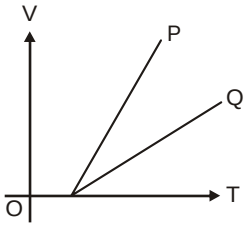
1. The resistance R of a wire is given by the relation $R = \frac{\rho \ell}{\pi r^2}$. Percentage error in the measurement of $\rho$, $l$ and r is 1%, 2% and 3% respectively. Then the percentage error in the measurement of R is :
(1) 6 (2) 9
(3) 8 (4) 10

2. Figure shows the v – t graph for two particles P and Q. Which of the following statements regarding their relative motion is ture ? Their relative velocity




(1) is zero
(2) is non – zero but constant
(3) continuously decreases
(4) continuously increases

3. Time required to boil 2 litres of water initially at 20°C by a heater coil which works at 80% efficiency spending 500 joule/s is
(1) 82 minutes (2) 50 minutes
(3) 28 minutes (4) 37 minutes

4. A mass is tied to a string and rotated in a vertical circle, the minimum velocity of the body at the top is

(1) $\sqrt{gr}$ (2) g/r (3) $\left(\frac{g}{r}\right)^{3/2}$ (4) gr

5. A man projects a coin upwards from the gate of a uniformly moving train. The path of coin for the man will be
(1) parabolic
(2) inclined straight line
(3) vertical straight line
(4) horizontal straight line

6. What is the disintegration constant of radon, if the number of its atoms diminishes by 18% in 24 h? $\left(\ell n\left(\frac{50}{41}\right) = 0.198\right)$
(1) $2.1 \times 10^{-3}\ s^{-1}$ (2) $2.1 \times 10^{-4} s^{-1}$
(3) $2.1 \times 10^{-5} s^{-1}$ (4) $2.1 \times 10^{-6} s^{-1}$

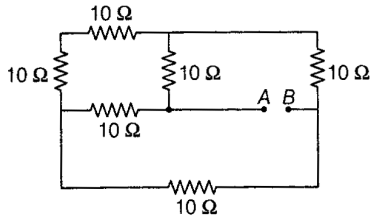
7. The frequencies of X – rays, $\gamma$ – rays and ultraviolet rays are respectively a, b, and c. Then
(1) a < b, b < c (2) a < b, b > c
(3) a > b, b > c (4) a > b, b < c

8. A galvanometer can be changed into an ammeter by using
(1) law resistance shunt in series
(2) low resistance shunt in parallel
(3) high resistance shunt in series
(4) high resistance shunt in parallel

9. Which of the following statements is FALSE for a particle moving in a circle with a constant angular speed ?
(1) The acceleration vector points to the centre of the circle
(2) The acceleration vector is tangent to the circle
(3) The velocity vector is tangent to the circle
(4) The velocity and acceleration vectors are perpendicular to each other.

10. A monoatomic gas at 27°C is compressed adiabatically to $\frac{8}{27}$ of its original volume. The rise in temperature will be :
(1) 300°C (2) 350°C
(3) 375°C (4) 400°C

11. Effective resistance between A and B in the following circuit




(1) 10Ω (2) 20 Ω
(3) 5 Ω (4) $\frac{20}{3}\Omega$

12. The energy of hydrogen atom in the $n^{th}$ orbit is $E_n$, then the energy in the $n^{th}$ orbit of single ionised helium atom is

(1) $\frac{E_n}{2}$ (2) $2E_n$

(3) $4E_n$ (4) $\frac{E_n}{4}$

13. Two identical particles move towards each other with velocity 2v and v respectively. The velocity of centre of mass is :
(1) v (2) v/3
(3) v/2 (4) zero

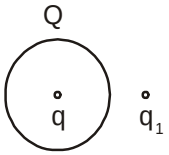
14. The mass number of He is 4 and that for sulphur is 32. The radius of sulphur nuclei is larger than that of helium by
(1) $\sqrt{8}$ (2) 4
(3) 2 (4) 8

15. According to Newton's law of cooling, the rate of cooling of a body is proportional to $(\Delta\theta)^n$, where $\Delta\theta$ is the difference of the temperature of the body and the surroundings, then n is equal to :
(1) two (2) three
(3) four (4) one

16. A body having initial velocity of 10 m/s moving on a rough surface comes to rest after moving 50 m. What is coefficient of friction between the body and surface ? ($g = 10\ m/s^2$)
(1) 0.5 (2) 0.2
(3) 0.3 (4) 0.1

17. The separation between successive fringes in a double slit arrangement is x. If the whole arrangement is dipped under water what will be the new fringe separation? [The wavelength of light being used is 5000 Å] ($\mu = \frac{4}{3}$)
(1) 1.5 x (2) x
(3) 0.75 x (4) 2x

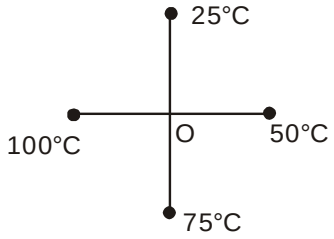
18. A thin, metallic spherical shell contains a charge Q on it. A point charge q is placed at the centre of the shell and another charge $q_1$ is placed outside it as shown in figure. All the three charges are positive. The force on the charge at the centre is




(1) towards left (2) towards right
(3) upward (4) zero

19. A charge q is moving with a velocity v parallel to a magnetic field B. Force on the charge due to magentic field is
(1) q v B (2) q B / v
(3) zero (4) B v / q.

20. Four identical rods are joined at their ends. The free ends are maintained at constant temperatures as indicated. Find temperature of the junction




(1) T = 62.5°C (2) T = 60.5°C
(3) T = 52.5°C (4) T = 72.5°C

21. In uniform circular motion, the velocity vector and acceleration vector are
(1) perpendicular to each other
(2) in same direction
(3) in opposite direction
(4) not related to each other

22. The current in a coil of L = 40 mH is to be increased uniformly from 1A to 11 A in 4 milli sec.The induced e.m.f. will be
(1) 100 V (2) 0.4 V
(3) 440 V (4) 40 V

23. Two capacitors when connected in series have a capacitance of 3 μF, and when connected in parallel have a capacitance of 16 μF. Their individual capacities are
(1) 1 μF,2μF (2) 6 μF, 2μF
(3) 12 μF,4μF (4) 3 μF,16μF

24. The weight of a body will be the least at
(1) poles
(2) equator
(3) at height equal to R
(4) centre of the earth

25. When a tuning fork produces sound waves in air, which one of the following is same in the material of tuning fork as well as in air
(1) Wvelength (2) Frequency
(3) Velocity (4) Amplitude

26. Four identical rods each mass 'm' and length '*l*' are joint to form a square. Find the moment of intertia of the system about an axis passing through the centre of mass of the system and perpendicular to the plane of the rods.

