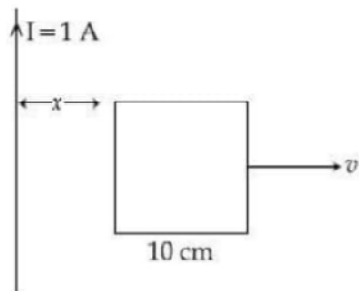


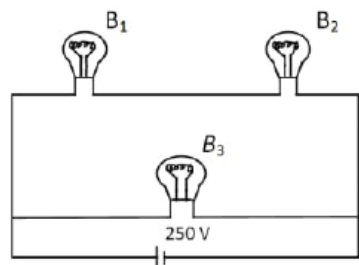
NTA NEET MOCK TEST - 7

PHYSICS

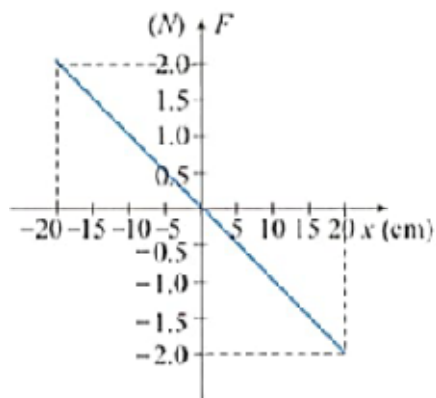
- An ideal gas is at temperature 300K. The final temperature of the gas when its volume changes from V to $2V$ in the process $P = \alpha V$ (here α is a positive constant) is
 1) 900 K 2) 1200 K 3) 600 K 4) 300 K
- A short bar magnet of magnetic moment 0.4 J T^{-1} is placed in a uniform magnetic field of 0.16 T. The magnet is in stable equilibrium when the potential energy is
 1) -0.064 J 2) Zero 3) -0.082 J 4) 0.064 J
- What is the dimension of the coefficient of viscosity η ?
 1) $ML^{-1}T^{-2}$ 2) MLT^{-1} 3) $ML^{-1}T^{-1}$ 4) $ML^{-2}T^{-2}$
- A square frame of side 10 cm and a long straight wire carrying current 1 A are in the plane of the paper. Starting from close to the wire, the frame moves towards the right with a constant speed of 10 ms^{-1} (See figure). The e.m.f. induced at the time the left arm of the frame is at $x = 10$ cm from the wire is



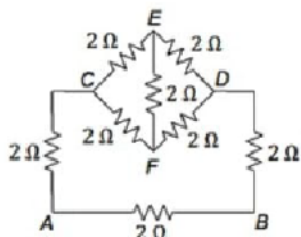
- 1) $0.75 \mu V$ 2) $1 \mu V$ 3) $2 \mu V$ 4) $0.5 \mu V$
- A ball is projected at an angle 60° with the horizontal with speed 30 m/s. What will be the speed of the ball when it makes an angle 45° with the horizontal?
 1) 30 m/s 2) $15\sqrt{2}$ m/s 3) $\frac{15}{\sqrt{2}}$ m/s 4) $30\sqrt{2}$ m/s
- In the circuit given below, a 100 W bulb B_1 and two 60 W bulbs B_2 and B_3 , are connected to a 250V direct current source. If W_1, W_2 and W_3 are the powers of the three bulbs then, which of the following statements is correct?



- 1) $W_1 > W_2 = W_3$ 2) $W_1 > W_2 > W_3$ 3) $W_1 < W_2 = W_3$ 4) $W_1 < W_2 < W_3$
- The figure shows the variation of force acting on a particle of mass 400 g executing simple harmonic motion. The frequency of oscillation of the particle is

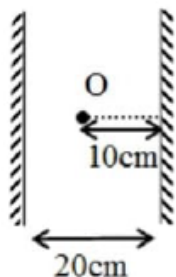


- 1) 4 s^{-1} 2) $(5/2\pi)\text{s}^{-1}$ 3) $(1/8\pi)\text{s}^{-1}$ 4) $(1/2\pi)\text{s}^{-1}$
8. 2L of water in a container is heated with a coil of 1 kW at 27°C . The lid of the container is open and energy dissipates at rate of 160 Js^{-1} . Find the time after which temperature will rise from 27°C to 77°C ?
[Given specific heat of water is $4.2\text{kJ} / \text{Kg}$]
- 1) 8 min 20 sec 2) 6 min 2 sec 3) 7 min 4) 14 min
9. Angular speed of hour hand of a clock in degree per second is
- 1) $\frac{1}{30}$ 2) $\frac{1}{60}$ 3) $\frac{1}{120}$ 4) $\frac{1}{720}$
10. Which of the following is more close to a black body?
- 1) Black board paint 2) Green leaves
3) Black holes 4) Red roses
11. The fundamental frequency of a string stretched with a weight of 4 kg is 256 Hz. The weight required to produce its octave is
- 1) 16 kg - wt 2) 12 kg - wt 3) 24 kg -wt 4) 8 kg – wt
12. Volume (V) of the nucleus is related to mass number (A) as
- 1) $V \propto A^2$ 2) $V \propto A^{1/3}$ 3) $V \propto A^{2/3}$ 4) $V \propto A$
13. A wire of length 10 m is subjected to a force of 100N along its length and hence the lateral strain produced is $0.01 \times 10^{-3} \text{ m}$. The Poisson's ratio was found to be 0.4. If the area of cross-section of wire is 0.025 m^2 , its Young's modulus will be
- 1) $1.6 \times 10^8 \text{ Nm}^{-2}$ 2) $2.5 \times 10^{10} \text{ Nm}^{-2}$ 3) $1.25 \times 10^{11} \text{ Nm}^{-2}$ 4) $16 \times 10^9 \text{ Nm}^{-2}$
14. An object is dragged along a horizontal surface by the machine which delivers a constant power. How does the distance moved by the object is dependent on time t?
- 1) $t^{3/4}$ 2) $t^{3/2}$ 3) $t^{1/4}$ 4) $t^{1/2}$
15. The resistance of the following circuit figure between A and B is



