right lung is longer than the left lung

c) Right lung is pink in colour and left lung is transparent

d) None of the above

116. In human beings, rib cage and sternum move upwardly and outwardly during

a) exercise **b)** sudden back injury **c)** expiration **d)** inspiration

117. After deep inspiration, capacity of maximum expiration of lung is called

a) Total lung capacity **b)** Functional residual capacity

c) Vital capacity **d)** Respiratory capacity

118. Study the following statements.

I. Ethylene and ABA hormones accelerate the process of senescence.

II. Zeatin is physiologically active cytokinins in maize kernels.

III. Arginine is precursor for auxin biosynthesis.

IV. Auxin induces cell division.

Choose the correct option.

a) I and II **b)** II and III **c)** III and IV **d)** I, II, III and IV

119. The Avena curvature is used for bioassay of

a) GA3 **b)** IAA **c)** Ethylene **d)** ABA

120. Photoperiodism was first characterised in

a) tobacco **b)** potato **c)** tomato **d)** cotton

121. 'Descent with modification' is the main theme of

a) Genetics and interpretation **b)** biogenesis **c)** recapitulation **d)** evolution

122. Which one of the following are analogous structures ?

a) Wings of bat and wings of pigeon

b) Gills of prawn and lungs of man

c) Thorns of Bougainvillea and tendrils of Cucurbita

d) Flippers of dolphin and legs of horse

123. Organic compounds first evolved in earth required for origin of life were

a) Urea and amino acids

b) Proteins and nucleic acids

c) Proteins and amino acids

d) Urea and nucleic acids

124. Peripatus is a connecting link between

a) Ctenophora and Platyhelminthes

b) Mollusca and Echinodermata

c) Annelida and Arthropoda

d) Coelenterata and Porifera

125. When F_1 –generation progeny resembles both the parents, this is called

a) *codominance* **b)** incomplete dominance **c)** Both (a) or (b) **d)** Complete dominance

126. Genotypic and phenotypic ratio in monohybrid cross remains same in case of

a) Sex-linked genes **b)** pseudoallelic genes

c) intermediate inheritance **d)** dominant and recessive genes

127. Match the following columns.

Column I	Column II
A. Gregor Mendel	1. Chromosomal theory of inheritance
B. Sutton and Boveri	2. Law of inheritance
C. Henking	3. Mendelian disorder
D. Thalassaemia	4. Discovered X-body

Codes

	A	B	C	D
a)	4	2	1	3

	A	B	C	D
b)	2	1	4	3

	A	B	C	D
c)	4	1	2	3

	A	B	C	D
d)	2	3	4	1

128. Four children belonging to the same parents have the following blood groups A, B AB and O. hence the genotypes of the parents are

a) Both parents are homozygous for 'A' group

b) One parent is homozygous for 'A' and another parent is homozygous for 'B'

c) One parent is heterozygous for 'A' and another parent is heterozygous for 'B'

d) Both parents are homozygous for 'B' group

129. Match the following columns.

Column I	Column II
A. ABO blood groups	1. Dihybrid cross
B. Law of segregation	2. Monohybrid cross
C. Law of independent assortment	3. Base pairs substitution
D. Gene mutation	4. Multiple allelism

Code

	A	B	C	D
a)	4	2	1	3

	A	B	C	D
b)	2	1	4	3

	A	B	C	D
c)	4	1	2	3

	A	B	C	D
d)	2	3	4	1

130. Polyploidy leads to rapid formation of new species because of

a) isolation **b)** development of multiple sets of chromosomes

c) mutation **d)** genetic recombination

131. Heterochromatin remains condensed in which part of chromosome?

a) Secondary constriction-I **b)** Secondary constriction-II

c) Telomeres **d)** Both (**a)** and (**b)**

132. Centromere is required for

a) transcription **b)** crossing over

c) cytoplasmic cleavage **d)** movement ot chromosomes towards poles

133. A condition characterised by not having an exact number of chromosomes n a multiple of haploid set is called

a) polyploidy **b)** synploidy **c)** aneuploidy **d)** None of these

134. If a character is always transmitted directly from a father to all his sons and from their sons to all their sons, then which chromosome carries the gene for the character?

a) Autosome **b)** X-chromosome **c)** Y-chromosome **d)** None of these

135. Codons are degenerate, means some amino acid are coded by

a) more than one codon **b)** only one codon **c)** two codons **d)** more than 8 codon s