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

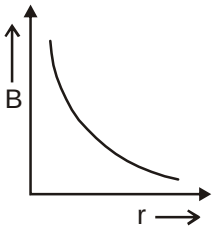
(3) $\frac{5}{3}m\ell^2$ (4) $\frac{4}{5}m\ell^2$

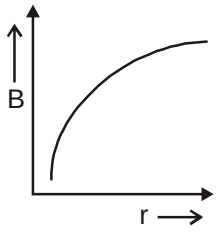
27. Two sphereical bodies A (radius 6 cm) and B (radius 18 cm) are at temperature $T_1$ and $T_2$ respectively. The maximum intensity in the emission spectrum of A is at 500 nm and in that of B is at 1500 nm. Considering them to be black bodies, what will be the ratio of the rate of total energy radiated by A to that of B ?
(1) 2 :1 (2) 3 : 2
(3) 9 : 4 (4) 9 : 1

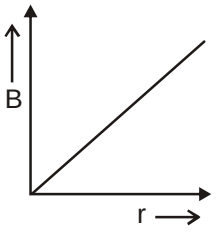
28. Consider the follwoing statement :
When jumping from one height, you should bend your kness as you come to rest, instead of keeping your legs stiff. Which of the following relations can be useful in explaining the statement ? Where symboles have their usual meanings .
(1) $\Delta\vec{p}_1 = -\Delta\vec{p}_2$ (2) $\Delta E = \Delta(PE + KE) = 0$
(3) $\vec{F}\Delta t = m\Delta\vec{v}$ (4) $\Delta x \propto \Delta F$

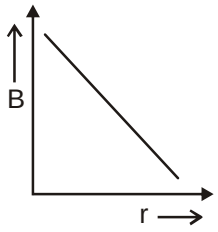
29. The amplitude of magnetic field of an electromagentic wave is $2 \times 10^{-7}$ T. It's electric field amplitude if the wave is travelling in free space is
(1) 6 $Vm^{-1}$ (2) 60 $Vm^{-1}$
(3) 10/6 $Vm^{-1}$ (4) None of these

30. The magnetic flux density B at a distance r from a long straight wire carrying a steady current varies with distance r as

(1) 

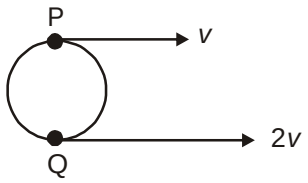

(2) 


(3) 


(4) 

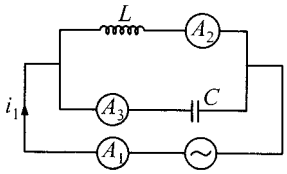

31. An object is placed at 20 cm from a convex mirror of focal length 20 cm. The distance of the image from the pole of mirror is
(1) infinite (2) 10 cm
(3) 15 cm (4) 40 cm

32. Two point P and Q, diametrically opposite on a disc of radius R, have linear velocities *v* and 2*v* as shown in figure. The angular speed of the disc is :




(1) $\frac{v}{R}$ (2) $\frac{2v}{R}$
(3) $\frac{v}{2R}$ (4) $\frac{v}{4R}$

33. For the circuit shown, the ammeter $A_2$ reads 1.6 A and ammeter $A_3$ reads 0.4 A. The $i_1$ is :




(1) 1.6 A (2) 0.4 A
(3) 1.2 A (4) 2A

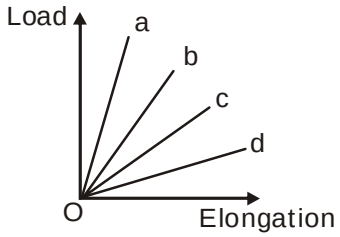
34. The unit vector along $2i - 3j + k$ is
(1) $\frac{2i - 3j + k}{\sqrt{14}}$ (2) $\frac{2i - 3j + k}{5}$
(3) $\frac{2i - 3j + k}{\sqrt{15}}$ (4) None of tehse

35. An iron rod of length 2m and cross – sectional area of 50 $mm^2$ is stretched by 0.5 mm, when a mass of 250 kg is hung from its lower end. Young's modulus of iron rod is
(1) 19.6 $10^{20}$ $N/m^2$ (2) 19.6 × $10^{18}$ $N/m^2$
(3) 19.6 × $10^{10}$ $N/m^2$ (4) 19.6 × $10^{15}$ $N/m^2$

36. A particle of mass 1 kg is moving is S.H.M. with an amplitude 0.02 and a frequency of 60 Hz. The maximum force acting on the particle is
(1) 144 $\pi^2$ (2) 188 $\pi^2$
(3) 288 $\pi^2$ (4) None of these

37. According of Maxwell's hypothesis, a changing electric field gives rise to
(1) an e.m.f (2) magnetic field
(3) electric current (4) pressure gradient

38. The load versus elongation graph for four wires has been shown in the figure. The thinest wire is




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

39. A ray of light is incident on the surface of separation of a medium with the velocity of light at an angle 45° and its refracted in the medium at an angle 30°. Velocity of light in the medium will be (velocity of light in air = $3 \times 10^8$ m/s)
(1) $3.8 \times 10^8$ m/s (2) $3.38 \times 10^8$ m/s
(3) $2.12 \times 10^8$ m/s (4) $1.56 \times 10^8$ m/s

40. The rain drops are in spherical shape due to
(1) residual pressure (2) thrust on drop
(3) surface tension (4) viscosity

41. A dip circle is so set that its needle moves freely in the magnetic meridian. In the position, the angle of dip is 40°. Now the dip circle is rotated so that the plane in which the needle moves makes an angle of 30° with the magnetic meridian. In this position, the needle will dip by an angle
(1) 40° (2) 30°
(3) more than 40° (4) less than 40°

42. Light of wavelength 550 nm falls normally on a slit of width $22.0 \times 10^{-5}$cm. The angular position of the second minima from the central maximum will be (in radians)

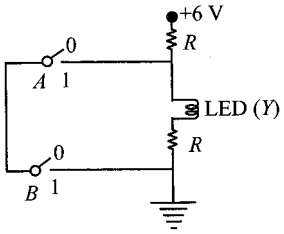
(1) $\frac{\pi}{8}$ (2) $\frac{\pi}{12}$

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

43. Unpolarized light of intensity I is incident on a system of two polarizers, A followed by B. The intensity of emergent light is $\frac{I}{2}$. If a third polarizer C is placed between A and B, the intensity of emergent light is reduced to $\frac{I}{3}$. The angle between the polarizers A and C is $\theta$. Then

(1) $\cos\theta = \left(\frac{1}{3}\right)^{\frac{1}{2}}$ (2) $\cos\theta = \left(\frac{2}{3}\right)^{\frac{1}{4}}$

(3) $\cos\theta = \left(\frac{2}{3}\right)^{\frac{1}{2}}$ (4) $\cos\theta = \left(\frac{1}{3}\right)^{\frac{1}{4}}$

44. 