- 1) $(3/2) \Omega$ 2) 2Ω 3) 4Ω 4) 8Ω

16. Find the value of field at $x = +x$, if a uniform electric field having a magnitude E_0 and directed along the positive x -axis exists. Take the potential as zero at $x = 0$
- 1) $V(x) = +xE_0$ 2) $V(x) = -xE_0$ 3) $V(x) = +x^2E_0$ 4) $V(x) = -x^2E_0$
17. Which of the following forces can cause a change in the potential energy?
- 1) Both conservative and non-conservative forces
2) Conservative force only
3) Non-conservative force only
4) Neither conservative nor non-conservative forces
18. Two plane mirrors are kept parallel at 20 cm from each other. A point object O is placed exactly in between them. Calculate distance between second images formed by two mirrors



- 1) 80 cm 2) 60 cm 3) 40 cm 4) 10 cm
19. A uniform chain of mass 4 kg and length 2 m is kept on table such that $3/4^{\text{th}}$ of the chain hangs freely from the edge of the table. How much work has to be done in pulling the entire chain on the table?
- 1) 7.2 J 2) 120 J 3) 1200 J 4) 3.6 J
20. The Earth's atmosphere consists primarily of oxygen (21%) and nitrogen (78%). The rms speed of oxygen molecules (O_2) in the atmosphere at a certain location is 535 m/s. The rms speed of the nitrogen molecules at this location will be [Given $1 \text{ amu} = 1.66 \times 10^{-27} \text{ kg}$, molecular mass of $O_2 = 32$, molecular mass of $N_2 = 28$]
- 1) 572 m/s 2) 437 m/s 3) 835 m/s 4) 715 m/s
21. An ideal gas with pressure P , volume V and temperature T is expanded isothermally to a volume $2V$ and final pressure P_I . The same gas is expanded adiabatically to a volume $2V$ and final pressure in this case is P_A . In terms of the ratio of the two specific heats for the gas γ , the ratio P_I / P_A is
- 1) $2^{\gamma-1}$ 2) $2^{1-\gamma}$ 3) 2^γ 4) 2γ
22. A block of mass 4 kg is kept on a rough horizontal surface. The coefficient of static friction is 0.8. If a force of 19N is applied on the block parallel to the floor, then the force of friction between the block and floor is
- 1) 32 N 2) 18 N 3) 19 N 4) 9.8 N
23. Calculate the momentum transferred to a surface when a radiation of energy E falls normally on it. Assume that the reflectivity of the surface is unity
- 1) E/c 2) $2E/c$ 3) Ec 4) E/c^2
24. A projectile is fired from the surface of earth of radius R with a velocity ηv_e where v_e is the escape velocity and $\eta < 1$. Neglecting air resistance, the orbital velocity of projectile is-

1) $v_e \sqrt{1-\eta^2}$

2) $v_e \sqrt{\frac{\eta^2}{5}}$

3) $\frac{2}{5} v_e \sqrt{\eta}$

4) $\frac{2\eta}{5} v_e$

25. If the relative permittivity and permeability of a given material are ϵ_x and μ_r , respectively then, which among the following is correct for a diamagnetic material?

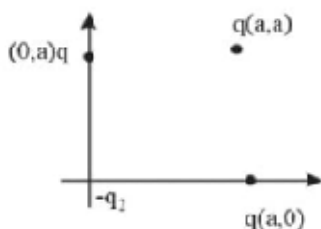
1) $\epsilon_x = 1.5, \mu_r = 1.5$

2) $\epsilon_x = 0.5, \mu_r = 1.5$

3) $\epsilon_x = 1.5, \mu_r = 0.5$

4) $\epsilon_x = 0.5, \mu_r = 0.5$

26. Calculate the net force acting on the charge present at the origin



1) $\frac{qq_1}{4\pi\epsilon_0 a^2} \times \sqrt{2}$

2) $\frac{qq_1}{4\pi\epsilon_0 \sqrt{2} a^2} + \frac{qq_1}{8\pi\epsilon_0 a^2}$

3) $\frac{qq_1}{4\pi\epsilon_0 a^2} \left(\sqrt{2} + \frac{1}{2} \right)$

4) $\frac{qq_1}{4\pi\epsilon_0 a^2} \left(\frac{1}{2} - \sqrt{2} \right)$

27. An observer looks at a distant tree of height 10 m with a lens of magnifying power of 20. To the observer the tree appears as