136. Which one of the following triplet codon is a chain termination codon?

a) UGU **b)** AAU **c)** UUG **d)** UAG

137. Which strand of DNA works as template strand?

a) 5' – 3' polarity strand **b)** 3' – 5' polarity strand **c)** Both (a) and (b) **d)** None of these

138. Amino acids are activates by

a) ADP **b)** AMP **c)** ATP **d)** Special proteins

139. Lactose is transported into cells through

a) β-galactosidase **b)** permease **c)** transacetylase **d)** transferase

140. DNA fingerprinting involves identifying the differences in some specific regions in DNA sequence called

a) non-repetitive DNA **b)** coding DNA

c) non-coding DNA **d)** repetitive DNA

141. The bulk of DNA (other than repetitive) forms the major peaks during density gradient centrifugation. The other small peaks are referred to as

a) satellite DNA **b)** non-satellite DNA **c)** exonic DNA **d)** intronic DNA

142. What is it that forms the basis of DNA fingerprinting

a) The relative proportions of purines and pyrimidines in DNa

b) The relative difference in the DNA occurrence in blood, skin and saliva

c) The relative amount of DNA in the ridges and grooves of the fingerprints

d) Satellite DNA occurring as highly repeated short DNA segments

143. The primary goal of the Human Genome project was

a) to study the genomics of eukaryotes

b) to study the genomics of prokaryotes

c) to generate detailed map of the human genome

d) to study protein sequencing

144. Restriction endonucleases are enzymes which

a) Make cuts at specific positions within the DNA molecule

b) Recognise a specific nucleotide sequence for binding of DNA ligase

c) Restrict the action of the enzyme DNA polymerase

d) Remove nucleotides from the ends of the DNA molecule

145. a complete collection of cloned dna fragments comprising of entire genome of an organism is known as

a) DNA amplification **b)** DNA library **c)** DNA synthesis **d)** Cell cloning

146. Match the following columns.

Column I	Column II
A. Polymerase Chain Reaction (PCR)	1. Themus aquaticus
B. Bioreactor	2. Themosoccus litoralis
C. Taq polymerase	3. Large scale culture
D. Vent polymerase	4.Amplification of gene

Codes

	A	B	C	D
a)	2	4	3	1
b)	3	1	2	4
c)	4	3	1	2
d)	1	2	4	3

147. PCR and Restriction Fragment Length Polymorphism are the method for

a) Study of enzymes **b)** Genetic transformation

c) DNA sequencing **d)** Genetic fingerprinting

148. Flavr savr tomato is developed by using an antisense gene that inhibits

a) cell division **b)** ripening **c)** reproduction **d)** flowering

149. Which one of the following diseases is caused due to helminth infection ?

a) Ascariasis **b)** Wuchereriasis **c)** Both (a) and (b) **d)** None of the above

150. Common cold differs from pneumonia in, that

a) Pneumonia is a communicable disease, whereas the common cold is a nutritional deficiency disease

b) Pneumonia can be prevented by a live attenuated bacterial vaccine, whereas the common cold has no effective vaccine

c) Pneumonia is caused by a virus, while the common cold is caused by the bacterium Haemophilus

d) Pneumonia pathogen infects alveoli whereas the common cold affects nose and respiratory passage, but not the lungs

151. Fungi belonging to general Microsporum, Trichophyton and Epidermophyton are responsible for causing

a) ringworm **b)** skin allergy **c)** amoebiasis **d)** measles

152. Which one of the following diseases causes dry scaly lesions on skin, nails and scalp ?

a) Ringworm **b)** Skin allergy **c)** Botulism **d)** None of these

153. 'Jaya' and 'Ratna' developed for green revolution in india are the varieties of

a) rice **b)** wheat **c)** bajra **d)** maize

154. Match the following columns

Column I		Column II	
A	Totipotency	1	Part of a plant grown in vitro
B	Callus	2	Hybrid plants produced through protoplast fusion
C	Protoplast culture	3	Undifferentiated tissue
D	Explant	4	Capacity of a cell to produce whole plant

