NTA ABHYAS NEET MOCK TEST–68

PHYSICS

1. An electron collides with a hydrogen atom in its ground state and excites it to n = 3. The energy given to hydrogen atom in this inelastic collision is (neglect the motion of hydrogen atom)

   1) 10.2eV 2) 12.1eV 3) 12.5eV 4) None of these

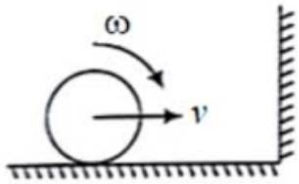
2. At what speed should the electron revolve around the nucleus of a hydrogen atom in order that it may not be pulled into the nucleus by electrostatic attraction? Take the radius of orbit of an electron as $0.5A^0$, the mass of the electron as 9.1×10^{-31}kg and charge as 1.6×10^{-19}C

   1) $2.25\times10^{4}ms^{-1}$ 2) $2.25\times10^{5}\ ms^{-1}$ 3) $2.25\times10^{6}\ ms^{-1}$ 4) $2.25\times10^{7}\ ms^{-1}$

3. Three identical spheres of mass M each are placed at the corners of an equilateral triangle of side 2m. Taking one of the corners as the origin as shown in the figure, the position vector of the centre of mass is

   1) $\sqrt{3}\left(\hat{i}-\hat{j}\right)$ 2) $\frac{\hat{i}}{\sqrt{3}}+\hat{j}$ 3) $\frac{\hat{i}+\hat{j}}{3}$ 4) $\hat{i}+\frac{\hat{j}}{\sqrt{3}}$

4. A ball having velocity u towards the right and having angular velocity clockwise approaches the wall. It collides elastically with wall and moves towards the left. Ground and wall are frictionless. Select the correct statements about the angular velocity of the ball after the collision



   1) It will be anti-clockwise 2) It becomes zero

   3) Angular speed decreases 4) It will be clockwise

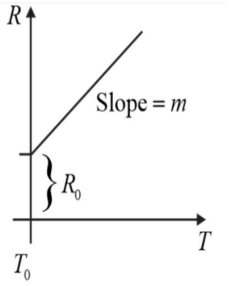
5. A sphere is suspended by a thread of length l. The minimum horizontal velocity which has to be imparted to the sphere for it to reach the height of suspension is

   1) $2\sqrt{gl}$ 2) $\sqrt{2gl}$ 3) $\sqrt{gl}$ 4) $4\sqrt{gl}$

6. A flywheel at rest is to reach an angular velocity of 24 rad s^{-1} in 8s with constant angular acceleration. The total angle turned through during this interval is

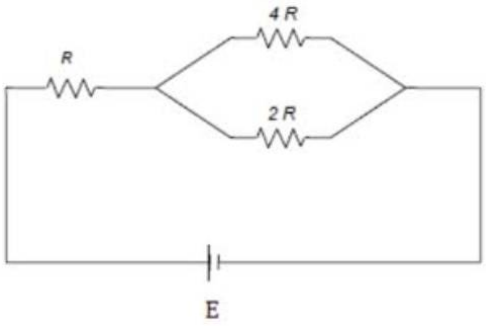
   1) 24 rad 2) 48 rad 3) 72 rad 4) 96 rad

7. Variation of resistance of the conductor with temperature is as shown. Temperature coefficient of the conductor is



1) $\frac{R_0}{m}$ 2) mR_0 3) m^2R_0 4) m/R_0

8. The figure shows a network in which the cells is ideal and it has an emf E. The potential difference across the resistance 2R is



1) 2E 2) 4E/7 3) E/7 4) 3E/7

9. The magnetic flux neat the axis and inside air-core solenoid of length 60cm carrying currents I is 1.57×10^{6}Wb.Its magnetic moment will be (cross-sectional area of a solenoid is very small as compared to its length, $\mu_0 = 4\pi\times10^{-7}$ Si units)

1) 0.25A m^2 2) 0.5 A m^2 3) 0.75A m^2 4) 1 Am^2

10. Power dissipated in an LCR series circuit connected to an A.C source of emf is

1) $\varepsilon^2\frac{\sqrt{R^2+\left(L\omega-\frac{1}{C_\omega}\right)}}{R}$ 2) $\varepsilon^2\frac{\left[R^2+\left(L\omega-\frac{1}{C_\omega}\right)\right]}{R}$

3) $\frac{\varepsilon^2R}{\sqrt{R^2+\left(L\omega-\frac{1}{C_\omega}\right)^2}}$ 4) $\frac{\varepsilon^2R}{\left[R^2+\left(L\omega-\frac{1}{C_\omega}\right)^2\right]}$

11. If electrical force between two charges is 200N and we increase 10% charge on one of the charges and decrease 10% charge on the other, then the electrical force between them for the same distance becomes

1) 200 N 2) 202 N 3) 198 N 4) 199 N

12. The ratio of electric field intensity at P and Q in the shows arrangement is

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

13. Kepler's third law states that the square of period of revolution (T) of a planet around the sun is proportional to the third power of average distance, r between the sun and the planet i.e. $T^2 = Kr^3$. Here, K is constant. If masses of the sun and the planet are M and m respectively, then as per Newton's law of gravitation force of attraction between them is $F = \frac{GMm}{r^2}$, where G is gravitational constant. The relation between G and K is described as

1) $GK = 4\pi^2$ 2) $GMK = 4\pi^2$ 3) K = G 4) $K = \frac{1}{G}$

14. The acceleration due to gravity on the surface of a planet is one-fourth of the value on earth. When a brass ball is brought to this planet, its

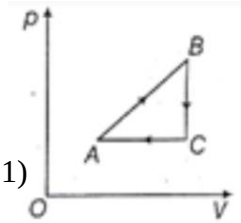
1) Mass is halved 2) Weight is halved

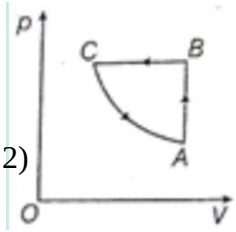
3) Mass become one-fourth 4) Weight become one-fourth

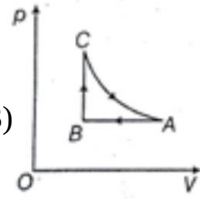
15. If the emission rate of a blackbody at 0^0C is R, then the rate of emission at 273^0C is

1) 2R 2) 4R 3) 8R 4) 12R

16. A cyclic process of shown in the p-T diagram. Which of the following curves shows the process on the p-V diagram?

1) 

2) 

3) 

17. An ideal gas is taken through a cyclic thermodynamical process through four steps. The amount of heat involved in steps are Q_1 = 5960 J, Q_2 = -5585 J, Q_3 = -2980 J and Q_4 = 3645 J, respectively. The corresponding works involved are W_1 =2200 J, W_2 = -825 J, W_3 =-1100 J and W_4 , respectively. The value of W_4 is

1) 1315 J 2) 275 3) 765 J 4) 675 J

18. Ions of different momentum (p), having the same charge, enter normally a uniform magnetic field. The radius of the orbit of an ion is proportional to

1) P 2) $\frac{1}{P}$ 3) P^2 4) $\frac{1}{P^2}$

19. A galvanometer of resistance 50 Ω giving full scale deflection for a current of 10 mA is to be changed into a voltmeter of range 100 V. What should be the value of resistance to be added in series with this galvanometer?

1) 9950 Ω 2) 10025 Ω 3) 10000 Ω 4) 9975 Ω

20. Nickel shows the ferromagnetic property at room temperature. If the temperature is increased beyond Curie temperature, then it will show

1) Anti ferromagnetism 2) No magnetic property

3) Diamagnetism 4) Paramagnetism

21. The position coordinates of a particle moving in X – Y as a function of time t are

$x = 2t^2 + 6t + 25$

$y = t^2 + 2t + 1$

The sped of the object at t =10 s is approximately

1) 31 units 2) 51 units 3) 71 units 4) 81 units

22. Three balls are projected from the top of a building with equal speeds but at different angles. Balls strike the ground with velocities v1, v2 and v3 respectively, then

1) v1 > v2 > v3 2) v3 > v2 > v1 3) v1= v2 = v3 4) v2 < v3 < v1

23. A man of 50 Kg is standing at one end on a boat of length 25 m and mass 200 Kg. If he starts running and reaches the other end, he has a speed 2 m s^{-1} with respect to the boat. The final speed of the boat is

(in m s^{-1})

1) 2/5 2) 2/3 3) 8/5 4) 8/3

24. A piece of wire is bent in the shape of a parabola $y = kx^2$ (y – axis vertical) with a bead of on it. The bead can slide on the wire without friction. It stays at the lowest point of the parabola when the wire is at rest. The wire is now accelerated parallel to the x-axis with a constant acceleration. The distant of the new equilibrium position of the bead, where the bead can stay at rest with rest with respect to the wire, from the y – axis is –

1) a/gk 2) a/2gk 3) 2a/gk 4) a/4gk

25. The curve of binding energy per nucleon as a function of an atomic mass number has a sharp peak for the helium nucleus. This implies that helium

1) Can easily be broken up 2) Is very stable

3) Can be used as fissionable material 4) Is radioactive

26. Select the true statement from the following. Nuclear force is

1) Strong, short range and charge long range force

2) Charge independent, attractive and long range force

3) Strong, charge dependent and short range attractive force

4) Long range, charge dependent and attractive force

27. For a particle executing SHM, the displacement x is given by $x = A \cos \omega t$. Identify the graph which represents the variation of potential energy (PE) as a function of time t and displacement x.

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

28. The pendulum suspended from the ceiling of a train has a period of T when the train is at rest. When the train is accelerating with uniform acceleration, the period of oscillation wil

1) Increase 2) Decrease 3) Remain unaffected 4) Become infinate

29. The photons of same frequencies moving in same medium have

1) Same linear momentum and wavelengths

2) Same linear momentum and same speeds

3) Same energies and same linear momentum

4) None of the above

30. In the kinetic energy of a moving particle is E, then the de – Broglive wavelength is

1) $\lambda = h\sqrt{2mE}$ 2) $\lambda = \sqrt{2mE/h}$ 3) $\lambda = h/\sqrt{2mE}$ 4) $\lambda = hE/\sqrt{2mE}$

31. In a capillary tube having area of cross-section A, the water rises to a height h. If the cross-sectional area is reduced to A/9, the rise of water in the capillary tube is

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

32. Two bodies are in equilibrium when suspended in water from the arms of a balance. The mass of one body is 36 g and its density is 9 g cm^{-3}. If the mass of the other is 48 g, its density in g cm^{-3} is

1) 4/3 2) 3/2 3) 3 4) 5

33. A ray of light is incident on a surface of glass slab at an angle 45^0. If the lateral shift produced per unit thickness is $1/\sqrt{3}$, then the angle of reflection produced is

1) $\tan^{-1}(\sqrt{3}/2)$ 2) $\tan^{-1}(1-\sqrt{2/3})$ 3) $\sin^{-1}(1-\sqrt{2/3})$ 4) $\tan^{-1}(\sqrt{2/3-1})$

34. Monochromatic light is reflected from air into a glass of refractive index μ. The ratio of the wavelength of the incident and refracted waves is

1) 1 : 1 2) 1 : μ 3) μ : 1 4) μ^2 : 1

35. An ice stacker spins at 3 π rad s-1with her arms extended. If her moment of inertia with arms folded is 75% of that with arms extended, her angular velocity when she folds her arms is

1) π rad s^{-1} 2) 2π rad s^{-1} 3) 3π rad s^{-1} 4) 4π rad s^{-1}

36. The wheels on the old-time bicycle shown in diagram have radii of 60.0 cm and 10.0 cm. If the larger wheel is rotating at 12.0 rad s^{-1}, what is the angular speed of the smaller wheel ?

1) 12.0 rad s^{-1} 2) 60.0 rad s^{-1} 3) 72.0 rad s^{-1} 4) 2.0 rad s^{-1}

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

1) $75\cos(15t + \frac{2\pi}{3})$ 2) $2\cos(15t + \frac{5\pi}{6})$ 3) $300\cos(15t + \frac{4\pi}{3})$ 4) $300\cos(15t + \frac{\pi}{3})$

38. The input of A and B for the given Boolean expression is $(\overline{A+B})\,.\,(\overline{A.B})$ = 1

1) (0,0) 2) (0,1) 3) (1,0) 4) (1,1)

39. Liquids A and B are at 30 ^{0}C and 20 ^{0}C, respectively. When mixed in equal mass, the temperature of the mixture is found to be 26 ^{0}C, The specific heats of A and B are in the ratio of m:n , then the minimum value of m + n =?

1) 5 2) 2 3) 6 4) 7

40. The set of physical quantities among the following which is dimensionally different is

1) Terminal velocity, drift velocity, critical velocity

2) Potential energy, work done, kinetic energy

3) Disintegration constant, frequency, angular velocity

4) Dipole moment, electrical flux, electrical field

41. In Young's double –slit experiment, the spacing between the slits is 'd' and the wavelength of light used is 6000A. If the angular width of a fringe formed on a distant screen is 1^0, then calculate 'd'(nearly).

1) 1 mm 2) 0.05 mm 3) 0.03 mm 4) 0.01 mm

42. In Young's double –slit experiment, the source is white light. One slit is covered with a red filter and other with a blue filter. There shall be

1) Alternate red and blue fringes 2) Alternate dark and pink fringes

3) Alternate and yellow fringes 4) No interference

43. A wave pulse in string is described by the equation $y_1 = \dfrac{5}{(3x-4t)^2+2}$ and another wave pulse in the same string is described by $y_2 = \dfrac{-5}{(3x+4t-6)^2+2}$. The values of y_1, y_2 and x are in meters and t is in seconds. Which of the following statement is correct?