1) 20 times taller

2) 20 times nearer

3) 10 times taller

4) 10 times nearer

28. What is the resulting nucleus when a nucleus ${}_n^m X$ emits one α particle and two β^- particles?

1) ${}_{n-4}^{m-4} Z$

2) ${}_{n-6}^{m-6} Z$

3) ${}_n^{m-4} X$

4) ${}_{n-2}^{m-4} Y$

29. Electric displacement is given by $D = \epsilon E$, here ϵ = electric permittivity, E = electric field strength. The dimensions of electric displacement are

1) $[ML^{-2}TA]$

2) $[L^{-2}T^{-1}A]$

3) $[L^{-2}TA]$

4) None of these

30. The mean kinetic energy of one mole of gas per degree of freedom (on the basis of kinetic theory of gases) is

1) $\frac{1}{2} kT$

2) $\frac{3}{2} kT$

3) $\frac{3}{2} RT$

4) $\frac{1}{2} RT$

31. A parallel beam of light of wavelength 600nm is incident normally on a slit of width a . If the distance between the slit and the screen is 0.8m and the distance of 2nd order minimum from the centre of the screen is 1.5 mm, calculate the width of the slit

1) $9.2 \times 10^{-4} \text{ mm}$

2) $6.4 \times 10^{-4} \text{ m}$

3) $6.32 \times 10^{-6} \text{ mm}$

4) None of these

32. Two bodies begin a free fall from rest from the same height 2 seconds apart. How long after the first body begins to fall, the two bodies will be 40 m apart? (Take $g = 10 \text{ ms}^{-2}$)

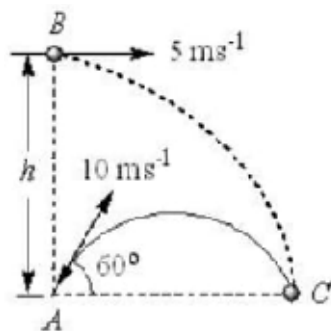
1) 1s

2) 2s

3) 3s

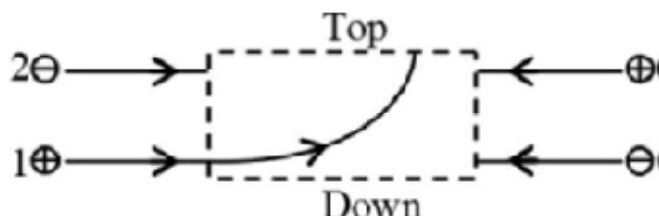
4) 4s

33. A particle A is projected from the ground with an initial velocity of 10 ms^{-1} at an angle of 60° with horizontal. From what height h should another particle B be projected horizontally with velocity 5 ms^{-1} so that both the particles collide in ground at point C if both are projected simultaneously? ($g = 10 \text{ ms}^{-2}$)



- 1) 10 m 2) 30 m 3) 15 m 4) 25 m

34. The path of a positively charged particle 1 through a rectangular region of a uniform electric field is shown in the figure. What is the direction of the uniform electric field and what are the directions of deflection of particles 2, 3 and 4?



- 1) top, down, top, down 2) top, down, down, top
3) down, top, top, down 4) down, top, down, down

35. Near and far points of human eye are

- 1) 25 cm and infinite 2) 25 cm and 100 cm
3) 55 cm and 200 cm 4) 0 cm and 25 cm

36. If a body of mass m is moving on a rough horizontal surface of coefficient of kinetic friction μ , then net electromagnetic force exerted by the surface on the body is

- 1) $mg\sqrt{1+\mu^2}$ 2) μmg 3) mg 4) $mg\sqrt{1-\mu^2}$

37. A stone is tied to one end of a string and is rotated in a horizontal circle with a uniform angular velocity. Let T be the tension in the string. If the length of the string is halved and the angular velocity of the stone is doubled, the tension in the string will be

- 1) $2T$ 2) $4T$ 3) T 4) $8T$

38. A straight conductor of length 0.4m is moving with a speed of 7 ms^{-1} perpendicular to the magnetic field of intensity of 0.9 Wb ms^{-2} . The induced emf across the conductor will be

- 1) 7.25 V 2) 5.52 V 3) 1.25 V 4) 2.52 V

39. Two spheres A and B have diameters in the ratio $1 : 2$, densities in the ratio $2 : 1$ and specific heat capacities in the ratio $1 : 3$. The ratio of their thermal capacities is

- 1) $1 : 6$ 2) $1 : 12$ 3) $1 : 3$ 4) $1 : 4$

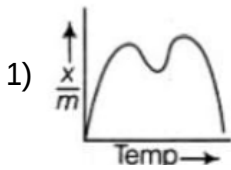
40. A fish is near the centre of a spherical fishbowl filled with water ($\mu_w = 4/3$). A child is standing at a distance of $2R$ from the centre of the bowl, where R is the radius of curvature of the bowl. The distance from the centre of the fishbowl, where the child's nose will appear to the fish is