The correct Boolean operation represented by the circuit diagram drawn is
(1) NOR (2) AND
(3) OR (4) NAND

45. The input signal given to a CE amplifier having a voltage gain of 150 is $V_i = 2\cos\left(15t + \frac{\pi}{3}\right)$. The corresponding output signal will be

(1) $2\cos\left(15t + \frac{5\pi}{6}\right)$ (2) $300\cos\left(15t + \frac{4\pi}{3}\right)$

(3) $300\cos\left(15t + \frac{\pi}{3}\right)$ (4) $75\cos\left(15t + \frac{2\pi}{3}\right)$

46. How many molecules are present in 5.23 gm of glucose ($C_6H_{12}O_6$) ?
(1) $1.65 \times 10^{22}$ (2) $1.75 \times 10^{22}$
(3) $1.75 \times 10^{21}$ (4) None of these

47. The shortest wavelength in H spectrum of Lyman series when $R_H = 109678\ cm^{-1}$ is –
(1) 1215.67 Å (2) 911.7 Å
(3) 1002.7 Å (4) 1127.30Å

48. The energy of an electron in the second and third Bohr orbits of the hydrogen atom is $-5.42 \times 10^{-12}$ erg and $-2.41 \times 10^{-12}$ erg respectively.Calculate the wavelength of the emitted radiation when the electron drops from third to second orbit –
(1) $5.6 \times 10^3$Å (2) $6.6 \times 10^2$Å
(3) $6.6 \times 10^3$ Å (4) $10.6 \times 10^3$Å

49. The $IP_1$, $IP_2$, $IP_3$, $IP_4$ and $IP_5$ of an element are 7.1, 14.3, 34.5, 46.8,162.2eV respectively. The element is likely to be :
(1) Na (2) Si
(3) F (4) Ca

50. Which of the following statement is incorrect ?
(1) Non – bonding pairs occupy more space than bonding pairs
(2) The bonding orbitals in a trigonal bipyramidal molecule are described as $sp^3d$ hybrid
(3) $SnCl_2$ has linear shape
(4) $PCl_4^+$ and $AlCl_4^-$ are isoelectronic

51. Which of the following has pyramidal shape ?
(1) $XeO_3$ (2) $XeF_4$
(3) $XeF_2$ (4) $XeF_6$

52. Arrange in increasing order of the boiling point – HF, HCl, HBr, HI.
(1) HCl < HBr <HI <HF (2) HCl > HBr > HI > HF
(3) HCl < HBr > HI < HF (4) None of these

53. Atmospheric air contains 20% $O_2$ and 80% $N_2$ by volume and exerts a pressure of 760 mm. Calculate the partial pressure of each gas.
(1) 152 mm, 608 mm (2) 608 mm, 152 mm
(3) 760 mm both (4) None of these

54. The specific heats of iodine vapours and solid are 0.031 and 0.055 Cal/g respectively. If heat of sublimation of iodine is 24 Cal/g at 200°C, What is its value at 250°C?
(1) 22.8 Cal/g (2) 11.2 Cal/g
(3) 12.8 Cal/g (4) 24.4 Cal/g

55. The heat of combustion of napthalene ($C_{10}H_8(s)$) at constant volume was measured to be – 5133 kJ $mol^{-1}$ at 298 K. Calculate the value of enthalpy change (Given R = 8.314$JK^{-1}$ $mol^{-1}$)
(1) –3137955.14 Joule (2) –5137955.14 Joule
(3) – 4127955.14 Joule (4) –3247955.14 Joule

56. One mole of nitrogen and three moles of hydrogen are mixed in a 4 litre container. If 0.25 percent of nitrogen is converted to ammonia by the following reaction–

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

what will be the value of K for the following equilibrium ?

$$\frac{1}{2}N_2(g) + \frac{3}{2}H_2(g) \rightleftharpoons NH_3(g)$$

(1) $1.49 \times 10^{-5}$ L $mol^{-1}$
(2) $2.22 \times 10^{-10}$ $L^2$ $mol^{-2}$
(3) $3.86 \times 10^{-3}$L $mol^{-1}$
(4) Question is incomplete

57. 0.15 mole of pyridinium chloride has been added into 500 $cm^3$ of 0.2 M pyridine solution. Claculate pH of the resulting solution assuming no change in volume.($K_b$ for pyridine = $1.5 \times 10^{-9}$ M)
(1) 4 (2) 9
(3) 5 (4) 8

58. The solubility of $CaF_2$ in water at 20°C is 15.6 mg per $dm^3$ solution. What will be the solubility product of $CaF_2$ ?
(1) $4.0 \times 10^{-4}$ (2) $8.0 \times 10^{-8}$
(3) $32.0 \times 10^{-10}$ (4) None

59. What will be the equivalent weight of the reducing agent which donates one electron in the following chemical reaction ?

$$2S_2O_3^{2-} \rightarrow S_4O_6^{2-} + 2e^-$$

(1) 2M (2) 3M
(3) M/2 (4) M.

60. Which of the following chemicals, in addition to water, are used for the manufacture of $Na_2CO_3$ by Solvay process ?
(1) NaCl, CO and $NH_3$ (2) NaCl, $CO_2$ and $NH_3$
(3) NaCl, $NH_4Cl$ and $CO_2$ (4) $NaHCO_3$, CO and $NH_3$

61. In silicon dioxide,
(1) Each silicon atom is surrounded by four oxygen atoms and each O – atom is bonded to two Si – atoms
(2) Each Si – atom is surrounded by two O – atoms and each O – atom is bonded to two Si – atoms
(3) Si–atom is bonded to two O – atoms
(4) There are double bonds between Si and O – atoms

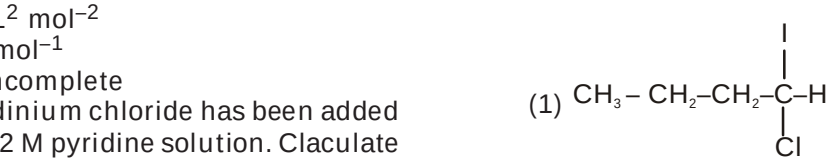
62. IUPAC name of compound $CH_3CH_2OCOCH_2CH_2CH_3$ is –
(1) Propyl propanoate (2) Ethyl butanoate
(3) Propyl butanoate (4) Ethyl propanoate

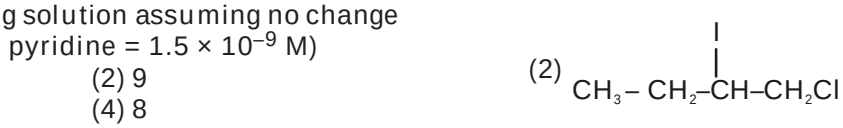
63. Electromeric effect–
(1) comes into play at the demand of attacking reagent
(2) involves displacement of electrons in a sigma bond
(3) comes into play in the molecule when at least one atom has unshared pair of electrons
(4) involves the distortion of the electron cloud