1) y1 travels along –x direction and y_2 along +x direction

2) Both y1 and y_2 travel along +x direction

3) At x = 1m, y_1 and y_2 always cancel

4) At time t = 1s, y_1 and y_2 exactly cancel everywhere

44. A simple wave motion is represented by $y = 5(\sin 4\pi t + \sqrt{3}\cos 4\pi t)$. Its amplitude is

1) 5 units 2) $5\sqrt{3}$ units 3) $10\sqrt{3}$ units 4) 10 units

45. A body of mass 3 Kg is moving under the action of a force such that its displacement is given by the relation $s = \dfrac{1}{3}t^2$, where t is time in second. The work done by the force in 2 s is

1) $\dfrac{8}{3}$ J 2) $\dfrac{19}{5}$ J 3) $\dfrac{5}{19}$ J 4) $\dfrac{3}{8}$ J

CHEMISTRY

46. In chromium chloride ($CrCl_3$), Cl^- ions have cubic close packed arrangement and Cr^{2+} ions are present in the octahedral holes. The fraction of the total number of holes occupied is

1) 1/3 2) 1/6 3) 1/9 4) 1/12

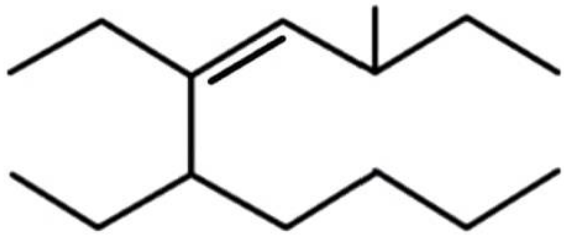
47. A solution of sucrose (Molar mass = 342) has been prepared by dissolving 68.4g of sucrose in one kg of water. K_f for water is 1.86 K kg mol^{-1}. The freezing point of the solution will be

1) -0.684^0C 2) -0.342^0C 3) -0.372^0C 4) -0.186^0C

48. The metal extracted by electrolysis of its fused salt is

1) Iron 2) Lead 3) Sodium 4) Copper

49. The IUPAC name of the given compound



1) 5, 6-Diethyl-3-methyl-4-decene 2) 7-methyl-2, 4, 6-trieneoctanal

3) 6-methylheptene 4) 3, 3-diethyl-5-ethyl-4-decene

50. The gas produced by the passage of air over hot coke is

1) Carbon monoxide 2) Carbon dioxide 3) Producer gas 4) Water gas

51. Which order is correct about acidity

1) $CH_2COOH > C_6H_5COOH > C_6H_5OH$ 2) $C_6H_5COOH > CH_3COOH > C_5H_5OH$

3) $C_6H_5OH > C_6H_5COOH > CH_3COOH$ 4) $C_6H_5OH > CH_3COOH > C_6H_5COOH$

52. The molecule which does not exhibit dipole moment is

1) NH_3 2) $CHCl_3$ 3) CCl_4 4) H_2O

53. Artificial sweetener which is stable under cold conditions only is

1) Saccharine 2) Sucralose 3) Aspartame 4) Alitame

54. When a sulphur sol is evaporated sulphur is obtained. On mixing with water sulphur sol is not formed. The sol is

1) Lyophilic 2) Reversible 3) Hydrophobic 4) Hydrophilic

55. RNA and DNA are chiral molecules, their chirality is due to

1) Chiral bases 2) Chiral phosphate ester units

3) D-sugar component 4) L-sugar component

56. A salt on treatment with dil. HCl gives a pungent smelling gas and a yellow precipitate. The salt gives green flame when tested. The salt solution gives a yellow precipitate with potassium chromate. The salt is

1) $NiSO_4$ 2) BaS_2O_3 3) PbS_2O_3 4) $CuSO_4$

57. The general formula $C_nH_{2n}O_2$ could be for open chain

1) diketones 2) Carboxylic acids 3) diols 4) dialdehydes

58. The ionic product of $Ni(OH)_2$ is 2.0×10^{-15} The molar solubility of $Ni(OH)_2$ in 0.10 M NaOH is-

1) 3.2×10^{-12} 2) 2.0×10^{-13} 3) 4.34×10^{-12} 4) 0.58×10^{-4}

59. In which of the following reactions, the product (S) given is/are not correct

1) $Cu + 8HNO_3(dil) \rightarrow Cu(NO_3)_2 + 2NO + 4H_2O$

2) $3\ Zn + 8HNO_3\ (very\ dil) \rightarrow 3Zn(NO_3)_2 + 2NO + 4H_2O$

3) $4Sn + 10HNO_3(dil) \rightarrow 4Sn(NO_3)_2 + NH_4NO_3 + H_2O$

4) $As + 3HNO_3(dil) \rightarrow H_3AsO_3 + 3NO_2$

60. At 35°C the vapour pressure of CS_2 is 512 mm Hg, and of acetone, CH_3COCH_3 , is 344 mm Hg. A solution of CS_2 and acetone in which the mole fraction of CS_2 is 0.25 has a total vapour pressure of 600 mm Hg. Which of the following statements about solution of acetone - CS_2 is true ?

1) A mixture of 100 ml of acetone and 100 ml of CS_2 has a total volume of 200 ml.

2) When acetone and CS_2 are mixed at 35°C , heat must be absorbed in order to produce a solution at 35°C .

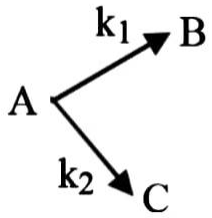
3) When acetone and CS_2 are mixed at 35°C , heat is released.

4) Raoult's law is obeyed by both CS_2 and acetone for the solution in which the mole fraction of CS_2 is 0.25.

61. For an ideal gas, number of moles per litre in terms of its pressure P, gas constant R and temperature T is

1) PT/R 2) PRT 3) P/RT 4) RT/P

62. A substance undergoes first order decomposition involving two parallel first order reaction as



$k_1 = 1.25 \times 10^{-4} s^{-1}$

$k_2 = 3.80 \times 10^{-5} s^{-1}$

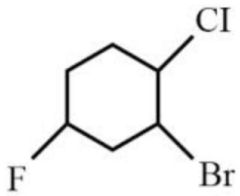
The mole percentage of B in the products is

1) 23.17 2) 77 3) 30.16 4) 69.84

63. If $\Delta G = \Delta H - T\Delta S$ and $\Delta G = \Delta H + T\left[\frac{d(\Delta G)}{dT}\right]$, the variation of EMF of a cell E, with temperature T, is given by

1) $\frac{\Delta H}{nF}$ 2) $\frac{\Delta G}{nF}$ 3) $\frac{\Delta S}{nF}$ 4) $\frac{-\Delta S}{nF}$

64. Determine that total number of stereoisomers



1) 2 2) 4 3) 8 4) 16

65. When 9.65 c of electricity is passed through a solution of silver nitrate (atomic weight of Ag = 107.87 taking as 108), the amount of silver deposited is

1) 5.8 mg 2) 10.8mg 3) 15.8mg 4) 20.8mg

66. Which of the following is not a characteristic property of chemical equilibrium

1) Rate of forward reaction is equal to rate of backward reaction at equilibrium

2) After reaching the chemical equilibrium, the concentrations of reactants and products remain unchanged with time

3) For A(g) $\rightleftharpoons$ B(g),KC is 10^{-2}. If this reaction is carried out in the presence of catalyst, the value of K_C decreases

4) After reaching the equilibrium, both forward and backward reactions continue to take place

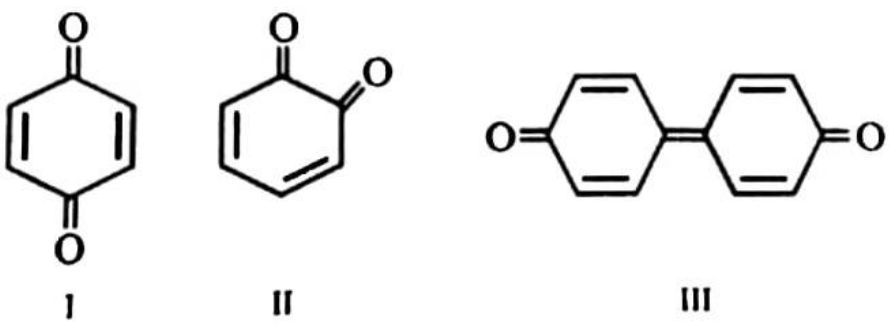
67. The probability of finding the electron in the orbit is

1) 100% 2) 90-95% 3) 70-80% 4) 50-60%

68. In the reaction $CH_3CN \xrightarrow[SnCl_2]{HCl} X \xrightarrow{Boiling\ H_2O}$. The term Y is

1) Acetone 2) Ethanamine 3) Acetaldehyde 4) Dimethyl amine

69. The correct stability order of the following three quinines is



1) I > III > II 2) I = III > II 3) I = II > III 4) III > I > II

70. Which one of the following cyano complexes would exhibit the lowest value of paramagnetic behavior

(Atomic no. Cr = 24, Mn = 25, Fe = 26, Co = 27)

1) $[CO(CN)_6]^{3-}$ 2) $[Fe(CN)_6]^{3-}$ 3) $[Mn(CN)_6]^{3-}$ 4) $[Cr(CN)_6]^{3-}$

71. Which of the following reagent used to identify fructose

1) Neutral $FeCl_3$ 2) $CHCl_3$/alcKOH 3) Ammoniacal $AgNO_3$ 4) Iodine

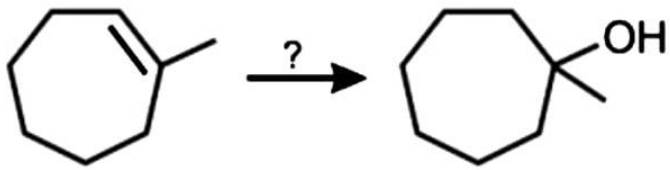
72. The heat of neutralization of NaOH with HCl is 57.3 kJ and with HCN is 12.1 kJ. The heat of ionization of HCN is

1) +69.4kJ 2) +45.2kJ 3) -45-.2kJ 4) -69.4kJ

73. Determine the oxidation number of Xe atom in Ba_2XeO_6

1) +8 2) -8 3) +5 4) -7

74. Which is the best combination of reagent for the reaction



1) $KMnO_4$, H_3O^+ 2) m-CPBA, CH_2Cl_2

3) i) 9-BBN ii) NaOH, H_2O_2 4) i) Hg(OAc)2, H_2O (ii) $NaBH_4$

75. C – Cl bond is stronger than C – I bond, because

1) C – Cl bond is more ionic than C – I 2) C – Cl bond is polar covalent bond

30 C – Cl bond is more covalent than 4) C – Cl bond length is longer than C – I

76. The molecular formula of a non-stoichiometric tin oxide containing Sn (II) and Sn(IV) ions is $Sn4_{.44}O_8$. Therefore, the molar ratio of Sn(II) to Sn (IV) is approximately

1) 1:8 2) 1:6 3) 1:4 4) 1:1

77. 99% of a first order reaction was completed in 32 min. When will 99.9% of the reaction complete

1) 24 min 2) 8 min 3) 4 min 4) 48 min

78. In an octahedral structure the pair of d-orbitals involved in $d^2 sp^3$ hybridisation is

1) $d_{x^2-y^2}, d_{z^2}$ 2) $d_{xz}, d_{x^2-y^2}$ 3) d_{z^2}, d_{xz} 4) d_{xy}, d_{yz}

79. The difference between heat of reaction and change in internal energy at constant volume for the reaction given below at 25^0C in kJ is

$2C_6H_6(I) + 15O_2(g) \rightarrow 12CO_2(g) + 6H_2O(I)$

1) -7.43 2) +3.72 3) -3.72 4) +7.43

80. The bond angle H-X-H is the greatest in the compound

1) PH_3 2) CH_4 3) NH_3 4) H_2O

81. Which of the following reaction follows S_N1 mechanism

1) $(CH_3)_3C - CH_2Cl + CH_3OK$ 2) $(CH_3)_2CHCH_2Cl + KCN$

3) $(CH_3)_3C - Cl + NaOH$ (aq.) 4) $(CH_3)_2\ CHI + H_2O$

82. HBr reacts with $CH_2 = CH - OCH_3$ under anhydrous conditions at room temperature to give

1) $BrCH_2 - CH_2 - OCH_3$ 2) $H_3C - CHBr - OCH_3$

3) CH_3CHO and CH_3Br 4) $BrCH_2CHO$ and CH_3OH

83. Which of the following oxides is not expected to react with sodium hydroxide

1) CaO 2) SiO_2 3) BeO 4) B_2O_3

84. One atomic mass is equal to

1) 1.66×10^{-27}g 2) 1.66×10^{-24}g 3) 1.66×10^{-23}g 4) 1.66×10^{-25}g

85. The formation of O_3 in upper part of atmosphere is catalyzed by

1) N_2 2) NO 3) CO 4) CO_2

86. Which is the major product formed when acetone is heated with iodine and potassium hydroxide

1) Acetophenone 2) Iodoform 3) Iodoacetone 4) Acetic acid

87. The basic character or MgO, BaO, Na_2O and FeO follow the order

1) MgO < FeO < BaO , Na_2O 2) FeO < MgO < BaO < Na_2O

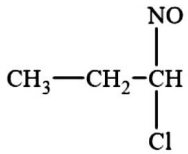
3) FeO < MgO < BaO < Na_2O 4) Na_2O < MgO < FeO < BaO

88. The compound formed in the positive test for nitrogen with the lassaigne solution of an organic compound is

1) $Fe(CN)_3$ 2) $Na_3[Fe(CN)_6]$ 3) $Fe_4[Fe(CN)_6]_3$ 4) $Na_4[Fe(CN)_5NOS]$

89. CH_3-CH=CH_2+NOCl $\rightarrow$ P; Identify the adduct.

1) $CH_3 - \underset{Cl}{CH} - \underset{NO}{CH_2}$ 2) $CH_3 - \underset{NO}{CH} - \underset{Cl}{CH_2}$

3) 

4) $\underset{Cl}{CH_2} - CH_2 - \underset{NO}{CH_2}$

90. Which one of the following has strongest metallic bonding?

1) Fe 2) Sc 3) V 4) Cr

91. The adult___ are radially symmetrical but larvae are bilaterally symmetrical.

1) Asterias 2) Balanoglossus 2) Obelia 4) Ascaris

92. Read these statements about a taxonomic key. How many are false?

a) A taxonomic key is based on the contrasting characters generally in a pair called a couplet.

b) It is generally analytical.

c) It is a taxonomic aid used for identification of plants only.

d) Only accepted statement in the key is called a lead.

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

93. Select the CORRECT statement from the following:

(P) In monocots, leaf base expands into a sheath covering the stem partially or wholly

(Q) In all leguminous plants, the leaf base may become swollen, which is called the pulvinus

(R) The lamina or leaf blade is the green expanded part of the leaf with vein and veinlets

(S) Veins provide rigidity to leaf blade

1) P and Q only 2) R and S only 3) All except Q 4) All

94. Which of these reactions is a multi step process?

1) Glucose $\rightarrow$ Glucose - 6- phosphate 2) Fumarate $\rightarrow$ Oxaloacetate

3) PEPA $\rightarrow$ PA 4) Succinyl CoA $\rightarrow$ Succinate

95. Observe the given diagram and state the correct property of the organism depicted in it

1) Fresh water green alga, oogamous, diplontic life cycle

2) Giant kelp, fucoxanthin, haplontic life cycle

3) Reserve food material is floridean starch, non motile spores and gametes, oogamous

4) Stone worts, motile gametes, monoecious

96. Stem tendrils develop from___ in plants like gourds.

1) axillary bud 2) apical bud 3) leaves 4) apical meristem

97. The correct match of the group of protozoans with the correct example.

Protozoan	**Example**
P) Amoeboid protozoan	i) Plasmodium
Q) Sporozoan	ii) Trypanosoma
R) Ciliated protozoan	iii) Paramoecium
S) Flagellated protozoan	iv) Entamoeba

1) P - iv, Q - R - S - i 2) P - Q - R - S - iv 3) P - Q - R - iv, S - i 4) P - iv, Q - i, R - iii, S - ii

98. All these statements about trophic levels and ecosystems are false except

1) Trophic level represents a functional level, not a species as such

2) A given species never occupies more than one trophic level in the same ecosystem at the same time

3) In most ecosystems, producers are less in number and biomass than the herbivores

4) Pyramid of energy can never be upright.