- 1) R 2) $2R$ 3) $3R$ 4) $4R$

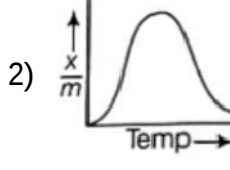
41. A conducting circular loop of radius r carries a constant current i . It is placed in a uniform magnetic field B_0 which is perpendicular to the plane of the loop. The magnetic force acting on the loop is

- 1) irB_0 2) $2\pi irB_0$ 3) zero 4) πirB_0
42. An object of mass 4 kg and another object of mass 1 kg are moving such that they have equal kinetic energies. The ratio of the magnitudes of their linear momenta is
 1) 1 : 2 2) 1 : 1 3) 2 : 1 4) 4 : 1
43. A bullet of mass 10 g moving horizontally with a velocity of 400 ms^{-1} strikes a wooden block of mass 2 kg which is suspended by a light inextensible string of length 5m. As a result, the centre of gravity of the block is found to rise a vertical distance of 10 cm. The speed of the bullet after it emerges out horizontally from the block will be
 1) 100 ms^{-1} 2) 80 ms^{-1} 3) 120 ms^{-1} 4) 160 ms^{-1}
44. The ratio of the magnetic field at the centre of a current carrying circular coil to its magnetic moment is x . If the current and radius both are doubled the new ratio will become
 1) $2x$ 2) $4x$ 3) $x/4$ 4) $x/8$
45. In a series L-R circuit, under which condition the power loss will be least for an a.c. voltage source?
 1) high resistance and high inductance 2) high resistance and low inductance
 3) low resistance and high inductance 4) low resistance and low inductance

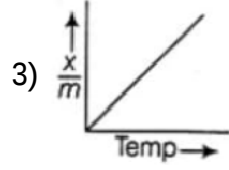
CHEMISTRY

46. The density of a gas is 1.964 g dm^{-3} at 273 K and 76 cm Hg. The gas is
 1) CH_4 2) C_2H_6 3) CO_2 4) Xe
47. If $\text{Fe}(\text{CO})_5$, the Fe-C bond possesses
 1) π -character only 2) Ionic character 3) σ -character only 4) Both σ and π characters
48. Which is used in the formation of nylon – 6, 6?
 1) Sulphurhexa fluoride 2) Adipic acid
 3) Sulphurous acid 4) Phthalic acid
49. Which of the following represents physical adsorption?
- 

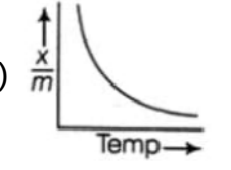
1)



2)

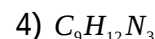
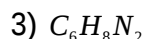
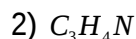
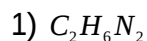


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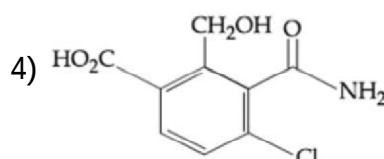
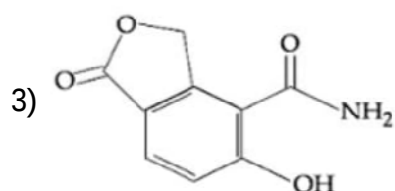
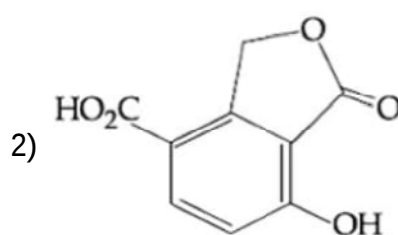
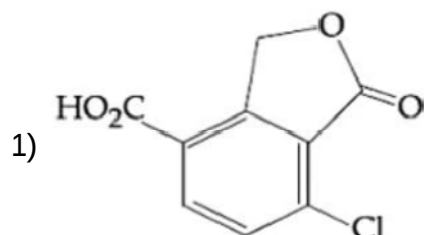
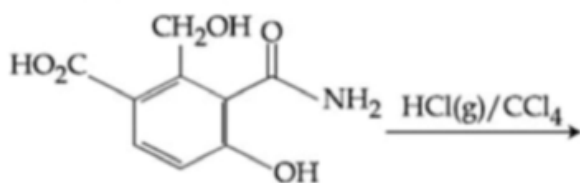