Codes

	A	B	C	D
a)	1	3	2	4
b)	4	3	2	1
c)	4	3	1	2
d)	3	4	2	1

155. Undifferentiated mass of plant cells grown on nutrient medium is called

a) callus **b)** bud **c)** clone **d)** scion

156. Given below are statements regarding mutational breeding. Choose the wrong statement.

a) It involves changing the type of plant through mutations

b) It can be done only on somatic cells

c) Both physical mutagens (radiations) or chemical mutagens are used

d) Sharbati sonora is an example of mutational breeding in India

157. Which method is used to eliminate inbreeding depression ?

a) Interspecific hybridisation **b)** outbreeding

c) Both (a) and (b) **d)** None of the above

158. MOET stand for

a) Multiple Ovulation Embryo Transfer technology

b) More Ovulation Embryo Transfer technology

c) Multiple Ovulation Embryo Test technology

d) None of the above

159. Which one of the following is a disease of poultry?

a) Foot and Mouth disease **b)** Pebrine disease

c) Anthrax **d)** Ranikhet disease

160. Which one of the following products of apiculture is used in cosmetics and polishes?

a) Honey **b)** Oil **c)** Wax **d)** Royal jelly

161. Primary treatment is the

a) physical removal of large and small particles from wage

b) biological removal of large and small particles from sewage

c) Both (a)and (b)

d) chemical removal of large and small particles from sewage

162. The residue left after methane production from cattle-dung is

a) burnt **b)** buried in land fills

c) used as manure **d)** used in civil construction

163. The percentage of methane in biogas is

a) 15-30% **b)** 30-45% **c)** 50-80% **d)** 87%

164. Which of the following four components of the blood are necessary for clotting?

a) Calcium, vitamin-K, albumin and globin

b) Calcium, prothrombin, fibrinogen and platelets

c) Calcium, heparin, prothrombin and fibrinogen

d) Calcium, prothrombin, platelets and vitamin-A

165. In an open circulatory system,

a) there is no distinction between the blood and the tissue fluid

b) tissue fluid is absent

c) no need of blood vessels

d) open space or sinuses are absent

166. Haemolymph' is the term used for the blood of the organism having

a) water circulatory system **b)** closed circulatory system

c) open circulatory system **d)** blood circulatory system

167. Every CO_2 molecule entering the Calvin cycle needs

a) 2 molecule of NADPH and 3 molecule of ATP for its fixation

b) 2 molecule of NADPH and 2 molecule of ATP for its fixation

c) variable amount of ATP

d) only NADPH

168. In Calvin cycle, if one molecule of RuBP is carboxylated than how many PGA molecule will be formed ?

a) 2 **b)** 3 **c)** 4 **d)** 5

169. Under normal condition, which one of the following is a major limiting factor?

a) Light **b)** CO_2 **c)** Temperature **d)** Chlorophyll

170. Match the following columns and choose the correct combination from the option given below.

Column-I		Column-II	
A)	Visible light	1.	0.1 to 1 nm
B)	Ultra violet	2.	400 to 700 nm
C)	X-rays	3.	Longer than 740 nm
D)	Infrared rays	4.	100 to 400 nm
		5.	< 0.1 nm

Codes

	A	B	C	D
a)	1	3	4	5
b)	2	4	3	1
c)	4	3	2	1
d)	2	4	1	3

171. Selenocytes is a type of cell which have the function of

a) digestion **b)** respiration

c) elimination of nitrogenous excretory wastes **d)** All of the above

172. Uricotelic mode of passing out nitrogenous wastes is found in

a) birds and annelids **b)** amphibians and reptiles

c) insects and amphibians **d)** reptiles and birds

173. Earthworms are

a) ureotelic, when plenty of water is available

b) uricotelic, when plenty of water is avail8ble.

c) uricotelic, under conditions of water scarcity

d) ammonotelic, when plenty of water is available

174. In which one of the following processes CO_2 is not released ?

a) Aerobic respiration in plants

b) Aerobic respiration in animals

c) Alcoholic fermentation

d) Lactate fermentation.

175. If RQ is less than 1.0 in a respiratory metabolism it would mean that

a) Carbohydrates are used as respiratory substrate

b) Organic acid are used as respiratory substrate

c) The oxidation of the respiratory substrate consumed more oxygen than the amount of CO_2 released

d) The oxidation of the respiratory substrate consumed less oxygen than the amount of CO_2 released

176. Glucose breakdown takes place ..... in fermentation.

a) Partially **b)** Completely **c)** According to substrate **d)** None of these

177. How many ATP molecules will be generated in a plant system during complete oxidation of 40 moles of glucose ?

a) 190 **b)** 380 **c)** 1520 **d)** 3040

178. Respiratory control centre is

a) cerebellum **b)** medulla oblongata **c)** spinal cord **d)** cerebrum

179. Match the column I (the parts of the human brain) with column II (the functions) and identify the correct choice from the given option.