99. The pigment in blue-green algae is ____ which is the same as the one found in green plants. These blue- green algae are_____

1) Phycocyanin, Photoautotrophs 2) Heterocysts, Nitrogen fixers

3) All pigments except chlorophyll a, Photoautotrophs

4) Chlorophyll a, photoautotrophs

100. Which of these structures has two sets of chromosomes in flowering plants?

1) Microspore 2) Microsporangium 3) Endosperm 4) Megaspore

101. Which of these parts in the complex permanent tissue involved in transport of water is different from the rest?

1) tracheid 2) vessel 3) xylem fibers 4) xylem parenchyma

102. Which one of the following does not differ in E. coli and Chlamydomonas?

1) Ribosomes 2) Cell wall 3) Cell membrane 4) Nuclear organization

103. If an endosperm cell of an angiosperm contains 24 chromosomes, the number of chromosomes in each cell of the root will be

1) 8 2) 4 3) 16 4) 24

104. Read the following cell processes. In how many of them are mesosomes involves?

(Respiration, Secretion, DNA replication, Cell wall formation, Resistance to antibiotics, Protection)

1) Five 2) Three 3) Four 4) Six

105. A mature corn plant absorbs almost___ of water in ___

1) 5 litres, in a day 2) 1 litre, one hour 3) 5 litres in a half day 4) 3litres, a day

106. Which one of these doesn't fall in the same group as the other three?

1) Bone 2) Cartilage 3) Nerve fibers 4) Blood

107. To produce 200 zygotes, how many meiotic divisions are required in flowering spermatophytes?
2) 125 2) 250 3) 300 4) 400

108. The virologist showed that the viruses could be crystallized.
1) W. M. Stanley 2) T.O. Diener 3) M.W. Beijerinek 4) D.J. Ivanowsky

109. Which of these statements about bryophytes is true?
1) In bryophytes, zygote does not undergo reduction division immediately.
2) Leafy members having leaf-like appendages in two rows on the stem-like structures are not observed in liverworts.
3) Leafy stage of mosses develops from the primary protonema as a lateral bud.
4) The sporophyte of mosses is less elaborate than that of liverworts.

110. Following features belong to which syndrome?
I) Furrowed tongue II) Palm is broad with characteristic palm crease.
III) Physical and mental retardation IV) Short statured with small round head.
1) Down's syndrome 2) Turnpr', cvnrlrnme 3) Klinefelter's syndrome 4) Cri du chat syndrome

111. Filament, hook and basal body are the parts of
1) Flagella in prokaryotes 2) Flagella in eukaryotes
3) Fimbriae 4) Flagella in both eukaryotes and prokaryotes

112. The phenomenon of interaction between the member of two different species where one organism is being benefitted without affecting the other is
1) Amensalism 2) Commensalism 3) Mutualism 4) Predation

113. Increased vigour of a hybrid, over the parents resulting from the crossing of genetically unlike organisms is called
1) mutant 2) heterosis 3) polyploid 4) superiorios

114. The entire body of molecular biology was a consequent development with major contributions from
1) Tansley, Aristotle, Nirenberg, Khorana, Kornberg, Benzer, Monod, Brenner
2) Watson, Crick, Humboldt, Darwin, Kornberg, Benzer, Monod, Brenner
3) Watson, Crick, Nirenberg, Khorana, Kornberg, Erlich, Mendel
4) Watson, Crick, Nirenberg, Khorana, Kornberg, Benzer, Monod, Brenner

115. 60% of the angiosperms shed their pollens at the
1) 2 celled stage 2) 3 celled stage 3) 4 celled stage 4) 1 celled stage

116. Catalytic activity is ____ when ___is removed from the enzyme which testifies that they play crucial role in the catalytic activity of the enzyme.
1) Lost, Co-factor 2) Intensified, Co-factor
3) Lost, Inhibitor 4) both (a) and (c)

117. Which is a wrong pair about C_4 plants?

1) Mesophyll – Homogenous
2) Chloroplasts - Dimorphism
3) PEP carboxylase - Present in bundle sheath chloroplast
4) RUBISCO - Present in abundance in chloroplasts of bundle sheath cell

118. Cold treatment to biennial plants will stimulate what kind of response?

1) Photolysis
2) Phototropism
3) Photoperidic response
4) vernalization

119. Nitrobacter

1) Oxidise nitrite
2) Oxidese nitrate
3) Reduce nitrite
4) Reduce nitrate

120. The flower in the given diagram depicts the flower of

1) Guava
2) Cucumber
3) Ray florets of sunflower
4) All of these

121. In a mouse, duplication of centrioles in cytoplasm is completed in

1) S-Phase
2) G_2 Phase
3) G_1 Phase
4) both (B) and (C)

122. How many molecules of ATP will be generated in Krebs cycle, if a molecule of sucrose is completely oxidised and used as substrate?

1) 24
2) 48
3) 2
4) 30

123. Which of these is not an example of alien species invasion?

1) Nile perch introduced in Lake Victoria
2) African catfish in Indian River
3) Water hyacinth in India
4) Soyabean cultivation in Amazon forest

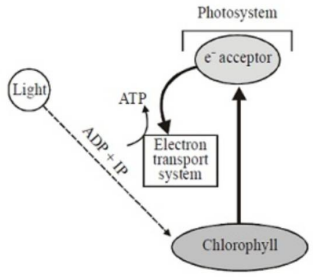
124. Sulphur is present in

1) Cysteine and Methionine
2) Ferredoxin and Coenzyme A
3) All amino acids
4) Both (A) and (B)

125. In the fully developed angiospermic female gametophyte, what is the ratio of haploid, diploid and triploid cells?

1) 5 : 1 : 1 2) 3 : 1 : 3 3) 6 : 1 :0 4) 6 : 0 : 1

126.



Which of the following is not applicable to the given figure ?

1) This process occurs when light of wavelengths beyond 680 nm are available for excitation.

2) This process results only in the synthesis of ATP not of NADPH $^{+}H^{+}$

3) This process requires two molecules of H_2O to release one O_2

4) This process occurs in the thylakoid which lack NADP reductase enzyme

127. All these pairs of plants and their structures are correctly matched, except

1) Rhizophora - Pneumaotphores 2) Ficus benghalensis - Stilt roots

3) Bryophyllum - Leaf buds 4) Pumpkin -Tendrils

128. Match the processes occurs during cell cycle with the names of the events

(P) Synapsis aligns homologous chromosomes	i) Anaphase-II
(Q) Synthesis of RNA and protein	ii) Zygotene
(R) Action of enzyme recombinase	iii)G-phase
(S) Centromeres do not separate but chromatids move towards opposite poles	iv) Anaphase-I
	v) Pachytene

1) (P) - (I), (Q) - (ii), (R) - (v), (S) - (iv) 2) (P) - (ii), (Q) - (iii), (R) - (iv), (S) - (v)

3) (P) - (ii), (Q) - (i), (R) - (iii), (S) - (iv) 4) (P) - (ii), (Q) - (iii), (R) - (v), (S) - (iv)

129. GGG, GGA, GGC and GGU code for

1) Glycine 2) Lysine 3) Leucine 4) Isoleucine

130. A cross between a pure pea plant with yellow pod and round seeds with a pure pea plant with green pods

and round seeds yields _____ green round plants in

1) 50% 2) 25% 3) 0% 4) 100%

131. Which of the following waves of ECG are correctly paired with their events?

1) P wave - depolarisation of atria 2) QRS complex - Repolarisation of ventricles

3) T wave- start of systole 4) T wave - end of diastole

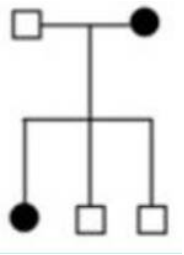
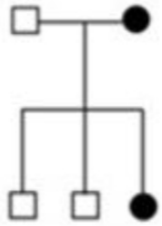
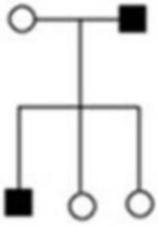
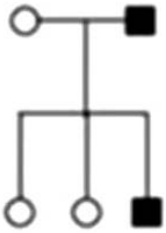
132. Which of these terms have been paired correctly?

1) Bark – Periderm 2) Cork – Phellem

3) Cork cambium – Phelloderm 4) Secondary cortex - Phellogen

133. A couple has three children: a 14-year-old daughter and two sons that are 12 and 10 years old. If the mother and daughter are both known to have a genetic disorder, what would the pedigree of this family

look like?

1)  2)  3)  4) 

134. Exponential growth can be expressed as

1) $W_1 = W_0 e^{rt}$ 2) $W_0 = W_1 e^{rt}$ 3) $W_1 = W_0 e^{\Delta rt}$ 4) $W_0 = W_1 e^{\Delta rt}$

135. In recombinant DNA technology before the use of restriction endonuclease, first we have to isolate and precipitate the genetic material (DNA). For this purpose we use following different enzyme/chemical

1) Ethidium bromide 2) RNA polymerase 3) T_4 ligase 4) Chiilled Ethanol

136. Each of the following options has a pair of equal number of bones. Which one doesn't?

1) Number of bones in the right upper limb and number of bones in the left lower limb

2) Number of bones in the cranium and number of bones in the right wrist

3) Number of true ribs and number of bone in the fingers of the left hand

4) Number of cervical vertebrae in the body and number of ankle bones in the body

137. Which of the following techniques is used to check the progression of restriction enzyme digestion?

1) Insertional inactivation 2) Transformation

3) Gel electrophoresis 4) Polymerase chain reaction

138. In the following flowchart about protein digestion, P, Q, R and S are enzymes.

The correct information of enzymes P, Q, R and S is

1) P: Produced by intestine as a proenzyme stage and is activated at alkaline pH

Q: Produced by pancreas as acts a proenzyme and is activated by an intestinal enzyme

R: Produced by stomach as a proenzyme stage and is activated at acidic pH

S: Produced by pancreas in an active state

2) P: Produced by stomach as a proenzyme stage and is activated at acidic pH

Q: Produced by pancreas as acts a proenzyme and is activated by an intestinal enzyme

R: Produced by pancreas in an active state

S: Produced by intestine in an active state

3) P: Produced by stomach as a proenzyme and is activated at acidic pH

Q: Produced by pancreas as a proenzyme and is activated by an intestinal enzyme

R: Produced by intestine in an active state

S: Produced by intestine in an active state

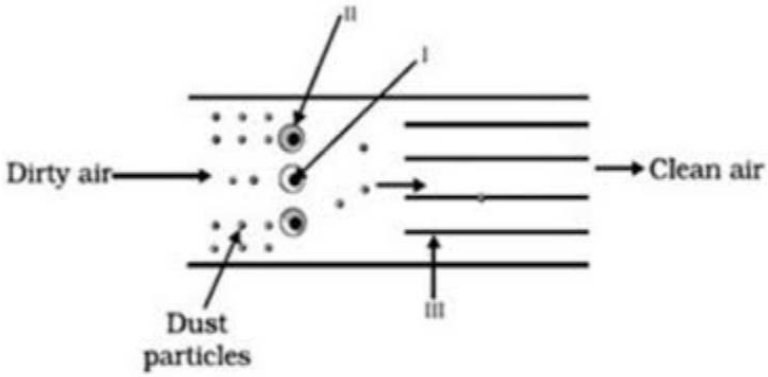
4) P: Produced by stomach as a proenzyme stage and is activated at acidic pH

Q: Produced by pancreas as a proenzyme and is activated by an intestinal enzyme

R: Produced by intestine as a proenzyme

S: Produced by intestine in an active state

139. Study the diagram given below and mark the INCORRECT statement related to this.



1) It helps in removal of up to 90% particulate matter from exhaust of thermal power plant.

2) It is negatively charged wire maintained at several thousand volts.

3) It releases electrons.

4) It is place where dust particles get collected.

140. The correct arrangement of these biomolecules in increasing order of their molecular weight is

1) ATP, ADP, AMP, DNA 2) ADP, ATP, AMP, DNA

3) AMP, ADP, ATP, DNA 4) DNA, ATP, ADP AMP

141. Depolarization of axolemma during nerve conduction takes place because of

1) an equal amount of Na^+ and K^+ move out across axolemma

2) Na^+ moves inside Correct Answer

3) there is more Na^+ outside than inside

4) K^+ moves inside

142. Many diseases can be diagnosed by observing the symptoms in the patient. Which group of symptoms are indicative of pneumonia

1) Difficulty in respiration, fever, chills, cough, headache

2) Constipation, abdominal pain, cramps, blood clots

3) Nasal congestion and discharge, cough, sore throat, headache

4) High fever, weakness, stomach pain, loss of appetite and constipation

143. Aplysia shows all of these properties, except

1) Organ system level of organization 2) Segmentation

3) Bilateral symmetry 4) Triploblastic coelomate

144. All statements about aqueous humor are false, except

1) It is located between cornea and the lens, and it is a thin watery fluid

2) It is located between lens and retina and it is similar to CSF.

3) It is located between cornea and lens, and it is thick and viscous.

4) It is located between lens and retina and it is thin watery fluid.

145. The common ancestor for cycads and angiosperms is

1) Seed ferns 2) Progymnosperms 3) Zosterophyllum 4) Bryophytes

146. The number of parents involved in Apomixis and Amphimixis, respectively, are

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

147. The medical termination of pregnancy is legal up to ____ of pregnancy. go 12 weeks 4 weeks

1) 24 weeks 2) 4 weeks 3) 20 weeks 4) 24 weeks

148. In the following the duration of intra-uterine life is matched with the events completed. Which of these is matched correctly?

i. End of the first month: Embryo heart is formed

ii. End of the second month: Foetus develops limbs and digits

iii. End of the fifth month: Hair on head

iv. End of the sixth month: Eyelashes are formed

1) i, ii and iii 2) ii and iv 3) i and iii 4) i, ii, iii and iv

149. What is the genotype of II (3)?

1) AA 2) as 3) aA 4) Aa

150. All the following factors are favourable for the formation of oxyhaemoglobin, except

1) Low CO_2 2) Low H^+ concentration

3) Low O_2 tension 4) Low temperature

151. Which of the following is correct about Hardy Weinberg's principle?

1) p^2 is the number of pure homozygous dominant individuals in the population, q^2 is the number of pure homozygous recessive individuals in the population and 2pq is the number of heterozygous individuals in the population.

2) p^2 is the number of pure homozygous recessive individuals in the population, q^2 is the number of pure homozygous dominant individuals in the population and 2pq is the number of heterozygous individuals in the population.

3) p^2 is the proportion of pure homozygous dominant individuals in the population, q2 is the proportion of pure homozygous recessive individuals in the population and 2pq is the proportion of heterozygous individuals in the population.

4) p^2 is the proportion of pure homozygous recessive individuals in the population, q^2 is the proportion of pure homozygous dominant individuals in the population and 2pq is the proportion of heterozygous individuals in the population.