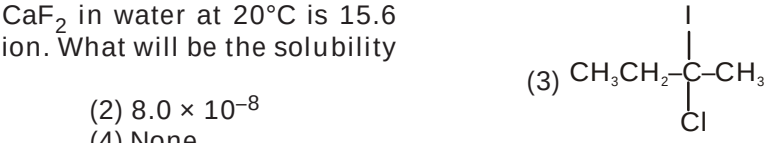
64. Which of the following should be subjected to Wurtz reaction to obtain the best yield of *n* – hexane ?
(1) Ethyl chloride and *n* – butyl chloride
(2) Methyl bromide and *n* – propyl bromide
(3) *n* – Propyl bromide
(4) Ethyl bromide and *n* – butyl bromide

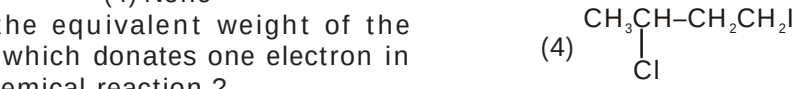
65. Predict the product C obtained in the following reaction of butyne – 1

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

(1) 

(2) 

(3) 

(4) 

66. Sudden mass death of fishes from oxygen depletion is more likely in case of –
(1) Oligotrophic lake (2) Oxalotrophic lake
(3) Eutrophic lake (4) Mesotrophic lake

67. In orthorhombic the value of a, b, and c are respectively 4.2 Å ,8.6 Å and 8.3 Å. Given the molecular mass of the solute is 155 gm $mol^{-1}$ and density is 3.3 gm/cc, the number of formula unit per unit cell is :
(1) 2 (2) 3
(3) 4 (4) 6

68. A solid has a structure in which 'W' atoms are located at the corners of a cubic lattice. 'O' atoms at the centre of edges and 'Na' atoms at the centre of the cube. The formula of the compund is
(1) $NaWO_2$ (2) $NaWO_3$
(3) $Na_2WO_3$ (4) $NaWO_4$

69. Which of the following solution in water possesses the highest value of elevation in Boiling point ?
(1) 0.1 M NaCl (2) 0.1 N $BaCl_2$
(3) 0.1 M KCl (4) None of these

70. The molal elevation constant of water = 0.52°C molar$^{-1}$. The boiling point of 1.0 molal aqueous KCl solution(assuming complete dissociation of KCl) should be :
(1) 100.52°C (2) 101.04°C
(3) 99.48°C (4) 98.96°C

71. The standard reduction potential at 298 K for the following half reaction are given against each

$Zn^{2+}(aq.) + 2e \rightleftharpoons Zn(s)$; – 0.762 V

$Cr^{3+}(aq) + 3e \rightleftharpoons Cr(s)$; – 0.740 V

$2H^+(aq) + 2e \rightleftharpoons H_2(g)$; 0.00 V

$Fe^{3+}(aq) + e \rightleftharpoons Fe^{2+}(aq)$; 0.770 V

Which is the strongest reducing agent ?
(1) Zn(s) (2) Cr(s)
(3) $H_2(g)$ (4) $Fe^{2+}(aq)$

72. Reduction potential of four elements P, Q, R, S is – 2.90, + 0.34, + 1.20 and – 0.76. Reactivity decreases in the order
(1) P > Q > R > S (2) Q > P > R > S
(3) R > Q > S > P (4) P > S > Q > R

73. A gaseous hypothetical chemical equation $2A \rightarrow 4B + C$ is carried out in a closed vessel. The concentration of B is found to increase by $5 \times 10^{-3}$ mol $1^{-1}$ in 10 second. The rate of appearance of B is :
(1) $5 \times 10^{-4}$ mol $L^{-1}sec^{-1}$
(2) $5 \times 10^{-5}$ mol $L^{-1}sec^{-1}$
(3) $6 \times 10^{-5}$ mol $L^{-1}sec^{-1}$
(4) $4 \times 10^{-4}$ mol $L^{-1}sec^{-1}$

74. Which of the following colloids are formed when hydrogen sulphide gas is passed through a cold solution of arsenious oxide ?
(1) $As_2S_3$ (2) $As_2O_3$
(3) $As_2S$ (4) $As_2H_2$

75. Which of the following process does not involves calcination or roasting or dehydration ?
(1) $ZnCO_3 \rightarrow ZnO + CO_2$
(2) $Fe_2O_3 + 3C \rightarrow 2Fe + 3CO$
(3) $2PbS + 3O_2 \rightarrow 2PbO + 2SO_2$
(4) $Al_2O_3.2H_2O \rightarrow Al_2O_3 + 2H_2O$

76. Sulphuric acid reacts with $PCl_5$ to give
(1) Thionyl chloride
(2) Sulphur monochloride
(3) Sulphuryl chloride
(4) Sulphur tetrachloride

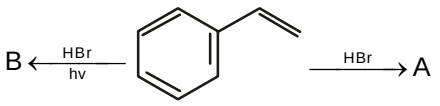
77. When iodine reacts with NaF, NaBr and NaCl
(1) It gives mixture of $F_2$,$Cl_2$ and $Br_2$
(2) It gives chlorine
(3) It gives bromine
(4) None of these

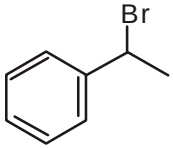
78. The IUPAC name fo the coordination compound $K_3[Fe(CN)_6]$ is
(1) Potassium hexacyanoferrate (II)
(2) Potassium hexacyanoferrate (III)
(3) Potassium hexacyanoiron (II)
(4) Tripotassium hexacyanoiron (II)

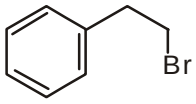
79. (i) $K_4[Fe(H_2O)_6]$ (ii) $K_3[Cr(CN)_6]$
(iii) $K_3[Fe(CN)_6]$ (iv) $K_2[Ni(CN)_4]$
Choose the complex which is paramagnetic
(1) (i), (ii) and (iii) (2) (i), (iii) and (iv)
(3) (ii), (iii), and (iv) (4) (i), (ii) and (iv)

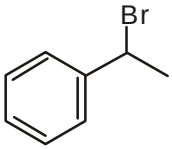
80. The major product obtained on treatment of $CH_3CH_2CH(F)CH_3$ with $CH_3O^-/CH_3OH$ is :
(1) $CH_3CH_2CH(OCH_3)CH_3$
(2) $CH_3CH = CHCH_3$
(3) $CH_3CH_2CH = CH_2$
(4) $CH_3CH_2CH_2CH_2OCH_3$

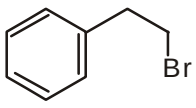
81. Identify the products A and B in the following reaction.