4)
50. $(\text{CH}_3)_3\text{CMgCl}$ on reaction with D_2O produces-
 1) $(\text{CH}_3)_3\text{CD}$ 2) $(\text{CH}_3)_3\text{OD}$ 3) $(\text{CD}_3)_3\text{CD}$ 4) $(\text{CD}_3)_3\text{OD}$
51. Difference in density is the basis of
 1) Ultrafiltration 2) Molecular sieving 3) Gravity separation 4) Molecular attraction
52. Stilbene ($\text{PhCH}=\text{CHPh}$) can exist in two diastereomeric forms (X) and (Y) and (X) is found to be more soluble in water than (Y). Predict which of the following statement is correct?
 1) X is trans isomer 2) Stability of X > Stability of Y
 3) Melting point of X > melting point of Y 4) Boiling point of X > boiling point of Y
53. "Chile Saltpetre" is an ore of
 1) Iodine 2) Sodium 3) Bromine 4) Magnesium

54. Which among the following statements is false?
- 1) The correct order of osmotic pressure for 0.01 M aqueous solution of each compound is $BaCl_3 > KCl > CH_3COOH > Sucrose$
 - 2) The osmotic pressure (π) of a solution is given by the equation $\pi = MRT$, (where M is the molarity of the solution)
 - 3) Raoult's law states that the vapour pressure of a component over a solution is proportional to it's mole fraction
 - 4) Two sucrose solutions of the same molaltiy prepared in different solvents will have the same freezing point depression
55. The rate law of reaction between the substances A and B is given by
 $Rate = k[A]^n[B]^m$
 On doubling the concentration of A and having the concentration of B, the rtio of the new rate to the earlier rate of reaction will be
- 1) $m + n$
 - 2) $n - m$
 - 3) $2^{(n-m)}$
 - 4) 2^{m+n}
56. How many carbon atoms are present in 0.35 mole of $C_6H_{12}O_6$?
 (Given: $N_A = 6.023 \times 10^{23}$)
- 1) 1.26×10^2 carbon atoms
 - 2) 1.26×10^{24} carbon atoms
 - 3) 1.26×10^{44} carbon atoms
 - 4) 1.26×10^{48} carbon atoms
57. Which of the following configurations, forms an outer octahedral complex only?
- 1) d^4
 - 2) d^8
 - 3) d^6
 - 4) None of these
58. Which of the following is a hypnotic drug
- 1) Luminal
 - 2) Salol
 - 3) Catechol
 - 4) paracetamol
59. Which of the following statements is correct?
- 1) The electronic configuration of Cr is $[Ar]3d^5, 4s^1$ (Atomic No. of Cr = 24)
 - 2) The magnetic quantum number may have a negative value
 - 3) In silver atom, 23 electrons have a spin of one type and 24 of the opposite type, (Atomic No. of Ag = 47)
 - 4) All of the above
60. Which of the following is the wrong statement?
- 1) All the actinoid elements are radioactive
 - 2) Alkali and alkaline earth metals are s-block elements
 - 3) Chalcogens and halogens are p-block elements
 - 4) The first member of the lanthanoid series is lanthanum
61. A gaseous mixture containing He, CH_4 and SO_2 was allowed to effuse through a fine hole then find what molar ratio of gases coming out initially? (Given mixture contains He, CH_4 and SO_2 in 1 : 2 : 3 mole ratio)
- 1) $\sqrt{2} : \sqrt{2} : 3$
 - 2) 2 : 2 : 3
 - 3) 4 : 4 : 3
 - 4) 1 : 1 : 3
62. In a compound C, H and N atoms are present in 9 : 1 : 3.5 by weight. Molecular weight of compound is 108. Molecular formula of compound is



63. The major product expected from the following reaction is



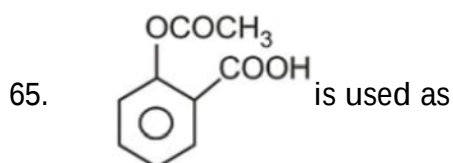
64. PCl_5 Causes cleavage of ether linkage $R-O-R'$ forming RCl and $R'Cl$ and $POCl_3$. $C_5H_{12}O$ on reaction with PCl_5 forms 2-chloropropane and 1-chloroethane as main compounds. Thus, $C_5H_{12}O$ is named as

1) 1-ethoxypropane

2) 2-ethoxypropane

3) 1-ethylpropane

4) 2-ethylpropane



1) Antacid

2) Insecticide

3) Antihistamine

4) Analgesic

66. The density of KBr is 2.75 g cm^{-3} , length of the unit cell is 654 pm. $K = 39$, $Br = 80$, then what can be true about the predicted nature of the solid?

(Given : $N_A = 6.023 \times 10^{23}$)

1) Solid has face centred cubic system with co-ordination number = 6

2) Solid has simple cubic system with co-ordination number = 4

3) Solid has face centered cubic system with co-ordination number = 1

4) None of the above

67. Benzamide on treatment with $POCl_3$ gives

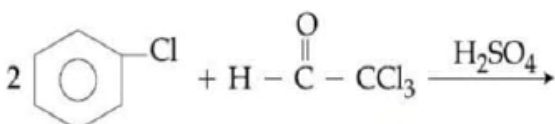
1) Aniline

2) Benzonitrile

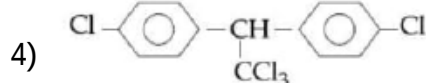
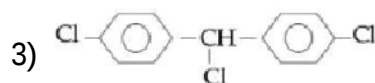
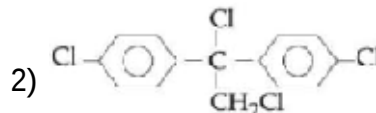
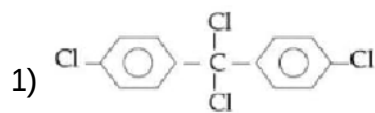
3) Chlorobenzene