Column I	Column II
A) Cerebrum	1. controls the pituitary
B) Cerebellum	2. Control vision and hearing
C) Hypothalamus	3. Controls the rate of heartbeat
D) Midbrain	4. Seat of intelligence
	5. Maintains body posture

Codes

	A	B	C	D
a)	5	4	2	1
b)	4	5	2	1
c)	5	4	1	2
d)	4	5	1	2

180. Match the following columns.

Column I	Column II
A) CNS	1. From tissue/organ to CNS
B) PNS	2. From CNS to tissue/organ
C) Afferent fibres	3. Comprises of brain and spinal cord
D) Efferent fibres	4. Comprises of nerves of body

Codes

	A	B	C	D
a)	2	3	4	1
b)	1	2	3	4
c)	3	4	1	2
d)	1	2	4	3

181. Cross-pollination results in

a) production of homozygous characters

b) genetically weak offsprings

c) mixing up of characters of the parents and produce improved progeny

d) None of the above

182. Bird pollinated flowers can be

I. cup-shaped II. urn-shaped

III. rich in nectar IV. bright in colour

V. produces large quantities of pollen grains

Choose the correct option.

a) I, II and III **b)** I, II, III, IV and V

c) III, IV and V **d)** II, III and IV

183. Match of the following column with column I it:

Column I	Column II
A) Porogamy	1. Pollen Lube enter by piercing the integument.
B) chalazogamy	2. Pollen tube enters through micropylar end)
C) Mesogamy	3. Pollen tube enters through chalazal end

Codes

	A	B	C		A	B	C
a)	2	3	1	**b)**	1	2	3
c)	3	2	1	**d)**	1	3	2

184. Thalamus contributes in the fruit formation in

a) apple **b)** strawberry **c)** cashewnut **d)** All of these

185. Coleorhiza is

a) lower end of embryonal axis in monocot

b) lower end of embryonal axis in dicots

c) lower end of embryonal axis in potato family

d) upper end of embryonal axis in dicot

186. Which one of the following is a non-endiospermic seed?

a) Sunflower **b)** Coconut **c)** Groundnut **d)** Wheat

187. Spot the odd one out from the following structures with reference to the male reproductive system

a) rete testis **b)** epididymis **c)** vasa efferentia **d)** isthmus

188. The epididymis leads to …A… that ascends to abdomen and loops over the …B… Here A and B refers to

	A	B
a)	epididymis	vas deferens
b)	vas deferens	pididymis
c)	vas deferens	urinary bladder
d)	urinary bladder	vas deferens

189. Acrosome secretes

a) hyaluronic acid **b)** hyaluronidase **c)** TSH **d)** fertilisin

190. Function of bulbourethral gland is to

a) lubricate the penis **b)** increase the motility of sperm

c) enhance the sperm count **d)** all of these

191. In the absence of acrosome, the sperm cannot

a) get food **b)** swim

c) penetrate the egg **d)** get energy

192. Human ovary is connected to uterus by the

a) rounded ligament **b)** mesovarium **c)** isthmus **d)** infundibulum

193. Which among the following nutrient cycle lacks an atmospheric component?

a) Water cycle **b)** Carbon cycle

c) Phosphorous cycle **d)** Nitrogen cycle

194. In plant succession, when climax community s reached, the net productivity

a) continues to increase **b)** becomes zero

c) becomes reduced **d)** becomes stable

195. The pioneers in xerarch succession is

a) crustose **b)** mosses **c)** foliose lichen **d)** shrubs

196. Polyblend is

a) a magnetic substance **b)** fine powder of recycled modified plastic

c) magnetic substance **d)** melted rubber

197. Mycorrhiza represents an intimate mutualistic relationship between

a) fungi and stem of higher plants **b)** fungi and roots of higher plants

c) fungi and leaves of higher plants **d)** and leaflets of higher plants

198. The interaction between which one of the following pairs is an example for commensalism?

a) Wasps and fig tree **b)** Cuckoo and crow

c) Cattle or sheep and grass **d)** Orchid and mango tree

199. Which one of the following possesses a very large number of endemic amphibian species?

a) North-East Ghats **b)** Andaman Nicobar Islands

c) Western Ghats **d)** North-West Ghats

200. Loss of biodiversity is caused by

a) overpopulation **b)** urbanization **c)** industrialisation **d)** All of the above

Together, we will make a difference.