152. Infertility in male is the inability to achieve an erection of penis to inseminate the female or having very low sperm count. Which of the following is the best method for correcting this infertility?

1) GIFT 2) IVF 3) Artificial insemination 4) ZIFT

153. The procedure through which a piece of DNA is introduced in a host bacterium is

1) gene cloning. 2) creation of recombinant DNA.

3) transformation 4) transfection.

154. All the following statements about inclusion bodies are true except

1) inclusion bodies are not bound by any membrane system.

2) they lie free in the cytoplasm.

3) reserve material in prokaryotic and eukaryotic cells is stored in the form of inclusion bodies.

4) gas vacuoles and phosphate granules are examples of inclusion bodies.

155. Which of the following structure of the female reproductive system can be taken as homologous to the scrotal sac of the male?

1) Mons pubis 2) Labia majora 3) Bulbourethral gland 4) Forchette

156. Test cross involves

1) crossing between two genotypes with dominant trait.
2) crossing between two genotypes with recessive trait.
3) crossing between two F1 hybrids.
4) crossing the F1 hybrid with a double recessive genotype.

157. When a person breathes out normally, then the amount of air which remains in the lung after a normal expiration is

1) expiratory reserve volume 2) expiratory capacity.
3) functional residual capacity (FRC). 4) residual volume.

158. Methylophilus methylotrophus bacterium as SCP produces more

1) proteins 2) fats 3) carbohydrates 4) lipids.

159. Which of these hormones decrease the amount of sodium lost by the body through urine?

1) ANF 2) Aldosterone 3) Parathormone 4) Vasopressin

160. A gene encoding for a polypeptide of 60 amino acids get mutated at 30th codon UAU becoming UAA. The result would be

1) A polypeptide of 29 amino acids

2) Two polypeptides one with 29 amino acids and second with 31 amino acids.

3) A polypeptide with 59 amino acids

4) A polypeptide of 25 amino acids.

161. Read the following statements about the human female reproductive system and identify the incorrect statement.

1) The wall of the uterus has three layers of tissue. The external thin membranous perimetrium, middle thick layer of smooth muscle, myometrium and inner glandular layer called endometrium that lines the uterine cavity.

2) The clitoris is a tiny finger-like structure which lies at the upper junction of the two labia majora above the urethral opening.

3) Each fallopian tube is about 10-12 cm long and extends from the periphery of each ovary to the uterus the part closer to the ovary is the funnel-shaped infundibulum.

4) The cavity of the cervix is called cervical canal which along with vagina forms the birth canal.

162. Read the following given examples:

i) Plant-pollinator mutualism.

ii) Lichen.

iii) African catfish during aquaculture.

iv) Nile perch and Cichlid fish.

Which out of these options CORRECTLY gives the example of 'co-extinction' as a cause of biodiversity loss?

1) (i), (ii) 2) (ii), (iii) 3) (iii), (iv) 4) (i), (iii)

163. Diseases are broadly grouped into infectious and non-infectious types. In the list given below, identify infectious diseases.

(i) Cancer (ii) Influenza (iii) Allergy (iv) Small pox

1) i and ii 2) ii and iii 3) iii and iv 4) ii and iv

164. Increase in GFR can be due to:

1) Increase in blood colloidal osmotic pressure 2) Increase in capsular hydrostatic pressure

3) Increase in capillary blood pressure 4) More than one option is correct

165. Rate of biomass production is expressed as:

1) (kcal m^{-2}) yr^{-1} 2) kcal g m^2 yr^{-1} 3) g m^3 yr 4) g m^{-2} yr

166. BOD of waste water is estimated by measuring the amount of:

1) Total organic matter 2) Biodegradable organic matter

3) Oxygen evolution 4) Oxygen consumption

167. Polydipsia, hyperglycemia and polyuria occur due to

1) Undersecretion of insulin 2) Undersecretion of thyroxine

3) Undersecretion of oestrogen 4) Hypersecretion of glucagon

168. Majority of transgenic animals are

1) Mice 2) Rabbit 3) Pigs 3) Cows

169. Which one of the following alcoholic drink has the least proportion of ethyl alcohol in it?

1) Wine 2) Whisky 3) Rum 4) Brandy

170. The sequence of nucleotides AUGCUUCUC indicates that it is a segment of

1) Sense strand of DNA 2) Antisense strand of DNA

3) RNA 4) Polypeptide chain

171. Which of these vaccines is not given against viral diseases?

1) DPT- Diphtheria, Pertussis and Tetanus vaccine

2) MMR- Mumps, Measles and Rubella vaccine

3) Oral Polio vaccine 4) Hepatitis B vaccine

172. The site for the production of an enzyme, the deficiency of which causes SCID, in the body is

1) bone marrow. 2) lymphocyte 3) blood plasma 4) monocytes.

173. What is meant by contact inhibition?

1) Contact with other cells promote their uncontrolled growth.

2) Contact with other cells doesn't inhibits their uncontrolled growth.

3) Contact with other cells inhibits their programmed cell death.

4) Contact with other cells inhibits their uncontrolled growth.

174. If we completely remove the decomposers from an ecosystem, the ecosystem functioning will be adversely affected because:

1) Mineral movement will be blocked

2) Herbivores will not receive solar energy

3) Energy flow will be blocked

4) Rate of deposition of other component will be very high.

175. Find the INCORRECT pairing.

1) SAN - Natural pacemaker 2) Heart rate - Pulse rate

3) Cardiac output – Heart rate x Stroke volume

4) Heart failure - Heart attack

176. Which is the most effective way to conserve the plant diversity of an area?

1) By tissue culture method 2) By creating biosphere reserve

3) By creating botanical garden 4) By developing seed bank

177. The regulatory protein of skeletal muscles whose filaments run close to the F-actin throughout its length is

1) Troponin T 2) Troponin C 3) Troponin I 4) Tropomyosin

178. Genetic drift operates in

1) Large isolated population 2)Small isolated population

3) Fast reproductive population 4) Slow reproductive population

179. Acromegaly is due to hypersecretion of a hormone secreted from:

1) Neurohypophysis 2) Adenohypophysis 3) Cells of Leydig 4) Pars intermedia

180. A logistic growth curve depicting a population that is limited by a definite carrying capacity is shaped like the letter

1) J 2) L 3) M 4) S

NTA ABHYAS NEET MOCK TEST–68

Answers and Explanations

PHYSICS

1) **2**	2) **3**	3) **4**	4) **4**	5) **2**	6) **4**	7) **4**	8) **2**	9) **3**	10) **4**
11) **3**	12) **3**	13) **2**	14) **4**	15) **4**	16) **2**	17) **3**	18) **1**	19) **1**	20) **4**
21) **2**	22) **3**	23) **1**	24) **2**	25) **2**	26) **1**	27) **1**	28) **2**	29) **4**	30) **3**
31) **2**	32) **3**	33) **2**	34) **3**	35) **4**	36) **3**	37) **3**	38) **1**	39) **1**	40) **4**
41) **3**	42) **4**	43) **3**	44) **4**	45) **1**					

CHEMISTRY

46) **3**	47) **3**	48) **3**	49) **1**	50) **3**	51) **2**	52) **3**	53) **3**	54) **3**	55) **3**
56) **2**	57) **2**	58) **2**	59) **2**	60) **2**	61) **3**	62) **2**	63) **3**	64) **3**	65) **2**
66) **3**	67) **2**	68) **3**	69) **4**	70) **1**	71) **3**	72) **2**	73) **1**	74) **4**	75) **1**
76) **3**	77) **4**	78) **1**	79) **1**	80) **2**	81) **3**	82) **2**	83) **1**	84) **2**	85) **2**
86) **2**	87) **3**	88) **3**	89) **1**	90) **4**					

BIOLOGY

91) **1**	92) **4**	93) **4**	94) **2**	95) **3**	96) **1**	97) **4**	98) **1**	99) **3**	100) **2**
101) **4**	102) **3**	103) **3**	104) **3**	105) **4**	106) **3**	107) **2**	108) **1**	109) **1**	110) **1**
111) **1**	112) **2**	113) **2**	114) **4**	115) **1**	116) **1**	117) **3**	118) **4**	119) **1**	120) **4**
121) **1**	122) **2**	123) **4**	124) **4**	125) **3**	126) **3**	127) **2**	128) **4**	129) **1**	130) **4**
131) **1**	132) **2**	133) **1**	134) **1**	135) **4**	136) **4**	137) **3**	138) **3**	139) **1**	140) **3**
141) **2**	142) **1**	143) **2**	144) **1**	145) **1**	146) **2**	147) **3**	148) **4**	149) **4**	150) **3**
151) **3**	152) **3**	153) **3**	154) **3**	155) **2**	156) **4**	157) **3**	158) **1**	159) **2**	160) **1**
161) **2**	162) **1**	163) **4**	164) **3**	165) **1**	166) **4**	167) **1**	168) **1**	169) **1**	170) **3**
171) **1**	172) **2**	173) **4**	174) **1**	175) **4**	176) **2**	177) **4**	178) **2**	179) **2**	180) **4**

PHYSICS

1. The energy takes by hydrogen atom corresponds to its transition from n = 1 to n = 3 state.

ΔE (given to hydrogen atom)

$= 13.6\left(1-\frac{1}{9}\right)$

$= 136.6\frac{8}{9} = 12.1\,\text{eV}$

2. For motion of the electron around the nucleus

$$\frac{m\upsilon^2}{r} = \frac{1}{4\pi\varepsilon_0}.\frac{e.e}{r^2}$$

$$\Rightarrow \upsilon^2 = \frac{1}{4\pi\varepsilon_0}.\frac{e^2}{mr}$$

$$\rightarrow \upsilon^2 = \frac{9\times10^9\times\left(1.6\times10^{-19}\right)^2}{9.1\times10^{-31}\times0.5\times10^{-10}} = 5\times10^{12}$$

$$\Rightarrow \approx 2.25\times10^6\, ms^{-1}$$

3. The x coordinate of centre of mass is

$$x_{com} = \frac{\sum M_i x_i}{\sum M_i}$$

$$= \frac{M\times0 + M\times1 + M\times2}{M+M+M} = 1$$

$$y_{com} = \frac{\sum m_i x_i}{\sum m_i}$$

$$= \frac{M\times0 + M\times\left(2\sin60\right) + M\times0}{M+M+M}$$

$$y_{com} = \frac{\sqrt{3}M}{3M} = \frac{1}{\sqrt{3}}$$

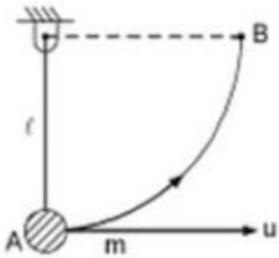
4. As collision is elastic, so after collision ball moves towards left with speed v. As walls and ground are smooth,

there is no tangential torque on the balls. Only normal forces and mg force pass through the centre of the ball.

So, their torques about its centre are zero. By T = $I\alpha$, angular acceleration is zero, hence angular velocity does

not change.

5.



Kinetic energy at A = $1/2mu^2$

Potential energy at B = mgh

For conservation of energy

$1/2mu^2 = mgl$

$u = \sqrt{2gl}$

6. $\omega_0 = 0, \omega = 24 \text{ rad s}^{-1}$, t = 8s

$\therefore \alpha = \dfrac{\omega - \omega_0}{t} = \dfrac{24}{8} = 3 \text{ rad s}^{-2}$

$\theta = \omega_0 t + \dfrac{1}{2}\alpha t^2$

$= 0 + \dfrac{1}{2} \times 3 \times (8)^2$

$= \dfrac{3 \times 64}{2} = 96 rad$

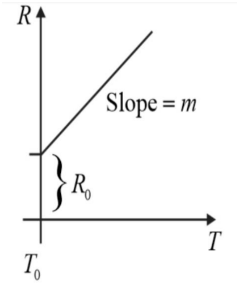
7. $R_t = R_0(1 + \alpha \Delta t)$

Where α is temperature coefficient of conductor

$= R_0 + R_0 \alpha \Delta T$

Slope of graph m = $R_0 \alpha$

$\therefore \alpha = \dfrac{m}{R_0}$



8. In the given circuit, resistors 4R and 2R and connected in parallel-while resistance R is connected in series to it. Hence, equivalent resistance is, of parallel combination

$\dfrac{1}{R'} = \dfrac{1}{4R} + \dfrac{1}{2R}$

$\Rightarrow R' = \dfrac{8}{6}R = \dfrac{4}{3}R$

$\Rightarrow R' = R + \dfrac{4}{3}R = \dfrac{7R}{3}$ (series combination)

Given, emf is E volts, therforeusing ohm's law

$i = \dfrac{E}{R} = \dfrac{3E}{7R}$

Potential difference across R is

$V = ir = \dfrac{3E}{7R} \times R = \dfrac{3E}{7}$

Potential difference across 2R is

$V' = E - \dfrac{3E}{7} = \dfrac{4E}{7}$

9. Magnetic induction inside the solenoid

$B = \dfrac{\mu_0 NI}{L}$

Magnetic flux $\phi = BA = \dfrac{\mu_0 NLA}{L}$

Magnetic moment = NIA $-\frac{\phi L}{\mu_0}$

$=\frac{1.57\times10^{-6}\times0.6}{4\times3.14\times10^{-7}}$

= 0.75Am^2

10. Average powe, $P = E_{rms}/_{rms}\cos\phi$

$Z=\sqrt{R^2+\left(X_L-X_C\right)^2}\cos\phi=\frac{R}{Z}$

But $I_{rms}=\frac{E_{rms}}{Z}\therefore P=E_{rms}^2.\frac{R}{Z^2}$

$\therefore P=E_{rms}^2\frac{R}{\left[R^2+\left(X_L-X_C\right)^2\right]}$

$=\frac{\varepsilon^2R}{R^2+\left[\left(L\omega-\frac{1}{C\omega}\right)^2\right]}$

11. Let two charge are q_1 and q_2 and r is the distance between them, then electrical force

$F=\frac{1}{4\pi\varepsilon_0}.\frac{q_1q_2}{r^2}=200N.....(i)$

Ifq$_1$ increased by 10%, then $q_1=\frac{110}{100}q_1$ and q^2 is decreased by 10% then $q_2=\frac{90}{100}q_2$

Then, the electric force between them $F'=\frac{1}{4\pi\varepsilon_0}\times\frac{q_1'q_2'}{r^2}$

$F'=\frac{\frac{1}{4\pi\varepsilon_0}\times\frac{110}{100}q_1\times\frac{90}{100}q_2}{r^2}.....(ii)$

From equation (i) and (ii) we get

$F'=200\times\frac{90}{100}\Rightarrow F'=198N$

12. $E_P=\frac{kq}{r^2}$

$E_Q=\frac{kq}{\left(2r\right)^2}+\frac{k3q}{\left(2r\right)^2}=\frac{4kq}{4r^2}$

Because the charges are positive on both the spheres so electric field at point Q is in the same direction, so they added algebraically