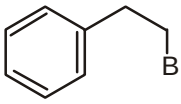


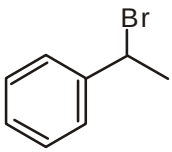

(1) Both A and B are 

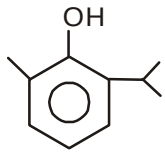

(2) Both A and B are 

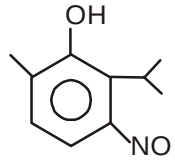

(3) A is 

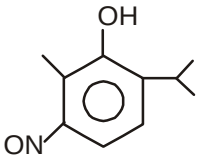
& B is 

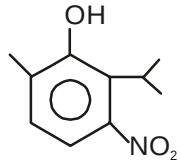

(4) A is 

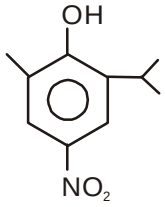
& B is 

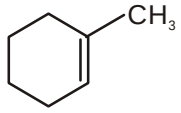
82.  $\xrightarrow[(ii)dil.HNO_3]{(i)NaNO_2,HCl}$ Z. Here Z is

(1) 

(2) 

(3) 

(4) 

83.  on reductive ozonolysis yields

(1) 6– oxoheptanal
(2) 6 – oxoheptanoic acid
(3) 6 – hydroxyheptanal
(4) 3 – hydroxypentanal

84. An alkene of molecule formula $C_9H_{18}$ on ozonolysis gives 2, 2 – dimethylpropanal & 2 – butanone, then the alkene is
(1) 2, 2, 4 – trimethyl – 3 – hexane
(2) 2, 2, 6 – trimethyl – 3 – hexene
(3) 2, 3, 4 – trimethyl – 2 – hexene
(4) 2, 2 – dimethyl – 2 – heptene

85. In the reacton, $C_6H_5OH \xrightarrow{NaOH}$(A)

$\xrightarrow[140°C,(4-7)atm]{CO_2}$ (B) $\xrightarrow{HCl}$ (C), th compound (C) is
(1) Benzoic acid (2) Salicyladehyde
(3) Chlorobenzene (4) Salicylic acid

86. Follwing reaction is an example of

$R\text{-}\overset{\overset{O}{\|}}{C}\text{-}OH + HN_3 \xrightarrow{H_2SO_4} R - NH_2$

(1) Hofmann reaction (2) Curtius reaction
(3) Schmidt reaction (4) Lossen reaction

87. Which one of the following is an amino acids ?
(1) $CH_3CONH_2$ (2) $CH_3CONHCH_3$
(3) $CH_3NHCHO$ (4) $NH_2CH_2.COOH$

88. The catalyst used for the polymerisation of olefins is
(1) Ziegler Natta catalyst
(2) Wilkinson's catalyst
(3) Pd – catalyst
(4) Zeise's salt catalyst

89. Antiseptic chloroxylenol is :
(1) 4 – chloro – 3, 5 – dimethylphenol
(2) 3 – chloro – 4, 5 dimethylphenol
(3) 4 – chloro – 2, 5 dimethylphenol
(4) 5 – chloro – 3, 4 dimethylphenol

90. $MnO_2$ and $H_2SO_4$ added to NaCl, the greeenish yellow gas liberated will be
(1) $Cl_2$ (2) $NH_3$
(3) $N_2$ (4) $H_2$

91. Sickel – cell – anaemia helps in prevention of which disease :
(1) Haemophilia (2) Malaria
(3) Anaemia (4) Thalasemia

92. The condition of maturation of anther and stigma of same flower simultaneously is called :
(1) Geitonogamy (2) Xenogamy
(3) Allogamy (4) Homogamy

93. Which of the following essential element of plants do not requires as cofactor of enzymes?
(1) Potassium (2) Zinc
(3) Boron (4) Mangnese

94. Trophic level of a man eating curd is :
(1) $T_1$ (2) $T_2$
(3) $T_4$ (4) $T_3$

95. Which of the following cow of general utility breed has been crossed with Holstein Friesian breed to raise Karan fries by NDRI ?
(1) 'Sahiwal Cow' (2) 'Haryana' Cow
(3) 'Kankrej' Cow (4) 'Tharparkar' Cow

96. DNA fingerprinting involves
(1) Sourthern blotting
(2) Northern blotting
(3) Western blotting
(4) ELISA

97. A horizontal underground stem is a
(1) Corm (2) Phylloclade
(3) Rhizome (4) Rhizoid

98. Read the following five statements (i–v) and answer the question.
(i) In *Equisetum* the female gametophyte is retained on the parent sporophyte.
(ii) In *Ginkgo* male gametophyte is not independent.
(iii) The sporophyte in *Riccia* is more developed than that in *Polytrichum.*
(iv) Sexual reproduction in *Volvox* is isogamous
(v) The spores of slime moulds lack cell walls.
How many of the above statements are correct ?
(1) Two (2) Three
(3) Four (4) One

99. Addition of solute to pure water causes
(1) negative water potential
(2) more negative water potential
(3) positive water potential
(4) more positive water potential

100. Which one of the following process help the water – soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts?
(1) Fragmentation (2) Leaching
(3) Catabolism (4) Humification

101. Which one of the following species of plant is considered as the world's most problematic aquatic weed ?
(1) *Lantana*
(2) *Eichhornia*
(3) *Parthenium* (carrot grass)
(4) Brown algae

102. The first dicarboxylic acid in Kreb's cycle is
(1) isocitric acid
(2) pyruvic acid
(3) oxalo acetic acid
(4) $\alpha$ – ketoglutaric acid

103. $N_2 + 8e^- + 8H^+ + 16\ ATP \rightarrow 2NH_3 + H_2 + 16ADP + 16Pi$
The above equation refers to
(1) ammonification (2) nitrification
(3) nitrogen fixation (4) denitrification

104. If turgor pressure becomes equal to osmotic pressure
(1) water leaves the cell
(2) water enters the cells
(3) no exchange of water takes place
(4) solute pass out of the cell

105. The two chromatids of a metaphase chromosome represent
(1) replicated chromosomes to be separated at anaphase
(2) homologous chromosomes of a diploid set
(3) non – homologous chromosomes joined at the centromere
(4) maternal and paternal chromosomes joined at the centromere

106. A vascular bundle in which the protoxylem is pointing to the periphery is called
(1) endarch (2) exarch
(3) radial (4) closed

107. Which one of the following micro – organisms is used for production of citric acid in industries ?
(1) *Penicillium citrinum*
(2) *Aspergillus niger*
(3) *Rhizopus nigricans*
(4) *Lactobacillus bulgaris*

108. Emasculation is not required when flowers are
(1) bisexual (2) intersexual
(3) unisexual (4) either (1) or (2)

109. Which one of the following is common to multicellular fungi, filamentous algae and protonema of mosses ?
(1) Diplontic life cycle
(2) Members of kingdom plantae
(3) Mode of Nutrition
(4) Multiplication by fragmentation