4) Benzyl amine

68. Chlorobenzene reacts with Trichloro acetaldehyde in the presence of H_2SO_4



The major product formed is:



69. Electrolysis of a solution of HSO_4^- ions produces $\text{S}_2\text{O}_8^{2-}$. Assuming 75% current efficiency, what current should be employed to achieve a production rate of 1 mol of $\text{S}_2\text{O}_8^{2-}$ per hour?
- 1) 71.50 A 2) 35.70 A 3) 142.96 A 4) 285.93 A
70. Sodium chloride is soluble in water but not in benzene because
- 1) $\Delta H_{\text{Solvation}} < \Delta H_{\text{Lattice energy}}$ in water and $\Delta H_{\text{Solvation}} > \Delta H_{\text{Lattice energy}}$ in benzene
- 2) $\Delta H_{\text{Solvation}} > \Delta H_{\text{Lattice energy}}$ in water and $\Delta H_{\text{Solvation}} < \Delta H_{\text{Lattice energy}}$ in benzene
- 3) $\Delta H_{\text{Solvation}} = \Delta H_{\text{Lattice energy}}$ in water and $\Delta H_{\text{Solvation}} < \Delta H_{\text{Lattice energy}}$ in benzene
- 4) $\Delta H_{\text{Solvation}} < \Delta H_{\text{Lattice energy}}$ in water and $\Delta H_{\text{Solvation}} = \Delta H_{\text{Lattice energy}}$ in benzene
71. The compound in which carbon uses only its sp^3 hybrid orbitals for bond formation is
- 1) $(\text{CH}_3)_3\text{COH}$ 2) HCOOH 3) CH_3COH 4) $(\text{H}_2\text{N})_2\text{CO}$
72. Which of the following will produce only one product on reduction with LiAlH_4 ?
- 1) $\text{CH}_3\text{COOCH}_2\text{CH}_3$ 2) $\text{CH}_3\text{CH}_2\text{OCOCH}_2\text{CH}_3$
- 3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCOCH}_3$ 4) $\text{CH}_3\text{CH}_2\text{OCOCH}_2\text{CH}_2\text{CH}_3$
73. When H_2O_2 is oxidized, the product is
- 1) OH^- 2) O_2 3) O^{2-} 4) HO_2^-
74. Fill in the blank:
- ${}_{92}^{235}\text{U} + {}_0^1\text{n} \rightarrow ? + {}_{36}^{92}\text{Kr} + 3{}_0^1\text{n}$
- 1) ${}_{56}^{141}\text{Ba}$ 2) ${}_{56}^{139}\text{Ba}$ 3) ${}_{54}^{139}\text{Ba}$ 4) ${}_{54}^{141}\text{B}$
75. The pH value of decinormal solution of NH_4OH , which is 20% ionized, is
- 1) 13.30 2) 14.70 3) 12.30 4) 12.95
76. Among the following, the compound that is both paramagnetic and coloured is:
- 1) $\text{K}_2\text{Cr}_2\text{O}_7$ 2) KMnO_4 3) CoSO_4 4) $\text{K}_3[\text{Cu}(\text{CN})_4]$
77. The alkali metals form salt-like hydrides by the direct synthesis at elevated temperature. The thermal stability of these hydrides decreases in which of the following orders?
- 1) $\text{NaH} > \text{LiH} > \text{KH} > \text{RbH} > \text{CsH}$ 2) $\text{LiH} > \text{NaH} > \text{KH} > \text{RbH} > \text{CsH}$
- 3) $\text{CsH} > \text{RbH} > \text{KH} > \text{NaH} > \text{LiH}$ 4) $\text{KH} > \text{NaH} > \text{LiH} > \text{CsH} > \text{RbH}$
78. By the ozonolysis of $\text{RCH}=\text{CR}_1\text{R}_2$ which of the following of the product is obtained?
- 1) $\text{R}_1\text{CH}_2\text{CH}_2\text{R}_2$ 2) R_2CO 3) R_1COR_2 4) None of these
79. The relative lowering of vapour pressure of an aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is
- 1) 0.70 2) 0.50 3) 0.80 4) 0.40
80. A chemistry student trying to detect the metallic ion in a salt, makes a paste on a clean platinum wire loop of the salt with concentrated HCl . When he takes a small amount of this

paste and keeps it in a non-luminous Bunsen flame, the colour of the flame changes to grassy green. He should, therefore, conclude that the metal is

- 1) Barium 2) Calcium 3) Potassium 4) Strontium

81. Electronegativity values for elements are useful in predicting

- 1) Polarity of bonds in molecules
2) Positions of elements in electrochemical series
3) Co-ordination number of elements
4) Oxidation number of elements