E_P: E_Q = 1:1

13. As $\frac{GMm}{r^2}=\frac{mv^2}{r}=$centripetal force $\Rightarrow\upsilon^2=\frac{GM}{r}\Rightarrow T=\frac{2\pi r}{\upsilon}$

Out putting the value of υ^2, we get

$T^2=\frac{4\pi^2r^2}{\left(\frac{GM}{r}\right)}\Rightarrow T^2=\frac{4\pi^2r^3}{GM}$

$\Rightarrow T^2=Kr^3$

Here, K is given by

$$\frac{4\pi^2}{GM} = K \Rightarrow GMK = 4\pi^2$$

14. We known that, weight (w) = mg

So, $\omega \propto g$

According to question

$$\frac{\omega_2}{\omega_1} = \frac{g}{\frac{4}{g}}$$

$$\frac{\omega_2}{\omega_1} = \frac{1}{4}$$

15. According stefan's law, emission rate of a ideal blackbody

$E \propto T^4$

For $T = 0^0 C = 273K$

$E_1 \propto (273)^4 .....(i)$

For T = 273^0C = 273 + 273 = 546 K

$E_2 \propto (543)^4 .....(ii)$

From equations (i) and (ii)

$$\Rightarrow \frac{E_1}{E_2} = \left(\frac{273}{546}\right)^4 \Rightarrow \frac{R}{E_2}$$

$$= \left(\frac{1}{2}\right)^4 (\therefore E_1 = R)$$

Hence, E_2 = 16R

16. $\because \frac{pV}{T}$ = constant (for a given mass of an ideal gass)

AB: isochoric process, V = constant

$T \uparrow and \ p \uparrow$

BC: isobaric process

P = constant

$T \downarrow hence \ V \downarrow$

CA: Isothermal process

P is decreasing hence, V is increasing, it means that P-V diagram will be rectangular hyperbola

17. As $\Delta Q = Q_1 + Q_2 + Q_3 + Q_4$

= 5960 – 5585 – 2980 3645 = 1040J

Also, $\Delta W = W_1 + W_2 + W_3 + W_4 = 2200 - 825 - 1100 + W_4$ =275 + W_4

For a cyclic process $\Delta U = 0$

i.e $U_f - U_i = 0$

From first law of thermodynamics

$\Delta Q = \Delta U + \Delta W$

1040 = 0+275 + W_4

Or W_4 = 765J

18. When charge enters into perpendicular magnetic field it moves circular path of radius

$$r = \frac{mv}{qB} = \frac{p}{qB}$$

19. V = I (G + R)

$100 = (R + 50) \times 10 \times 10^{-3}$

R + 50 = 1000

$\Rightarrow$ R = 9950 Ω

20. Beyond curie temperature ferromagnetic substance behaves like a paramagnetic substance

21. Given

$x = 2t^2 + 6t + 25$ and y = t^2 + 2t + 1

$\therefore \frac{dr}{dt} = 4t + 6$ and $\frac{dy}{dt} = 2t + 2$

At t = 10s

$\frac{dx}{dt} = 4(10) + 6 = 46$ and $\frac{dy}{dt} = 2(10) + 2 = 22$

$$\upsilon = \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}$$

$$= \sqrt{(46)^2 + (22)^2} \simeq 51 \text{ units}$$

22. All the balls are projected from the same height, and velocity is independent of θ therefore their velocities will be equal

Hence, $v_1 = v_2 = v_3$

23. Let υ be the speed of the boat with respect to the water, then from conservation of linear momentum

-(200 + 50) υ +50 $\times$ 2 = 50 $\times$ 0 + 200 $\times$ 0

250 υ = - 100

$$\upsilon = -\frac{100}{250} = -\frac{2}{5} \text{ ms}^{-1}$$

24. Slope $= \frac{dy}{dx} = \tan(\pi - \theta)$

$$= \frac{dy}{dx} = -\tan\theta$$

Ma $\cos\theta = mg\sin\theta$

a = g $\tan\theta$

$$\Rightarrow a = g\left(-\frac{dy}{dx}\right) \Rightarrow a = -g.2kx$$

$$x = \frac{a}{2gk}$$

25. In order of compare the stability of the nuclei of different atoms we determine the binding energy per nucleon. Higher the binding energy per nucleon, more stable is the nucleus. A graph between energy per nucleon and the mass number of nuclei is called the binding energy curve. It gives the following information that of two or more very light nuclei (nucleus of heavy hydrogen $_1H^2$ fuse into a relatively heavier nucleus ($_2He^4$), then binding energy will increase showing that helium is stable

26. Nuclear force has the following properties

i) Nuclear force is a short range force whose range is of the order of 2 to 3 femtometre

ii) The nuclear force is the strongest force in the nature

iii) Nuclear force is an attractive force acting between nucleons, which is charge independent

Therefore, nuclear force is strong, short range and change independent force

27. Potential energy as a function of displacement

$$PE = \frac{1}{2}ky^2$$

$\Rightarrow$ PE vs y graph will be an upwards parabola

$\Rightarrow$ graph IIII

Potential energy as a function of time

$$PE = \frac{1}{2}ky^2 = \frac{1}{2}\left(A\cos^2\omega t\right)^2$$

$\Rightarrow PE = \frac{1}{2}kA^2\cos^2\omega t$

$= \frac{1}{2}kA^2\frac{(1+\cos 2\omega t)}{2}$

$\Rightarrow$ PE vs time is a cosine wave with angular frequency $2\omega \Rightarrow$ graph I.

28. Comparing with $T = 2\pi\sqrt{\frac{L}{g_{eff}}}$

$\Rightarrow g_{eff} = \sqrt{g^2 + a^2}$

$\Rightarrow T' = 2\pi\sqrt{\frac{1}{g^2 + a^2}}$

Clearly, T' < T

29. Momentum is a vector quantity. Its value depends upon magnitude as well as direction. Hence, none of the above is correct

30. $E = \frac{1}{2}mu^2$ and $mu = \sqrt{2mE}$

So $\lambda = \frac{h}{mv} = \frac{h}{\sqrt{2mE}}$

31. $A_1 = \pi r_1^2$

$A_2 = \pi r_2^2$

$\frac{\pi r_1^2}{9} = \pi r_2^2$

$\frac{r_1^2}{r_2^2} = 9 \Rightarrow \frac{r_1}{r_2} = 3$

rh = constant

$r_1h_1 = r_2h_2$

$\frac{r_1}{r_2} = \frac{h_2}{h_1}$

$3 = \frac{h_2}{h_1} = \frac{h_2}{h_1}$

$h_2 = 3h_1 = 3h$

32. Apparent weight

$= V(\rho - \sigma) = \frac{m}{\rho}(\rho - \sigma)g$

Where m = mass of the body, ρ = density of the body and σ = density of water if two bodies are in equilibrium then their apparent weight must be equal

$\therefore \frac{m_1}{\rho_1}(\rho_1 - \sigma)g = \frac{m_2}{\rho_2}(\rho_2 - \sigma)g$

$\Rightarrow \frac{36}{9}(9-1) = \frac{8}{\rho_2}(\rho_2 - 1)g$

By solving we get $\rho_2 = 3$

33. Lateral shift,

$Y = \frac{t\sin(i-r)}{\cos r}$

$$\frac{Y}{t}=\frac{\sin(i-r)}{\cos r}$$

$$=\frac{\sin i\cos r-\cos i\sin r}{\cos r}$$

$$=\sin i-\cos i\tan r$$

$$\Rightarrow\frac{1}{\sqrt{3}}$$

$$45^0-\cos 45^0 r=\frac{1}{\sqrt{2}}(1-\tan r)$$

$$\Rightarrow\sqrt{\frac{2}{3}}=1-\tan r$$

$$\Rightarrow\tan r=1-\sqrt{\frac{2}{3}}$$

$$\therefore r=\tan^{-1}\left(1-\sqrt{\frac{2}{3}}\right)$$

34. Since the frequency μ of the light does not change as light travels from air into glass
We have,
$\upsilon_a=\mu\lambda_a$ and $\upsilon_g=\mu\lambda_g$
Therefore $\frac{\lambda_a}{\lambda_g}=\frac{\upsilon_a}{\upsilon_g}=\mu$

35. Here $\omega_1=3\pi$ rad s^{-1}, $I_1 = 1$
$I_2 = 75/100 = \frac{3}{4}I, \omega_2=?$
As $I_2\omega_2=I_1\omega_1$
$\therefore\omega_2=\frac{I_1}{I_2}\times\omega_1=\frac{4}{3}\times3\pi=4\pi$ rad s^{-1}

36. The linear velocity of both wheels will be the same
$60\times12 = 10\times\omega$
ω =72 rad s^{-1}

37. CE amplifier causes phase difference of $\pi\left(=180^0\right)$ so V_{out}
$$=300\cos\left(15t+\frac{\pi}{3}+\pi\right)$$

38. Given expression is
$\left(\overline{A+B}\right).\left(\overline{A.B}\right)$
Substitute A = 0 and B = 0 in above expression
$=\left(\overline{0+0}\right).\left(\overline{0.0}\right)$
$\overline{0}.\overline{0}=1.1=1$
Hence, (0, 0) is the input of the given bootean expression

39. At thermal equilibrium heat rejected by one liquid = heat accepted by other liquid
$ms_A(30-26)=ms_B(26-20)$
$\Rightarrow 4S_A = 6S_B$
$\therefore\frac{s_A}{s_B}=\frac{6}{4}=\frac{3}{2}$

$= \frac{m}{n} \Rightarrow m + n = 3 + 2 = 5$

40. Dipole moment [P] = q. d = [ITL]

Electric flux

$[\phi] = E.ds = \left[ML^3 I^{-1} T^{-3}\right]$

Electric, field $[E] = \frac{kq}{r^2} = \left[MLT^{-1}T^{-3}\right]$

41. Angular fringe width $\theta_0 = \frac{\beta}{D}$

$\theta_0 = \frac{\beta}{D} = \frac{D\lambda}{d} \times \frac{1}{D} = \frac{\lambda}{d}$

$\theta_0 = 1^0 = \frac{\pi}{180}$ rad and

$\lambda = 6 \times 10^{-7} m$

$d = \frac{\lambda}{\theta_0} = \frac{180}{\pi} \times 6 \times 10^{-7}$

$= 3.44 \times 10^{-5} m = 0.03 mm$

42. Red and blue filters produce inoherence resulting into no interference

43. ∵ Given

$y_1 = \frac{5}{(3x - 4t)^2 + 2}, y_2 = \frac{-5}{(3x + 4t - 6)^2 + 2}$

According option (d), at x = 1

$y_1 = \frac{5}{(3 - 4t)^2 + 2}$

$y_2 = \frac{-5}{(3 + 4t - 6)^2 + 2} = \frac{-5}{(3 - 4t)^2 + 2}$

Both wave pulse equation are existing in same string therefore resultant equation of wave pulse.

44. $y = 5\left(\sin 4\pi t + \sqrt{3}\cos 4\pi t\right)$

$y = 5\left(\sin 4\pi t + 5\sqrt{3}\cos 4\pi t\right)$

$A = \sqrt{A_1^2 + A_2^2}$

$A = \sqrt{(5)^2 + \left(5\sqrt{3}\right)^2}$

$= \sqrt{25 + 75} = \sqrt{100}$

A = 10

45. $s = \frac{1}{3}t^2$

$\upsilon = \frac{ds}{dt} = \frac{2}{3}t, a = \frac{d^2 s}{dt^2} = \frac{2}{3}$

$F = ma = 3 \times \frac{2}{3} = 2N$

W = $2 \times \frac{1}{3}t^2$

At t = 2s ; $W = 2 \times \frac{1}{3} \times 2 \times = \frac{8}{3}$ J

46. In $CrCl_3$ for every, $3Cl^-$ ions, there is one Cr^{3+} ion is present
Thus, if there are $3Cl^-$ ions are present in CCP
Number of octahedral voids = 3, and tetrahedral voids = 6
Total voids = 3 + 6 =9
As 1 Cr^{3+} ion is present in the octahedral void, therefore, fraction of holes occupied = 1/9

47. $\Delta T_f = K_f.m$

$\Delta T_f = i \times K_f \times m$

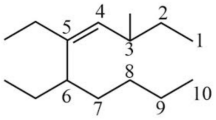
$T_f^0 - T_f^s = i \times k_f \times m$

$0 - T_f^s = 1)1.86 \text{ kkg mol}^{-1}) \dfrac{\frac{68.4}{342} mol}{1} /\text{kg}$

$=0.372^0$ k = 0.372^0C

$T_f^s = -0.372^0 C$

48. Metal extracted by electrolysis of its fused salt is sodium $\rightarrow$highly reactive metal

49. 

50. $2C(S) + O_2(g) + N_2(g) \xrightarrow{1263K} 2co(g) + 4N_2(g)$

Producer gas

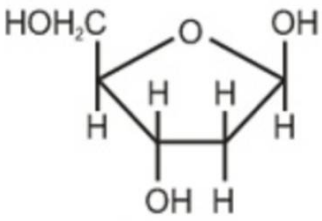
51. -1 increase the acidic character while +1 decrease acidic character
The correct order of acidity
$C_6H_5COOH > CH_3 COOH > C_6H_5OH$

52. CCl_4 does not exhibit dipole moment due to its symmetrical structure

53. Aspartame is stable at cold conditions but unstable at cooking temperature

54. Hydrophonic sol are irreversible in nature. They have no affinity between the dispersed phase and the dispersion medium (H_2O). Further once precipitated, they do not form the colloidal sol by simple addition of water

55. The constituents of nucleic acids are nitrogenous bases, sugar and phosphoric acid. The sugar present in DNA is D (-2)-2deoxyribose and the sugar present it RNA is D(-)- ribose. Due to these D(-)-sugar components, DNA and RNA molecules are chiral molecules



D(-)-2-deoxyribose

56. $Ba^{+2} + 2CH_3COO^- \rightarrow (CH_3COO)_2Ba$
BaS_2O_3 gives SO_2 gas with dil. HCl and also yellow ppt. of brarium chromate
$(CH_3COO)_2Ba + K_2CrO_4 \rightarrow 2CH_3COOK + BaCrO_4\downarrow$

(yellow ppt)

57. General formula of diketo and dialdehyde is $C_n H2_{n-2}O_2$ and general formula of diol is $C_nH_{3n}O_2$
Open chain carboxylic acid having $C_nH_{2n}O_2$ formula

58. $Ni(OH)_2 \rightleftharpoons Ni^{2+} + 2OH^-$

S 2s

Total $[OH^-]$ = 2s + 0.1

Ionic product =[s] $[2s + 0.1]^2$

$\approx S(0.01) = 2\times10^{-15}$

$0.01s = 2\times10^{-15}$

$s = 2\times10^{-13}$

59. With very dilute HNO_3, Zhn produces NH_4NO_3

60. $P_T = P_A\ {}^0X_A + P_B + {}^0X_B = 512\times0.25 + (344\times0.75) = 386$

$\therefore$ the solution in showing positive deviation

So for a solution of

Acetone + CS_2; $\Delta H = +ve$

61. We know PV = nRT

Number of moles of per litre *i.e.*, $\frac{n}{V} = \frac{P}{RT}$

62. Mole % of B $= \frac{12.5\times10^{-5}}{(12.5+3.8)\times10^{-5}}\times100 = \frac{12.5}{16.3}\times100 = 76.68\%$

63. By compariwion we get

$$\Delta S = \frac{-d(\Delta G)}{dT}$$

By substituting $\Delta G = -nFE$ and rearranging we get

$$\frac{dE}{dT} = \frac{\Delta S}{nF}$$

64. $N = \frac{chiral\ centre}{GI\ units} = 3$

$\Rightarrow$ Total no. of stereoisomers = $2^n = 8$

65. $w_{Ag} = \frac{E_{Ag}\times Q}{96500} = \frac{108\times9.65}{96500} = 1.08\times10^{-2}g = 10.8mg$

66. There will be no effect on equilibrium constant (K_C) in pressure of catalyst so, statement (c) is wrong

67. The probability of finding the electrons in the orbital is 90-95%

68. $SnCl_2 + 2HCl(g) \rightarrow SnCl_4 + 2[H]$

$CH_3CN + 2[H] + HCl \rightarrow CH_3CH = NH.HCl \xrightarrow[Boil]{H_2O} CH_3CHO + NH_4Cl$

(Y) (X)

X) is acetaldimine hydrochioride and

Y) is acetaldehyde

69. The keto group has considerable resonance energy, hence more the number of keto groups in a compound, higher is its stability. However, here all the three compounds have same (two) number of keto groups. Compound ll is least stable because two adjacent keto groups destabilize the molecules due to positive charge on the adjacent carbon atoms. Relative stability of I and II can be ascertained by the stability of their fully reduced froms (phenols), since, fully reduced form of III has two benzene rings, it will be more stable than the I whose form has only one benzene ring

70.