110. Which part of the coconut produces coir ?
(1) Seed coat (2) Mesocarp
(3) Epicarp (4) Pericarp

111. Root hair arises from
(1) pericycle (2) endodermis
(3) cortex (4) epiblema

112. The productivity of a crop declines when leaves being to wilt mainly because
(1) the chlorophyll of wilting leaves decomposes
(2) flaccid mesophyll cells are incapable of photosynthesis
(3) stomata close, preventing $CO_2$ from entering the leaf
(4) Photolysis, the water – splitting step of photosynthesis, cannot occur when there is a water deficiency

113. Which one of the following is not a function of an ecosystem ?
(1) Energy flow (2) Decomposition
(3) Producitvity (4)Stratification

114. The process in which nature differentiated cells reverse to meristematic activity to form callys is called :
(1) dedifferentiation (2) differentiation
(3) redifferentiation (4) None of the above

115. Which one of the following statement is true ?
(1) The greater the Biological Oxygen Demand (BOD) of waste water, more is its polluting potential.
(2) The greater the BOD of waste water, less is its polluting potenital.
(3) The lesser the BOD of waste water, more is its polluting potential
(4) The lesser of BOD of waste water, less is its polluting potential.

116. Ecosystem is :
(1) always open
(2) always closed
(3)both open and closed depending upon community
(4) both open and close depending upon biomass

117. Transition zone between two vegetations is
(1) ecotone (2) ecotype
(3) ecocline (4) ecosystem

118. The conditions necessary for vernalization are
(1) high temperature and water
(2) low temperature and oxygen
(3) water and carbon dioxide
(4) oxygen and water

119. Final electron acceptor in oxidative phosphorylation is
(1) hydrogen (2) dehydrogenase
(3) cytochrome (4) oxygen

120. In a CAM plant, the concentration of organic acid
(1) increases during the day
(2) decreases during the night
(3) increases during night
(4) decreases or increases during day

121. DNA test can not be prepared from :
(1) Sperm (2) W.B.C.
(3) R.B.C (4) Inner lining of cheek

122. Quantasomes are found in
(1) mitochondria (2) chloroplast
(3) lysosome (4) endoplasmic reticulum

123. Phellogen and phellem respectively denote
(1) cork and cork cambium
(2) cork cambium and cork
(3) secondary cortex and cork
(4) cork and secondary cortex

124. Which one of the following is a correct statement ?
(1) In Pteridophyte gametophyte has a protonemal and leafy stage
(2) In gymnosperms female gametophyte is free – living
(3)Antheridiophores & archegoniophores are present in pteridophytes
(4) Origin of seed habit can be traced in pteridophytes

125. Function of suspensor of embryo is
(1) absorption of nourishment
(2) push the embryo into nutritive endosperm region
(3) formation of secondary embryos
(4) All of the above

126. Scutellum is a/an
(1) protective covering of radicle
(2) protective covering of plumule
(3) endosperm of gymnosperms
(4) shield – shaped cotyledon

127. The common bottle cork is a product of :
(1) Dermatogen (2) Phellogen
(3) Xylem (4) Vasular cambium

128. Telomere and eukaryotic chromosome possesses short segements of
(1) guanine rich repeats
(2) thymine rich repeats
(3) cytosine rich repeats
(4) adenine rich repeats

129. What mechanism explains the movement of sucrose from source of sink ?
(1) Evaporation of water and active transport of sucrose from sink
(2) Osmotic movement of water into the sucrose loaded sieve tube cells creating a higher hydrostatic pressure into the source than in the sink
(3) Tension created by differences in hydrostatic pressure in the source and sink
(4) Active transport of sucrose through the sieve tube membranes driven by proton pump.

130. Which one of the following areas in India, is a hotspot of biodiversity ?
(1) Eastern Ghats (2) Ganetic plain
(3) Sunderbans (4) Western Ghats

131. A taxon facing an extremely high risk of extinction in wild in the immediate future is called ?
(1) critical endangered
(2) endangered
(3) vulnerable
(4) extinct in wild

132. Compensation point is
(1) where there is neither photosynthesis nor respiration
(2) when rate of photosynthesis is equal to the rate of respiration
(3) when entire food synthesized into photosynthesis remain utilized
(4) when there is enogh water just to meet the requirement of plant.

133. Which of the following hormones does not naturally occur in plants ?
(1) 2,4 – D (2,4 – dichloropheoxy acetic acid)
(2) IAA
(3) ABA
(4) GA

134. Two organism of same division but different order wil be kept under the same :
(1) Class (2) Sub order
(3) Genus (4) Species

135. A trace element essential for plant growth and radio – isotope, which is used in cancer therapy is
(1) cobalt (2) calcium
(3) sodium (4) iron

136. Match the following columns.

| Column – I | Column – II |
|---|---|
| (a) Alkaloid | (I) Vinblastin, Curcumin |
| (b) Essential oils | (II) Morphine, Codeine |
| (c) Toxins | (III) Lemon grass oil |
| (d) Drugs | (IV) Abrin, Ricin |

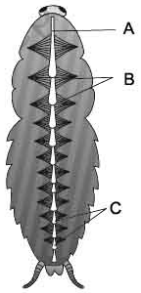
(1) a – II, b – III, c –IV, d – I
(2) a – III, b – II, c –IV, d – I
(3) a – II, b – III, c –I, d – IV
(4) a – III, b – II, c –I, d – IV

137. Correct order of abundance of oxygen, sulphur, Magnesium and calcium in the earth crust ?
(1) O > Ca > Mg > S (2) S > O > Mg > Ca
(3) Ca > O > S > Mg (4) Mg > Ca > S > O

138. An example of gene therapy is :
(1) Production of injectable Hepatitis – B vaccine
(2) Production of vaccines in food crops like Potatoes which can be eaten
(3) Introduction of gene for adenosine deaminase in persons suffering from severe combined immuno – deficiency (SCID)
(4) Production of test tube babies by artificial insemination and implantation of fertilized eggs

139. During the processing of the prohormone "Proinsulin" into the mature "insulin".
(1) C – peptide is added to proinsulin
(2) C – peptide is removed from proinsulin
(3) B – peptide is added to proinsulin
(4) B – peptide is removed from proinsulin

140. The given figure shows open circulatory system of Cockroach with structures marked as A,B and C. Which structure is a 13 pair of wing shaped involuntary muscles and maintain blood circulation ?




(1) A (2) B
(3) C (4) Both A and B

141. Which one of the following statements is true ?
(1) Head of humerus bone articulates with acetabulum of pectoral girdle
(2) Head of humerus bone articulates with glenoid cavity of pectoral girdle
(3) Head of humerus bone articulates with a cavity called acetabulum of Pelvic girdle
(4) Head of humerus bone articulates with glenoid cavity of pelvic girdle.