82. The enthalpy of vaporization of liquid is 30 KJ mol^{-1} and entropy of vaporization is $75 \text{ J mol}^{-1} \text{ K}$. The boiling point of the liquid at 1 atm is

- 1) 250 K 2) 400 K 3) 450 K 4) 600 K

83. Lanthanide contraction is caused due to

- 1) The imperfect shielding on outer electrons by 4-f electrons from the nuclear charge
2) The appreciable shielding on outer electrons by 4-f electrons from the nuclear charge
3) The appreciable shielding on outer electrons by 5d electrons from nuclear charge
4) The same effective nuclear charge from Ce to Lu

84. Which of the following is/are not a constant value between two given thermodynamic states of a given system?

(i) $q + w$

(ii) q

(iii) w

(iv) $H - TS$

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

85. Which element among the following cannot form an amphoteric oxide?

- 1) Al 2) Sn 3) Sb 4) P

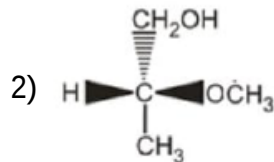
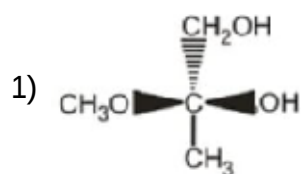
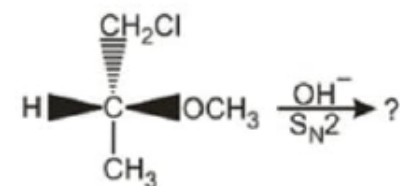
86. What is the potential of an electrode which originally contained 0.1 M NO_3^- and 0.4 M H^+ and which has been treated by 60% of the cadmium necessary to reduce all the NO_3^- to NO(g) at 1 atm

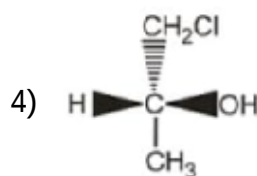
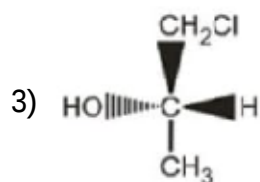
Given,



- 1) 0.52 V 2) 0.44 V 3) 0.86 V 4) 0.78 V

87. What is the major product of the reaction?





88. Rutherford's alpha particle scattering experiment eventually led to the conclusion that
- 1) mass and energy are related
 - 2) electrons occupy space around the nucleus
 - 3) neutrons are burned deep in the nucleus
 - 4) the point of impact with matter can be precisely determined
89. Compound $[Fe(NO_2)_3Cl_3]$ and $[Fe(ONO)_3Cl_3]$ shows which kind of isomerism in the following
- 1) Linkage isomerism
 - 2) Geometrical isomerism
 - 3) optical isomerism
 - 4) Hydrate isomerism
90. The equilibrium constant of the reaction
- $$A_2(g) + B_2(g) \rightleftharpoons 2AB(g)$$
- at 373 K is 50. If 1L of flask containing 1 mole of A_2 g is connected to 2L flask containing 2 moles $B_2(g)$ at $100^\circ C$, the amount of AB produced at equilibrium at $100^\circ C$ would be
- 1) 0.93 mol
 - 2) 1.87 mol
 - 3) 2.80 mol
 - 4) 3.74 mol

BIOLOGY

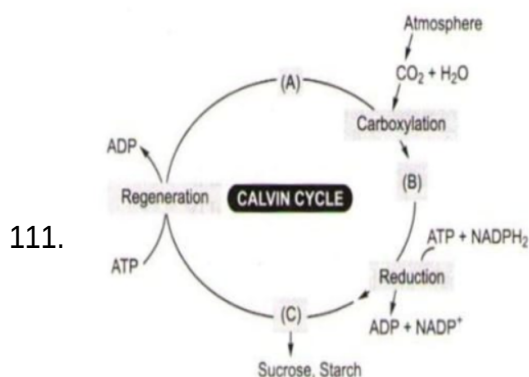
91. Which one of the following statement is true regarding the digestion and absorption of food in humans?
- 1) About 60% of starch is hydrolysed by salivary amylase in our mouth.
 - 2) Chylomirons are small lipoprotein particles that are transported from the intestine into blood capillaries.
 - 3) Fructose and amino acids are absorbed through intestinal mucosa with the help of carrier ions like Na^+ .
 - 4) Oxyntic cells in our stomach secrete the proenzyme pepsinogen
92. The basic unit of study in ecology is
- 1) Population
 - 2) Organism
 - 3) Community
 - 4) Species
93. Which option is incorrectly matched?
- 1) EcoRI – Production of sticky ends
 - 2) DNA ligase – Multiplication of DNA molecules
 - 3) ori – copy number
 - 4) Selectable marker – Identification of transformants
94. Which of the following is the correct description of the mechanism of action of a combined pill?
- 1) These inhibit ovulation and implantation as well as alter the quality of cervical mucus to prevent the entry of sperms.
 - 2) These prevent the physical meeting of sperm and ovum.
 - 3) These increase the phagocytosis of sperms within the uterus. These also suppress sperm motility and the fertilizing capacity of sperms.
 - 4) These prevent conception by blocking the entry of sperms through the cervix.