	Hybridization	Unparied electrons	Magnetic moment
$[CO(CN)_6]^{3-}$	d^2sp^3	0	0
$[Fe(CN)_6]^{3-}$	d^2sp^3	1	$\sqrt{3}BM$
$[Mn(CN)_6]^{3-}$	d^2sp^3	2	$\sqrt{8}$ BM
$[Cr[CN)_6]^{3-}$	d^2sp^3	3	$\sqrt{15}$ BM

71. Fructose is oxidized by ammonical $AgNO_3$. Therefore Ammonical $AgNO_3$ reagent is used to identity fructose

72. 'HCN' is a weak acid

$\therefore 57.3 - 12.1 = 45.2$ kJ

73. Let the oxidation number of Xe be 'a', then
$2 \times 2 + a + 6 \times (-2) = 0$
Hence, a = + 8

74. Oxymercuration-demercuration brings about Markownikoff hydration of alkene without rearrangemtn

75. C – Cl bond is more ionic than C – I bond because of the greater difference in electronegativities of C and Cl as compared to that of carbon and iodine. Therefore, C- Cl bond is stronger than C – I bond

76. Let in one mole of the given substance the number of moles of Sn (II) = x
Moles and number of moles of Sn(IV) = y moles
$\therefore x + y = 4.44$ and $2x + 4y = 16$
By solving x = 0.88 and y = 3.56
$\therefore$ mole ratio of
Sn (II) to Sn (IV) is $0.247 : 1 \simeq 1:4$

77. $k = \frac{2.303}{32}\log\frac{100}{1}$

$\therefore t = \frac{2.303}{\frac{2.303}{32}\log 100}\log\frac{100}{0.1}$

t = 48 min

78. In the formation of $d^2 sp^3$ hybrid orbitals, two (n – 1) d orbitals of e_g set i.e., (n – 1) dz2 and (n – 1) $d_{x^2-y^2}$ orbitals, one ns and three np (np_x, np_y and np_z)

Orbitals combine together and form six $d^2 sp^2$ hybrid orbitals

79. $\Delta H = \Delta E + \Delta n_g RT$

$\Delta H = \Delta E = \Delta n_g RT = (12 - 15) \times 8.314 \times 298 = -7.432 kJ$

80.

Molecule	Hybridization	Bond angle
1) PH_3	sp^3	98^0
2) CH_4	sp^3	$109^0.28$
3) NH_3	sp^3	107^0
4) H_2O	sp^3	104.5^0

81. $(CH_3)_3 C - Cl \rightarrow (CH_3)_3 C^+ + Cl^-$

$(CH_3)_3 C^{\oplus} + NaOH \rightarrow (CH_3)_3 C - OH + Na^+$

3^0 halides undergo reaction by S_N1 mechanism because of formation of stable carbocation

82. Methyl vinyl ether under anhydrous conditions at room temperature undergoes addition reaction

$$CH_2 = CH - OCH_3 \xrightarrow{HBr} CH_3 - \underset{Br}{CH} - O - CH_3$$

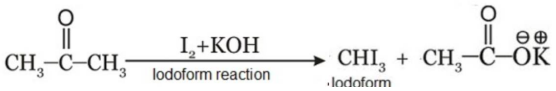
The reaction takes place according to markovnikov's rule

83. CaO being a basic oxide does not react with NaOH, however SiO_2 (acidic oxide), BeO (amphoteric oxide) and B_2O_3 (acidic oxide) react with NaOH

84. 1amu = 1.66057×10^{-27}kg = 1.66057×10^{-24}g

85. Catalyst for process is NO

86.



87. The basic character of metal oxides decreases from left to right in a period and increases down the group

88. $Fe_4[Fe(CN)_6]_3$ compound formed in the positive test for nitrogen with the lassaigne solution of an organic compounds

89. NOCl undergo electrophilic addition on alkene as
90. Strenght of metallic bond depends upon number of unpaired electrons increase, the bond strength also increases. So, Cr, Mo, show stronger bonding due to maximum number of unpaired electrons

91. Asterias belongs to the Phylum Echinodermata. The characteristic feature of echinoderm is the presence of endoskeleton made up of calcareous ossicles. They have a complete digestive system with ventrally placed mouth and dorsally placed anus. The organization seen is organ-system level. Echinoderms are triploblastic and coelomate animals. The adults are radially symmetrical where as the larvae are bilaterally symmetrical. Presence of water vascular system is the distinct feature of echinoderms. Examples are Sea Urchin, Brittle star, etc. Balanoglossus is a hemichordate whose adult as well as larva are bilaterally symmetrical. Obelia is a cnidarian whose adult as well as larva are radially symmetrical.
Ascarisis a round whose adult as well as larva are bilaterally symmetrical.

92. A key in taxonomy facilitates the identification of unknown species of an organism based on contrasting characters. It provides a choice between two contradictory statements resulting in acceptance of one and the rejection of the other. A single pair of the contradictory statement is called a couplet and each statement of a couplet is termed a lead (each statement in the key is called a lead). This taxonomic aid is used for all the organisms.

93. The leaf is divided into three parts - leaf base, petiole and lamina or leaf blade. Leaf base is a junction between the leaf and stem and in monocotyledons, it forms a sheath covering the stem completely or partially. In some leguminous plants, it swells up which is called a pulvinus. Petiole helps to hold the leaf blade allowing it to flutter in wind. The leaf blade is extended green part consisting of veins and veinlets which provide rigidity as well as transport food, water and minerals. In monocots, leaf base expands into a sheath covering the stem partially or wholly.

94. The question involves two pathways of cellular respiration, glycolysis and Kreb's cycle. In glycolysis the first step involves the conversion of a glucose molecule to glucose-6-phosphate, and the last step where the Phosphoenolpyruvic acid (PEPA) is converted to two molecules of Pyruvic acid (PA) or pyruvate. During the Kreb's cycle, Succinyl- CoA is converted to succinate using the Succinyl-CoA synthetase enzyme and the fumarate gets converted to malate with the help of enzyme fumarase. Malate is then converted to oxalo acetic acid with the formation of reduced coenzyme NADH

95. The diagram depicts a red algae, Porphyra. Red algae are marine organisms with the majority of them thriving in warmer areas. They habitat the light receiving regions as well as great depths of oceans where no light is seen. Oogamous sexual reproduction as well as asexual reproduction by non-motile spores are seen in these algae. They store the food material in form of a substance, similar to amylopectin and glycogen in structure, which is floridean starch.

96. The stem is a part of a plant consisting of branches, leaves, flowers and fruits. They also exhibit buds which can be axillary or terminal. They perform the function of conducting water, food and minerals and photosynthesis. In some plants, the stem is modified in different structures to perform various functions. In some plants like cucumber, pumpkins, watermelons and grapevines stem is modified into a thin and spirally coiled structure called tendrils which are developed from the axillary bud.

97. The species mentioned in Column II represent one of the group/class given in Column I basis their characteristics. Therefore, Entamoebais a genus of Amoebozoa. Plasmodium is one of the parasitic & pathogenic species of sporozoans. Paramoecium is a genus of ciliated protozoa and lastly, Trypanosomabelongs to the group of protozoans with the flagellum.

98. Organisms occupy a specific position in an ecosystem based on their source of food which is known as trophic levels. In trophic levels, the first level is occupied by producers second by herbivores and third level by carnivores. These levels do not depict the species but their functional level. A sparrow becomes a primary consumer when it eats seeds and secondary consumers when it feeds on worms. Hence a given specie can occupy more than one trophic level at the same time in the ecosystem. In the most ecosystem, the pyramid of energy and biomass is upright as producers more in number and biomass than herbivores and herbivores are more in number and biomass than carnivores.

99. The question signals towards the similarity with green plants which have the green photosynthetic pigment. The organisms who produce their own food and energy using light & carbon-di-oxide are known as Photoautotrophs. Hence, Cyanobacteria which contains Chlorophyll is capable of producing its food & energy and in turn releasing oxygen in the atmosphere.
100. Microsporangia is a structure located in anther which further develops into a pollen sac. It is a diploid structure. Pollen mother cells are diploid cells that undergo meiosis to form four microspores, hence microspores are haploid cells. Similarly, Megaspore mother cell is a diploid cell which undergoes meiotic division to form four haploid megaspore. Microspore is a male gamete that fuses with two polar nuclei present in the central cell in embryo sac resulting in the formation of the triploid endosperm. Hence, Microsporangium is a diploid structure.
101. Xylem tissue is described as a complex and heterogeneous one. It is composed of four elements, two tracheary elements namely tracheids & vessels, these are dead cells whose function includes transportation of water & minerals. Remaining elements include xylem fibres & xylem parenchyma of which the only parenchyma is a living cell. To conclude, xylem parenchyma is the only living cell in the xylem tissue.
102. Although E. coil is a prokaryotic cell with a peptidoglycan cell wall and Chlamydomonas is eukaryotic with a cellulosic cell wall, but they have cell membrane as a common structure which is essentially the same and is made up of phospholipid bilayer. Other components as mentioned above namely- ribosomes, cell wall & nuclear organization differ in these organisms.
103. Haploid male gamete fuses with the two polar nuclei present in the central cell in embryo sac to form triploid (3n) primary endosperm nucleus. Cells of roots are diploid (2n) in nature. Primary endosperm cell (3n) = 24, n = 8. Root cell (2n) = 16. Hence, if the endosperm cell has 24 chromosomes, the number of chromosomes in each cell of the root will be 16.
104. In Prokaryotes, the plasma membrane extends into the cytoplasm to form special structure known as mesosomes. These extend into the cell and hence are known as inclusions of the cell. These perform various functions like Cell wall formation, DNA replication, Distribution of DNA to daughter cells, Respiration, Secretion of substances in and out of cells and Increase in surface area of plasma membrane. These organelles are absent in Eukaryotes.
105. A plant water relationship is concerned with how plants control hydration of cells, including the collection of water from the soil and its transport within the plant. Terrestrial plants absorb a large quantity of water but most of it is lost through transpiration. A mature corn plant absorbs 3 litres of water per day and also some amount is lost in the air through transpiration.
106. The most abundant animal tissue is Connective tissue. These are of different types: Loose connective tissues which includes Areolar and Adipose tissue. Dense connective tissues which include Tendon and Cartilag. Specialised connective tissues which include Bone, cartilage, blood and lymph. Nerve fibres constitute the nervous system
107. 200 zygote are produced when 200 male gamete fuses with 200 eggs. Micropore mother cell undergoes meiotic division to produce microspore tetrads that dissociate to form 4 pollen grains. Similarly, Megaspore's mother cell undergoes meiotic division to form 4 megaspores but only one remains functional while the other three degenerate. Hence, to produce 200 male gametes 50 meiotic division is required whereas to produce 200 egg 200 meiotic division is required. So the total number of meiotic divisions required to produce 200 zygotes is 250
108. Wendell Meredith Stanley, an American virologist studied the tobacco mosaic virus, which affects the tobacco leaves. He experimented by using the infected tobacco leaves and was successful in extracting the virus in form of crystals.
T.O. Diener -Viriods are nothing but free DNA.
M.W. Beijerinek -Dutch microbiologist, 'Contagiumvivumfluidum'
D.J. lvanowsky - Coined the term 'virus'
109. Bryophytes include both mosses and liverworts. In bryophytes the antherozoids and the egg fuse to form the zygote which does not undergo immediate reduction and produce a multicellular body called the sporophyte. Some of these sporophytes produce haploid spores meiotically and germinate

to produce a gametophyte. Mosses have a leafy stage which develops as a lateral bud from the secondary protonema.

110. Down's syndrome is due to an extra chromosome number 21. The patient's cells have 3 copies of 21st chromosome (Trisomy 21) instead of homologous pair. It occurs due to failure of separation of homologous chromosomes or non-disjunction during meiosis (gamete formation). Symptoms of Down's syndrome:
(a) Patients show Mental retardation (b) Due to poor skeletal development, they have short stature and
relatively small skull
(c) Their face is typically flat with rounded flat nose
(d) They have an open mouth, protruding tongue and a high arched palate.
(e) Most children show typical facial features with a fold of skin (epicanthal skin fold) over the inner corner of the eye. This results in downward slanting of eyelids.
(f) They have flat hand with characteristic crease which runs all the way across the palm (Simian crease).

111. Motility in Bacteria is due to presence of thin extensions called as Flagella. The number and arrangement of flagella varies in different types of bacteria. Flagella is made up of three main parts: Filament: Longest and main part that extends from cell surface to the outside and is composed of flagellin protein. Hook: Structure near the cell surface. Basal body: A system of rings embedded in cell envelope. The eukaryotes also possess flagella but these are structurally different from that of the prokaryotic flagella. Their core called the axoneme, possesses a number of microtubules running parallel to the long axis. The axoneme usually has nine pairs of doublets of radially arranged peripheral microtubules, and a pair of centrally located microtubules. Such an arrangement of axonemal microtubules is referred to as the 9+2 array. The central tubules are connected by bridges and is also enclosed by a central sheath, which is connected to one of the tubules of each peripheral doublets by a
radial spoke. Thus, there are nine radial spokes. The peripheral doublets are also interconnected by linkers.