142. How many types of tissue our heart is made of ?
(A) Epithelial (B) Connective
(C) Muscular (D) Nervous
(1) A only (2) Both A and B
(3) A, B and C (4) A, B, C and D

143. The dark bands (Black bands) of a skeletal muscle are known as
(1) Isotropic or I – band
(2) Anisotrobic or A – band
(3) Z – band
(4) Both in A and I – band

144. Match the following column – I with column – II

| Column – I | Column – II |
|---|---|
| (a) Physical barrier | (i) Acid in stomach |
| (b) Physiological barrier | (ii) Natural killer cell |
| (c) Celluar barrier | (iii) lymphocyte |
| (d) Cytokine barrier | (iv) Interferons |
| | (v) Mucous membrane |

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

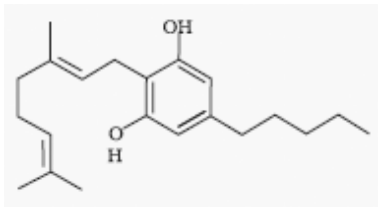
145. The length of alimentary canal of adult frog is :
(1) long as it is carnivore
(2) long as it is herbivore
(3) short as it is Carnivore
(4) short as it is herbivore

146. Which one of the following group is not of infectious diseases ?
(1) Cancer, Allergy, Rheumatoid arthritis
(2) Dysentery, Plague, Diptheria
(3) Polio, Pneumonia, Tetanus
(4) Small pox, Ringworm, Common cold

147. Which disorder is not related with smoking?
(a) Lung cancer (b) Bronchitis
(c) Emphysema
(d) Coronary heart disease
(e) Gastric ulcer
(f) Urinary bladder cancer
(g) Throat cancer
(1) a, b, e and g
(2) a, b, c, f and g
(3) c, d and f
(4) All are related

148. For cancer detection we use :
(1) Histochemical study
(2) Histopathological study
(3) Pathophysiological study
(4) Epidemiological study

149. Diagram is showing, skeletal structure of :



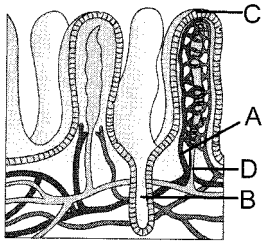

(1) Morphine molecule
(2) Cannabinoid molecule
(3) Opioid molecule
(4) Coca alkaloid

150. Find the correct match from the following table :

| | Column – I | Column – II | Column – III |
|---|---|---|---|
| (I) | Cacaine | Erythroxylon coca | Stimulant |
| (II) | Morphine | Papaver somniferum | Sedative |
| (III) | Marijuana | Claviceps purpurea | Stimulant |

(1) Only I (2) Only II
(3) I, II and III (4) both (I) and (II)

151. Which of the following is a correct identification of the labelled part and its description ?




(1) B – A villus with mucus producing goblet cells
(2) D – Blood capillary with actively and passively absorbed nutrients except lipids
(3) A – Lacteals, the lymph vessels being more porous than blood capillaries
(4) C – The finger like folding with microvilli giving brush bordered appearance

152. Kupffer cells are
(1) Mast cells (2) Phagocytic cells
(3) Hormones secreting cells
(4) Digestive enzyme secreting cells

153. Mucus in the saliva helps in lubricating and adhering the masticated food particles in to
(1) Chyme (2) Bolus
(3) Chyle (4) Rugae

154. Every 10 mL of deoxygenated blood delivers approximately _____ of $CO_2$ in the alveoli.
(1) 0.4mL (2) 4 mL
(3) 0.5 mL (4) 15 mL

155. How many of the following valves are in contact with oxygenated blood only ?
Bicuspid valve, Eustachian valve, Thebasian valve, Pulmonary semilunar valve, Aortic semilunar valve, Tricuspid valve
(1) Three (2) Four
(3) Two (4) One

156. Myogenic heart with incomplete double circulation is found is
(1) Crocodile (2) Turtle
(3) Crow (4) Kangaroo

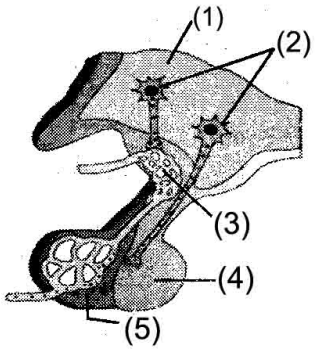
157. In which segment of nephron does tubular fluid have the highest osmolarity ?
(1) Collecting tubule (2) PCT
(3) DCT (4) Loop of Henle

158. Read the following statements :
(I) Loop of Henle is absent in frog
(II) In jaundice, blood level of bilirubin becomes very high
(III) Kangaroo rat excretes hypertonic urine
(IV) Hypersecretion of antidiuretic hormone can lead to diabetes insipidus
How many of the given statements is/are correct ?
(1) One (2) Two
(3) Four (4) Three

159. All of the following functions are attributed to ADH, except
(A) Increase in glomerular blood flow
(B) Promoting diuresis
(C) Decrease in blood pressure
(D) Increase in body fluid volume
(1) A & B (2) C & D
(3) B & C (4) A & D

160. What is the correct sequence of the parts of the eye that the light rays cross in reaching the retina ?
(1) Pupil → Cornea → Aqueous humour → Lens → Vitreous humour
(2) Lens → Cornea → Aqueous humour → Vitreous humour → Pupil
(3) Aqueous humour → Vitreous humour → Cornea → Pupil → Lens
(4) Cornea → Aqueous humour → Pupil → Lens → Vitreous humour

161. This is diagrammatic representation of pituitary and its relationship with hypothalamus. Select incorrect statement with reference to this diagram.




(1) 3 – carries oxytocin and vasopressin to pituitary gland
(2) 5 – is the anterior lobe of pituitary
(3) 4 and 5 together release at least 9 hormones
(4) Posterior pituitary receives axons of hypothalamic neurons

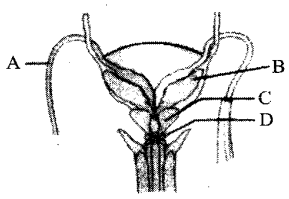
162. Match the columns.

| Column – I | Column – II |
|---|---|
| (A) Hypothyroidism | (i) Pupilary dilation |
| (B) Zona reticularis | (ii) During pregnancy this causes defective development of the growing baby |
| (C) Adrenaline | (iii) It's secretion acts on the mammary gland and stimulates formation of alveoli and milk secretion. |
| (D) Corpus luteum | (iv) Innermost layer of adrenal cortex |
| (E) Androgens | (v) Act on CNS and influence libido in male |
| | (vi) Stimulates RBC production |
| | (vii) Stimulatory role in spermatogenesis |

Choose the option containing minimum number of incorrect matches :
(1) (A) – (ii), B – (vi) and (iv), (C) – (iii), (D) – (i), (E) – (vii)
(2) (A) – (ii), B – (iv), (C) – (i), (D) – (iii), (E) – (v) and (vii)
(3)(A) – (vi), B – (iv), (C) – (i), (D) – (iii), (E) – (v) and (vii)
(4) (A) – (i) and (ii), B – (iii),(C) – (iv), (D) – (i), (E) – (v) and (vii)

163. Select the wrong statement from the following :
Hypothyroidism during pregnancy causes :
(i) Cretinism in baby
(ii) Mental retardation in baby
(iii) Low intelligent quotient and deaf – mutism
(iv) Abnormal skin in baby
(v) Menstrual cycle to become irregular
(1) Only (v) (2) (i), (ii) and (iii)
(3) (i), (ii) and (iv) (4) None of these

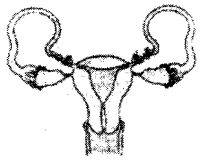
164. The given figure shows a diagrammatic sketch of a portion of human male reproductive system.