112. Interaction between the population of two different species can be harmful, beneficial or neutral to one of the species or to both. Commensalism is the interaction between two species where one is benefitted whereas other is neither harmed nor benefitted. Mutualism refers to those species interactions where both the species are benefited from the association and are dependent on each other for survival. In Predation, only one species that is the predator is benefitted and the predator kills the prey. Amensalism is where one specie is harmed and the other remains unaffected

113. Crossing between a superior male of one breed and superior female of other breed results in the combination of desirable qualities from both the breeds and suppression of undesirable recessive genes leading to the production of a hybrid with increased vigor and productivity. Hence heterosis or hybrid vigor is the one showing increased productivity or superiority over the parents.

114. The entire body of molecular biology was a consequent development with major contributions from Watson, Crick, Nirenberg, Khorana, Kornbergs (father and son), Benzer, Monod, Brenner, etc. A parallel problem being tackled was the mechanism of evolution.

115. Pollen grains represent male gametocyte. When pollen grains mature it consists of the vegetative cell which is bigger and has ample food reserve and generative cell which is relatively smaller. In over 60% of angiosperms pollen grains are shed at this 2 celled stage and in the remaining of angiosperms generative cell undergoes mitotic division resulting in the formation of two male gametes before pollen grains are shed (3 celled stage)

116. Enzymes are proteinaceous in nature. Some Enzymes also contain non-protein part known as Co-factors. These factors are attached to the Enzymes to enhanced their catalytic activity. The protein part of Enzyme is known as Apoenzyme. Hence Apoenzyme (Protein part) + Co-factors (Non protein part) = Holoenzyme (Whole Enzyme). As the co-factors are bound to enzymes, the removal of these factors affects the overall activity of Enzymes too.

117. C_4 plants are called so because the first product of carbon-di-oxide fixation is oxaloacetic acid, which has 4 carbon compounds. C_4 plants have a special composition as their leaves show response to high light intensities and they can tolerate high temperatures. The primary acceptor of CO_2, that is phosphoenolpyruvate (PEP) is found in the mesophyll cells which is fixed with the help of an enzyme
PEP carboxylase.

118. Photoperiodism is the way an organism responds to the changes in the length of the day. A biennial plant is a flowering plant that takes 2 years to complete its biological cycle. After the first year, they usually enter the period of dormancy. During this period they are subjected to cold treatment or vernalization to accelerate flowering and shorten the vegetative phase of the plants. When plants are subjected to low temperature, vernalization promotes flowering by a period of low temperature it stimulates a subsequent photoperiodic flowering response.

119. Nitrobacter is a nitrifying bacteria that use inorganic chemicals as an energy source. They are microorganisms that are important in the nitrogen cycle as converters of soil ammonia to nitrates. This involves two distinct groups of bacteria one (Nitrosomonas) which converts ammonia to nitrites and other (Nitrobacter) that convert nitrites to nitrates.

120. The female reproductive part of the flower known as gynoecium consists of stigma, style and ovary. After fertilization ovary develops into a fruit. Based on the location ovary can be superior or inferior. The ovary is inferior to other floral parts in epigynous flowers and superior in hypogynous flowers. When it is at the level of other floral parts, the flowers are called perigynous. Cucumber, guava and ray florets of sunflower have epigynous flower and hence have an inferior ovary.

121. The cell cycle is divided into two phases - Interphase and Mitosis phase or the M phase. The interphase is further divide into 3 phases - Gap 1 or G_1 phase, Synthesis phase or S phase and Gap 2 or G_2 phase. G_1 phase is the interval between mitosis and initiation of DNA replication during which the cell is metabolically active and grows but does not replicate. The DNA replication begins in the S phase and the centrioles duplicate in the cytoplasm. In the G_2 phase, proteins are synthesised in preparation for
mitosis while cell growth continues.

122. Sucrose is a disaccharide having one glucose and one fructose.
1 pyruvic acid in Kreb's cycle produces 12 ATP. One glucose molecule produces 2 pyruvate molecules
in glycolysis. Fructose also enters glycolysis by forming fructosel,6 diphosphate. Therefore there will be
two pyruvates from glucose and two from fructose, and each cycle producing 12 ATP. Therefore $12 \times 4 = 48$ ATP.

123. Four major causes of biodiversity loss include - habitat loss and fragmentation, overexploitation, alien species invasion and co extinction. When an alien species are introduced in a region intentionally or unintentionally they may result in the decline or extinction of indigenous species. This is known as alien species invasion. When large habitats are broken down into fragments or are cleared for cultivation or for turning it into grasslands it results in the decline of many birds and animals. Cultivation of soyabean in Amazon forest is one such example of habitat loss and fragmentation.

124. Cysteine and Methionine are sulphur containing amino acids. Chemical formula of cysteine is $C_3H_7NO_2S$. Chemical formula of Methionine is $C_5H_{11}NO_2S$ .Ferrodoxin (Fd) is present in the chloroplast and brings about electron transfer in photosynthesis. It is iron-sulphur cluster. Coenzyme A
is very important coenzyme in citric acid cycle as it brings about oxidation of pyruvate. Its chemical formula is $C_{21}H_{36}N_7O_{16}P_3S$

125. The nucleus of the female gametocyte undergoes three mitotic division progressing from 2 nucleate to 4 nucleate to ultimately 8 nucleate stage. Six of the eight nuclei gets surrounded by a cell wall and the remaining two polar nuclei form a large central cell. Three cells move towards the chalazal end and the other three move towards the micropylar end. All the cells in the female gametocytes are

haploid but the two polar nuclei fuse to form a diploid cell. Hence the ratio of haploid: diploid: triploid is 6: 1 :0

126. When only PS I is functional, the electron is circulated within the photosystem and the phosphorylation occurs due to cyclic flow of electrons. A possible location where this could be happening is in the stroma lamellae. While the membrane or lamellae of the grana have both PS I and PS II the stroma lamellae membranes lack PS II as well as NADP reductase enzyme. The excited electron does not pass on to NADP+ but is cycled back to the PS I complex through the electron transport chain. The cyclic flow hence results only in the synthesis of ATP, but not of NADPH + H^+. Cyclic photophosphorylation also occurs when only light of wavelengths beyond 680 nm are available for excitation.

127. Modification of roots and leaf takes place in order to perform various functions. In marshy areas, roots of plants such as Rhizophora grow vertically upward in order to get oxygen for respiration. In plants like maize and sugarcane, they develop roots from the basal nodes of the main stem that help in supporting the plant. These are known as Stilt roots. In the Banyan (Ficus benghalensis) tree, roots which give support to growing branches are called prop roots

128. Zygotene is the second stage of Prophase I where the chromosomes start pairing together. This process is called synapsis and the paired chromosomes are known as homologous chromosomes. Pachytene is the stage where bivalent chromosomes clearly appear as tetrads and is characterized by the appearance of recombination nodules which function as the sites of crossing over between non-sister chromatids of the homologous chromosomes. Crossing over is the exchange of genetic material between two homologous chromosomes and is mediated by the enzyme called recombinase. The stage where sister chromatids remain associated but homologous chromosomes separate is called Anaphase I. During Anaphase II the sister chromatids move towards the opposite poles of the cell due to the simultaneous splitting of the centromere.

129. The genetic code is degenerate. One amino acid can be specified by more than one codons. Glycine is coded by GGG, GGC, GGU and GGA . Leucine is coded by CUU, CUC, CUA, CUG, UUA, . UUG Isoleucine is coded by AUU, AUC, AUA . Lysine is coded by AAA and AAG

130. In pea plant, Green pod (G) is dominant over yellow pod (g) and Round seed (R) is dominant over wrinkled seed (r). Genotype of a pure pea plant with yellow pod and round seeds: ggRR. It will produce gametes with gR. Genotype of a pure pea plant with green pods and wrinkled seeds: GGrr. It will produce gametes with Gr. Thus their Fl offspring will have GgRr genotype which is a pea plant with green pod and round seeds

131. The graphical representation of the electrical activity of the heart is called the electrocardiogram (ECG). A standard ECG consists of different waves which correspond to specific electrical event in the heart. First is the P wave which represents the excitation of the atria also known as depolarization of the atria. It leads to contraction of atria. The next is the QRS complex which signifies the depolarization of the ventricles leading to ventricular contraction. T wave corresponds to ventricular repolarisation.

132. The above question identifies the alternate name for the first part. Consequently, cork-phellem is the right pair because cork is also known as phellem. While bark & periderm is incorrect because bark is composed of periderm as a layer which is in turn made of cork, cork cambium is also called as phellogen and phelloderm (commonly also known as Secondary cortex.)

133. In a pedigree chart a square symbol resembles male and circle symbol resembles a female. It the square / circled is filled it indicates disease while if it is unfilled it indicates no disease. While denoting the offsprings, the eldest to youngest offsprings are depicted from left to right. Mother and daughter both are affected. So Circles should be shaded. Also in the offspring from left to right there should be a circle (daughter), square (son) and square (youngest son)

134. Exponential growth: When the growth takes place rapidly at a very high rate.
It is also called the log phase, in exponential growth phase the cells divide mitotically and keep on dividing, therefore it is known as the exponential phase. It is expressed as
$W1 = W_0e^{rt}$, where W1 is the final size and Wo is the initial size of the plant, r is the growth rate, t is the

time of growth and e is the base of logarithms.

135. The genetic material in majority of organisms is DNA. For the restriction enzymes to cut DNA, it has to be in a pure form and free from other macromolecules. For this the cell needs to break open and release DNA with other macromolecules like RNA, proteins, polysaccharides and also lipids. This can be achieved by treating the cell with enzymes like lysozymes, cellulose, etc. The RNA is removed by ribonuclease and proteins by proteases. Similarly other macromolecules are removed by appropriate enzymes and finally DNA can be precipitated out as a collection of fine threads in the suspension after adding chilled ethanol.

136. One upper limb has 30 bones (1 Humerus, 1 Radius, 1 Ulna, 8 carpals, 5 metacarpals and 14 phalanges). One lower limb also has 30 bones (1 Femur, 1 Tibia, 1 Fibula, 1 patella, 7 tarsals, 5 metatarsals and 14 phalanges). There are 8 bones in the cranium (2 Parietals, 2 Temporals, 1 Frontal, 1 Occipital, 1 Sphenoid and 1 Ethmoid). Wrist bones are carpals. There are 8 carpals in one hand (Scaphoid, lunate, triquetral, pisci form, trapezium, trapezoid, capitate and hamate). The first seven pairs of ribs which are attached to the sternum by their own cartilage are true ribs. Thus there are 14 true ribs. Bones of the fingers are phalanges. Each hand has 14 phalanges (2 in thumb and 3 in each finger). There are 8 cervical vertebrae in the human body. Each ankle has 7 bones (tarsals) but the body has 2 ankles thus number of ankle bones in the body is 14.

137. The second step in Recombinant DNA technology is cutting of DNA at specific sites. The purified DNA molecules are incubated with restriction enzymes at optimal conditions for carrying out restriction enzyme digestions. The progress of a restriction enzyme digestion is checked with the help of Agarose gel electrophoresis. DNA being a negatively charged molecule moves towards the positive electrode. Similar process is repeated with the vector DNA. The 'gene of interest' obtained from the source DNA and also vector DNA obtained by restriction enzyme digestion are mixed and then ligase is added to it. This leads to formation of recombinant DNA.

138. P- pepsin produced by stomach as pepsinogen. It is activated at acidic pH. It converts proteins into proteoses and peptones. Q- Trypsin or chymotrypsin produced by pancreas as trypsinogen or chymotrypsinogen. Trypsin is activated by enterokinase from the intestine. It can convert peptones and proteoses to polypetides. R- Aminopeptidase produced intestine in an active form. R could also be carboxypeptidase produced by pancreas as procarboxypeptidase. Both of them can convert polypetides to dipeptides. In this contect it is aminopeptidase. S is dipeptidase produced by intestine in an active form. It converts dipeptides to amino acids

139. The diagram is of Electrostatic precipitator.
An electrostatic precipitator is one of the many ways of removing particulate matter from the exhaust of thermal plants. It is efficient in removing up to 99% of particulate matter. It consists of electrode wires, maintained at several thousand volts, which discharges corona which in turn releases electrons. These electrons get attached dust particles resulting in negatively charged particles. These charged particles get collected in collecting plates.

140. AMP is Adenosine monophosphate. When one phosphate gets added it becomes ADP i.e. Adenosine diphosphate. Similarly when two phosphates get added it is ATP i.e. Adenosine triphosphate. Hence as phosphates get added, the weight increases. Therefore molecular weight of AMP < ADP < ATP. AMP consists of Phosphate + Sugar + Nitrogen bases = Nucleotides and DNA consists of millions nucleotides , hence molecular weight DNA is highest

141. The axon is immersed in the extracellular fluid (ECF). In the axoplasm negatively charged protein molecules are present, which are neutralized due to the presence of large amount of 1-c- ions. In the ECF (outside the axon) the negatively charged C./— ions are neutralized by the presence of +vely charged Na+ Na- ions. To maintain resting potential, sodium potassium metabolic pump operates. This pump which is located on the axon membrane pump Na+ from axoplasm to ECF and K± from ECF to axoplasm. It pumps more positive charges (3 Na+) from axoplasm to ECF than in the reverse direction (2K+), and is run by an enzyme called as sodium potassium-ATPase. When a stimulus is membrane of the applied to the nerve fibre, its permeability changes and sodium potassium pump stop operating. Sodium ions rush inside and potassium ions ions rush outside. This results in the

positive charge inside and negative charge outside. The nerve fibre is said to be in action potential or depolarized