Identify the parts labelled as A, B, C and D and select the correct option.
(1) A – Vas deferens, B – Seminal vesicle, C – Prostate, D – Bulbourethral gland
(2) A – Vas deferens, B – Seminal vesicle, C – Bulbourethral gland, D – Prostate
(3) A – Ureter, B – Seminal vesicle, C – Prostate, D – Bulbourethral gland
(4) A –Ureter, B – Prostate, C – Seminal vesicle, D – Bulbourethral gland

165. A sectional view of mammary gland shows
(i) Nipple + Areola
(ii) Mammary lobe + Alveolus + Duct
(iii) Antibodies + Pectoralis major muscles + Ribs
(iv) Ampulla + Lactiferous duct
(1) (i), (ii) and (iv) (2) (i), (ii) and (iii)
(3) (iii) and (iv) (4) (i), (ii), (iii) and (iv)

166. What is the figure given below showing in particular ?



(1) Ovarian cancer (2) Uterine cancer
(3) Tubetomy (4) Vasectomy

167. In which of the following methods zygotes or early embryo upto 8 blastomers could be transferred into the fallopian tube ?
(1) GIFT (2) IUT
(3) ZIFT (4) ICSI

168. In case of a couple where the male is having a very low sperm count, which technique will be suitable for fertilisation ?
(1) Gamete intracytoplasmic fallopian transfer
(2) Artificial Insemination
(3) Intracytoplasmic sperm injection
(4) Both (2) and (3)

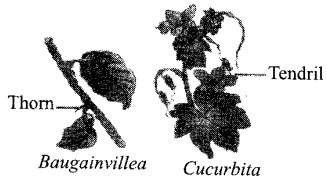
169. In his classic experiment on the formation of amino acids, Stanley Miller passed an electric discharge in a mixture of
(1) Steam, $CH_4$, $H_2$ and $NH_3$
(2) $CH_4$,$CO_2$, $O_2$ and $H_2$
(3) $NH_3$, $O_2$, $H_2$and steam
(4) $CH_4$, $H_2$,$N_2$ and steam

170. Pick up the correct match :

| Column – I | Column – II |
|---|---|
| I. Darwin | A.Use and disuse of organs |
| II. Lamarck | B.Origin of life |
| III. Mendel | C.Natural selection |
| IV. A.I. Oparin | D. Laws of heredity |

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

171. The figure given below shows an example of




(1) Homologous organs
(2) Convergent evolution
(3) Divergent evolution
(4) Both (1) and (3)

172. Mark the correct match of the animal and its common name
(1) Trygon – dog fish (2) Ascidia – lancelet
(3) Pterophyllum – flying fish
(4) Myxine – hagfish

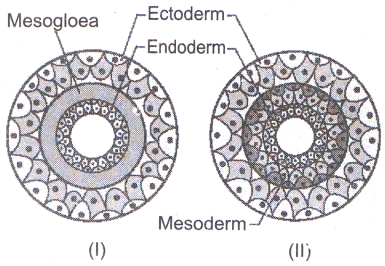
173. Study the lists and find the correct match :

| Column – I | Column – II |
|---|---|
| A. BOD | (i) Treatment of sewage |
| B. KVIC | (ii) Measure of organic matter in water |
| C. LAB | (iii) Biological methods for controlling plant disease |
| D. STP | (iv) Increases vitamin $B_{12}$ |
| | (v) Production of biogas |

(1) A = (iv), B = (iii), C = (ii), D = (v)
(2) A = (v), B = (ii), C = (iii), D = (i)
(3) A = (ii), B = (i), C = (iv), D = (v)
(4) A = (ii), B = (v), C = (iv), D = (i)

174. Which of the following character is not true for Cyclostomata ?
(1) Ectoparasites on some fishes
(2) Bearing 6 – 15 pairs of gill slits
(3) Sucking and circular mouth without jaws
(4) Cranium and vertebral column are bony

175. Given diagram shows the germ layer. Which of the following option is correct regarding germ layer and their examples ?




(1) I – Diploblastic – Annelida, II – Triploblastic – Arthropda
(2) I – Diploblastic – Platyhelminthes, II – Triploblastic – Ctenophora
(3) I – Diploblastic – Coelenterates, II – Diploblastic – Ctenophora
(4) I – Diploblastic – Coelenterata, II – Triploblastic – Arthropoda

176. Match the animals list with names under coloumn I with the animals listed with regular zoological name given under Column II; choose the answer which gives the correct combination of the alphabetes of the two columns.

| Column – I (*Animals with common name*) | Column – II (*Animals with zoological name*) |
|---|---|
| (A) Star fish | (i) Sepia |
| (B) Jellyfish | (ii) Asterias |
| (C) Devilfish | (iii) Aurelia |
| (D) Cuttlefish | (iv) Octopus |

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

177. In a sewage treatment plant (STP), the primary treatment is a __(A)__ which involves removal of small and large particles from sewage through __(B)__ and __(C)__ .

| | A | B | C |
|---|---|---|---|
| (1) | Physical process | Filtration | Sedimentation |
| (2) | Chemical process | Filtration | Sedimentation |
| (3) | Biological process | Filtration | Sedimentation |
| (4) | Biological process | Microbial digestion | Sedimentation |

178. The ministry of environment and forests has initiated _____ and ____ to save our rivers from water pollution.
(1) Ganga Action Plan (GAP); Yamuna Action plan (YAP)
(2) Biogas plant set up; chemical insecticide programme
(3) Air pollution act; sound pollution act
(4) All of the above

179. The free – living fungus Trichoderma can be used in :
(1) Killing insects
(2) Biological control of plant diseases
(3) Controlling butterfly caterpillars
(4) Producing antibiotics

180. The discovery of first antibiotic :
(1) Was a serendipity by Alexander Fleming while working on Staphylococci
(2) Was a serendipity by Walksman while working on staphylococci
(3) Was a serendipity by Alexander Fleming while working on Penicillium
(4) Was a serendipity by Walksman while working on Penicillium