142. Pneumonia is an infective disease of the lungs where the alveoli are primarily involved. The most common pathogens responsible for pneumonia are bacteria like Streptococcus pneumoniae and Haemophilusinfluenzae. The alveoli get filled up with fluid leading to difficulties in respiration. Symptoms of pneumonia include fever, chills, cough and headache. In severe cases cyanosis may occur i.e. bluish colouration of the lips and finger nails. It can spread through inhalation of droplets or aerosols from an infected person.
143. Aplysia belongs to Phylum Mollusca which is the second largest animal phylum. The organization seen in molluscs is of organ system level and they can be terrestrial or aquatic. Features of molluscs are that they are bilaterally symmetrical, triploblastic and coelomate animals. In molluscs the body is covered by calcareous shell and is unsegmented with distinct head, visceral hump and muscular foot. The mantle over the visceral hump is formed by soft and spongy layer of skin. There are feather like gills present in the mantle cavity (space between the hump and the mantle). Examples are Cuttle fish, Squid, Octopus, etc.
144. The lens divides the eye into two chambers and both the chambers are filled with fluid. The anterior chamber that lies between lens and cornea is known as Aqueous chamber and the posterior chamber between lens and retina is known as Vitreous chamber. Aqueous chamber contains watery fluid that drains into canal of Schelmm and hence this fluid is replaced continuously. Vitreous fluid is jelly like and it cannot be replaced.
145. In the evolution of plants, chlorophyte ancestors gave rise to tracheophyte ancestors which gave rise to Rhynia type plants. They further evolved into Psilophyton. Psilophyton further branched and gave rise to Sphenopsids, Ferns, Ginkgos, Conifers, Gnetales and Progymnosperms. Progymnosperms evolved to seed ferns which gave rise to cycads and angiosperms
146. Apomixis is the production of seeds without fertilization. It is a type of asexual reproduction which takes place when an organism produces its offsprings without exchanging any genetic details with another organism. There is no fusion taking place, so therefore only one parent gives rise to a new cell or organism resembling them in characteristics. Amphimixis involves fusion of gametes. This is a type of sexual reproduction which involves two different sexes which unite or fuse to form a new individual, who inherits the genes from both the parents.
147. Medical termination of Pregnancy also known as induced abortion has been legalized by the Government of India in 1971 under strict conditions. It is permitted in cases where pregnancy is the result of the failure of contraceptives or from rape. It is also allowed if the continuation of the pregnancy is harmful to the mother's health or is fatal to the mother or fetus. MTP is considered safe up to 12 weeks of pregnancy and becomes riskier during the second trimester hence, requires the opinion of two registered medical practitioners. MTP beyond 20 weeks is illegal.
148. Human pregnancy lasts for nine months and it officially begins after implantation i.e. 8th day after fertilization.The sign of developing foetus is first recorded at the end of 1st month as heart sounds are cleary audible. The foetus develops limbs and digits by the end of 60 days. Major systems also develop in the third month of pregnancy.Hence as the first trimester (3 months or 12 weeks) is completed the foetus has developed organ systems and limbs and digits. The first movements of the foetus and appearance of hair on the head are usually observed during the fifth month. By the end of 24 weeks (second trimester), the body is covered with fine hair, eye-lids separate, and eyelashes are formed.
149. Recessive conditions are clinically manifest only when an individual has two copies of the mutant allele. When just one copy of the mutant allele is present, an individual is a carrier of the mutation but does not develop the condition. When two carriers mate, each child has a 25% chance of being homozygous wild-type (unaffected); a 25% chance of being a homozygous mutant (affected); or a 50% chance of being heterozygous (unaffected carrier). (here genotype is Aa (heterozygous and unaffected).
150. Oxygen binds with haemoglobin in a reversible manner to form Oxyhaemoglobin. A maximum of four oxygen molecules are carried by each Hb. The binding of oxygen is related to partial pressure of

O_2 where as partial pressure of CO_2 , hydrogen ion concentrationand temperature are factors interfering with its binding. The factors which are favourable for formation of oxyhaemoglobin in the alveoli are high pO_2 , lesser H-concentration, low pCO_2 and lower temperature. The low pO_2 , high pCO_2 high H- concentration and higher temperature in the tissues are all the conditions leading to dissociation of
oxygen from the oxyhaemoglobin. This indicates that oxygen is bounded to haemoglobin in the lung and
dissociated in the tissues.

151. Hardy was a mathematician and Weinberg was a physician. They devised Hardy- Weinberg principle. According to this principle, the allelic frequencies will remain constant in a population if there is no evolution taking place. In other words, if no evolution takes place the sum of allele frequency will always be equal to one. This is Hardy -Weinberg Equilibrium. Five factors are known to affect Hardy-Weinberg equilibrium. These are gene migration or gene flow, genetic drift, mutation, genetic recombination and natural selection. It is represented by the equation $p^2+ 2pq\ q^2 = 1$, where p^2 is the
proportion of pure homozygous dominant individuals in the population, q^2 is the proportion of pure homozygous recessive individuals in the population and 2pq is the proportion of heterozygous individuals in the population.
152. The inability to conceive despite unprotected sexual intercourse is known as infertility. A man who is unable to inject semen in a female genital tract or has low sperm count can take the help of Artificial insemination. In this technique sperm from a husband or healthy male donor is collected and artificially injected into the vagina or uterus. In IVF and ZIFT, sperm and egg are allowed to fuse in a laboratory under simulated conditions and then the embryo is transferred into the fallopian tubes. In GIFT, Ovum from a donor is transferred in a fallopian tube of another female who can provide a suitable environment for fertilisation.
153. DNA cannot pass through cell membrane as it is a hydrophilic molecule. The bacterial cell is made competent to take up DNA by treating them with a cation like calcium. This increases the efficiency of the DNA entering the bacterial cell through pores in its cell wall. This process through which a piece of DNA is introduced into the host bacteria is called transformation.
154. Inclusion bodies are freely floating particles within the cytoplasm. Changes in pH of cytoplasm results in formation of these inclusion bodies. These are found in both prokaryotes and eukaryotes. In prokaryotes, they are formed to store reserve food whereas in eukaryotes these store materials that are ready for cellular metabolism. Reserve food material is stored in vacuoles in eukaryotes.
155. The external genitalia in females is known as the vulva. It consists of labia majora, labia minora, clitoris, mons pubis, the vestibule and vestibular glands. Labia majora is the pair of fleshy folds that extends from mons pubis to perineum. It is homologous to the male scrotum as both develop from same embryological tissue known as labioscrotal swellings.
156. The cross between F1 hybrid and the recessive homozygous parent is called test cross. Test cross helps in identifying the genotype of an organism. Test cross helps in verifying the laws of inheritance. Test cross is also used to introduce useful recessive trait in the hybrids in rapid crop improvement programmes. Test cross is an easier and faster way for improving the variety of a crop. Test cross is of great help in the production of pure line varieties.
157. The additional volume of air a person can expire by forcible expiration is called Expiratory Reserve Volume (ERV). Average ERV is 1000 mL to 1100 mL. Inspiratory Capacity (IC) is the total volume of air a person inspires post a normal expiration. Inspiratory capacity includes tidal volume and inspiratory reserve volume (TV+IRV). The total volume of air expired after a normal inspiration is Expiratory Capacity (EC) Tidal volume and expiratory reserve volume (TV+ERV) are both included in EC. Functional Residual Capacity (FRC) is the volume of air remaining in the lungs after normal expiration. Includes both ERV-FRV.
158. Single Cell Protein (SCP) or probiotics due to its high protein content can be used by both, humans as well as to feed animals. The bacteria Methylophilus methylotrophus has all the essential amino acids and low content of fats and therefore produces more proteins. It uses methanol to produce

proteins and are widely used for commercial purposes due to its high rate of biomass production and growth.

159. Adrenal cortex secretes many hormones collectively known as Corticoids. The Corticoids which help to maintain water and electrolyte balance in our body are known as Mineralocorticoids. Aldosterone is the most important mineralocorticoid in our body. This hormone acts on kidneys and enhances reabsorption of sodium and water in order to decrease their excretion. Hence if levels of Aldosterone decreases, sodium and water will be excreted from the body.
160. In this example, 30th codon is mutated to form stop codon. Thus the first 29 codons will be read and 29 amino acids will form a polypeptide chain. But the stop codon will not allow further translation to occur and the remaining codons will not be translated
161. The female external genitalia include mons pubis, labia majora, labia minora, hymen and clitoris. The clitoris is a tiny finger-like structure which lies at the upper junction of the two labia minora above the urethral opening. Each fallopian tube is about 10-12 cm long and extends from the periphery of each ovary to the uterus, the part closer to the ovary is the funnel-shaped infundibulum. The edges of the infundibulum possess finger-like projections called fimbriae, which help in collection of the ovum after ovulation. The infundibulum leads to a wider part of the oviduct called ampulla. The last part of the oviduct, isthmus has a narrow lumen and it joins the uterus. The wall of the uterus has three layers of tissue. The external thin membranous perimetrium, middle thick layer of smooth muscle, myometrium and inner glandular layer called endometrium that lines the uterine cavity.
162. Four major causes of biodiversity loss include - habitat loss and fragmentation, overexploitation, alien species invasion and co extinction. Co-extinction means when a certain species become extinct the plants and animals dependent on it also become extinct. Introduction of African catfish in a river for a purpose of aquaculture and of Nile perch into Lake Victoria is an example of Alien species invasion wherein certain species are introduced intentionally or unintentionally, resulting in the decline or extinction of indigenous species.
163. Diseases can be broadly divided into infectious and non-infectious. Infectious diseases are easily transmitted from one person to another. They are very common and all of suffer from it sometime in our life. Some examples of infectious diseases are AIDS, influenza, small pox, chicken pox, pneumonia, etc. Examples of non infectious diseases are cancer, allergies, diabetes, hypertension, obesity, etc. Cancer is the major cause of death due to non infectious disease.
164. Glomerular filtration is the first step in the formation of urine and is carried out by the glomerulus. GFR or glomerular filtration rate is the amount of the filtrate formed by the kidneys per minute. The factors playing a role in filtration are blood colloidal osmotic pressure, capsular hydrostatic pressure, capillary blood pressure and glomerular hydrostatic pressure. The increase in colloidal osmotic pressure will lead to decrease in GFR as the increased colloid will prevent effective filtration. Increase in capsular hydrostatic pressure will push the filtrate back into the capillaries and thus reduce the GFR. Decrease in glomerular hydrostatic pressure means the pressure of the blood in the capillaries which will lead to decrease in GFR where as an increase in capillary blood pressure will increase the rate of filtration.
165. The amount of biomass produced per unit area over a period of time is called primary productivity expressed in weight (g-2) or energy(kcalm-2) The rate at which this biomass is produced is called productivity. To compare the productivity of different ecosystems it is expressed by units g-2 yr -1 or (kcal m-2) yr -1 . It is divided into gross primary productivity and net primary productivity. The rate at which organic matter is produced during photosynthesis is gross primary productivity and the remaining biomass after the respiratory loss is net primary productivity.
166. Biochemical Oxygen demand is the amount of oxygen, present in water, taken up by bacteria and other microorganisms to degrade organic matter present in water. BOD estimates the organic matter in water. If there is a high amount of organic matter in water, there will be increased consumption of oxygen by microbes for the degradation of organic matter. Hence BOD is determined by the amount of consumption of oxygen by microbes. An increase in BOD results in a decrease in oxygen in the water.

167. Pancreas is composite or heterocrine glands as they contain both endocrine and exocrine glandular tissues. Endocrine tissue is made up of small clusters of cells known as Islets of Langerhans which has two types of cells: Alpha cells that secrete glucagon and Beta cells that secrete insulin. Both these hormones together carry out Glucose metabolism. Glucagon carries out glycogenolysis and Insulin is responsible for cellular uptake of glucose. If insulin levels are not adequate the cellular uptake of glucose is affected or in other words transport of glucose from blood into cells is affected due to which blood glucose level rises. This is known as Diabetes mellitus. Polyuria (increase urination), Polydipsia (increased thirst) and polyphagia (increased hunger are symptoms of diabetes mellitus)
168. Transgenic animals are those in whom the DNA is manipulated to possess and express an extra gene. Transgenic animals are specifically designed to allow the study of gene expressions, gene regulation and how genes affect normal function and development of the body. The commonly produced transgenic animals are rats, rabbits, sheep, pigs, fishes and cows. But out of these almost 95% transgenic animals are mice. Transgenic animals can be used to study normal physiology and development, disease, biological products, vaccine safety, chemical safety testing.
169. Distillation involves the purification of a liquid to increase the concentration of the specific components in it. Wine is an undistilled product, produced due to the traditional alcoholic fermentation of fruit juices by yeast. Thus the concentratation of alcohol is less in wine. The other three drinks are formed only after distillation as follows.
Whisky: Fermentation of grain mill (barley, corn, rye and wheat) -+ Distillation
Rum: Direct distillation of the byproducts of sugarcane or sugarcane juice.
Brandy: Distillation of fermented wine.
170. Thus chain contain A, U, C and G which are nitrogen bases Adenine, Guanine, Cytosine and Guanine respectively. These nitrogen bases are found only in nucleic acids and not in polypeptides. It contains Uracil which is found in RNA and not in DNA
171. Diphtheria is caused by Corynebacteriumdiphtheriae, Pertussis is caused by Bordetella pertussis and Tetanusis caused by Clostridium tetani. All of them are bacterial diseases. Mumps, Measles, Rubella, Polio and Hepatitis B are caused by viruses.
172. ADA which is adenosine deaminase is an enzyme which is important of the function of the immune system. ADA is produced by the immune system cells called lymphocytes. The deficiency of ADA is caused by deletion of the gene for adenosine deaminase (Severe Combine Immuno Deficiency). The deficiency of ADA can be cured by bone marrow transplantation and in some it can be treated with the help of enzyme replacement therapy in which injections of functional ADA are given to the patient. Both these methods are not completely curative. Permanent cure can be achieved if gene isolate from marrow cells producing ADA is introduced into cells at early embryonic stages.
173. Contact inhibition as the word explains 'inhibition upon contact' is the property of normal cells. This mechanism regulates the cells to grow in one layer and thus uncontrolled growth is prevented. In cancerous cells this property is lost and this results in uncontrolled proliferation and tumor formation
174. Heterotrophic organisms like bacteria and fungi act as decomposers which degrade the dead organic matter or detritus which in turn provides energy and nutrition. Decomposers secrete gastric enzymes resulting in the breakdown of dead organic matter into simple inorganic substances which are then absorbed in the soil and used by producers to grow. Hence if the decomposers are removed from the ecosystem, nutrients will not be available to producers which block the flow of minerals from producers to consumers.
175. The state of the heart when it is not able to pump blood effectively to meet the requirements of the body is known as heart failure. Another term used to describe heart failure is congestive heart failure as congestion of the lungs is one of the main symptom of this disease. Heart failure is not the same as heart attack or cardiac arrest. Cardiac arrest is the term used when the heart stops beating where as heart attack denotes damage to heart muscles due to inadequate blood supply.
176. Biosphere reserve is an in situ conservation method. Hence, it is the most effective way among the four for preserving genetic diversity by protecting wild population, traditional life style and domesticated plant genetic resource.

177. Actin filaments are made of two F actins wound helically. F actin which is a polymer is made of monomers of G actins. Two filaments of tropomyosin run close to these F actins throughout its length. Troponin which is a complex protein is distributed on tropomyosin at regular intervals. Subunit of troponin masks the active binding sites for myosin on the actin filament in the resting state.
178. New genes/alleles are added to the new population and these are lost from the old population. There would be a gene flow if this gene migration, happens multiple times. If the same change occurs by chance, it is called genetic drift. Sometimes the change in allele frequency is so different in the new sample of population that they become a different species. The original drifted population becomes founders and the effect is called founder effect.
179. The growth hormone somatotrophin is secreted by anterior pituitary. In adults, the over production of this hormone results in the elongation of jaws and deformities in the bones of face, hands and feet. This condition is called acronnegaly.
180. Logistic growth curve show sigmoid shape or S-shape curve. This growth curve is shown by the population which grows in a habitat with limited resources. The population growth shows a lag phase initially, followed by phases of increases and decrease and finally the population density reaches the carrying capacity where the population struggle to keep itself maintained, and ultimately, the population seems to be in balance or equilibrium with the limited resources.