95. In 1963, several varieties such as Sonalika and Kalyan Sona, which were high yielding and disease resistant variety of
 1) Wheat 2) Bajra 3) Rice 4) All the above
96. If the heartbeat of a person is about 75 beats per minute, and stroke volume is 70 mL per minute, then the cardiac output will be
 1) 5000 mL 2) 5250 mL 3) 5500 mL 4) 5150 mL
97. In Amoeba the ____ (i) ____ vacuole is important for osmoregulation and excretion. In many cells, as in protists, ____ (ii) ____ vacuoles are formed by engulfing the particles.
 1) (i) food; (ii) contractile 2) (i) osmoregulatory; (ii) contractile
 3) (i) food; (ii) osmoregulatory 4) (i) contractile; (ii) food
98. Match the following column I with column II and choose the option with the accurate matches.

	Column I		Column II
(a)	Operator site	(i)	The binding site for RNA polymerase
(b)	Promoter site	(ii)	The binding site for repressor molecule
(c)	Regulator gene	(iii)	Codes for protein/enzyme
(d)	Structural gene	(iv)	Codes for repressor molecule

- 1) a - (ii), b - (i), c - (iii), d - (iv) 2) a - (ii), b - (i), c - (iv), d - (iii)
 3) a - (iv), b - (iii), c - (i), d - (ii) 4) a - (ii), b - (iii), c - (i), d - (iv)
99. Baculoviruses are pathogens that attack
 1) Insects 2) Arthropods 3) Aphids 4) Both (a) and (b)
100. Which one of the following statements is incorrect for the interphase stage?
 1) Period of great metabolic activity 2) Also called as preparatory phase
 3) Absence of replication of DNA 4) It covers over 95% of the total duration of cell cycle
101. The common molecule between the Krebs cycle and C₄ pathway is
 1) Phosphoenolpyruvate 2) Ribulose 1, 5-disphosphate
 3) Oxalo-acetic acid 4) Phosphoglyceric acid
102. What are flocs?
 1) Masses of fungi with root of higher plants 2) Association of fungi with algae
 3) Masses of bacteria with fungi 4) Masses of bacteria with leguminous plants
103. Which one of the following is correct with respect to Euro-III norms?
 1) Sulphur to be controlled at 150 ppm in diesel and 350 ppm in petrol.
 2) Aromatic hydrocarbons are to be contained at 42% of the concerned fuel.
 3) The goal, according to the roadmap, is to reduce sulphur to 150 ppm in petrol and 50 ppm in diesel.
 4) All of these
104. Which of the following is/are examples(s) of passive immunity?
 1) Antibodies present in colostrum
 2) Antibodies received by foetus through placenta

- 3) Antibodies against the snake venom injected in patients
4) All of these
105. The deficiency of micronutrients, not only affect the growth of a plant but also affects the vital functions such as photosynthesis and cellular respiration. Among the list given below, which group of three elements shall affect both photosynthesis and cellular respiration the most?
1) Cu, Mn, and Fe 2) Co, Ni, and Mo 3) Mn, Co, and Ca 4) Ca, K, and Na
106. A vein possesses a large lumen because
1) Tunica media and tunica externa form a single coat
2) Tunica interna and tunica media form a single coat
3) Tunica interna, tunica media and tunica externa are thin
4) Tunica media is a thin coat
107. Osteoporosis, an age-related disease of the skeletal system, may occur due to
1) Immune disorder affecting neuromuscular junction leading to fatigue
2) High concentration of Ca^{++} and Na^+
3) Decreased level of estrogen
4) Accumulation of uric acid leading to inflammation of joints
108. The most widely accepted theory of ascent of sap in trees is
1) Capillarity 2) Role of atmospheric pressure
3) Pulsating action of living cell 4) Cohesion-tension-transpiration pull model
109. Which of the following statements is true?
1) Spores are always diploid. 2) Spores and gametes are diploid.
3) Gametes are always haploid. 4) Spores are gametes.
110. Which is/are correct statement/s?
1) In flowering plants, tracheids and vessels are the main water transporting elements.
2) In gymnosperms, tracheids are the chief water transporting elements
3) The companion cells play an important role in the maintenance of a pressure gradient in the sieve tubes
4) All of these



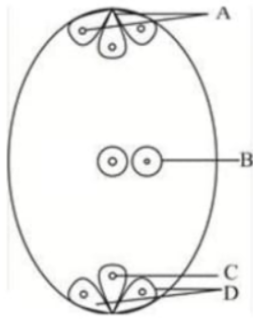
- 1) A-RuBp, B-Triose phosphate, C-PGA 2) A-PGA, B-RuBP, C-Triose phosphate
3) A-PGA, B-Triose phosphate, C-RuBP 4) A-RuBP, B-PGA, C-Triose phosphate
112. There are various types of reproduction. The type of reproduction adopted by an organism depends on
1) The habitat and morphology of the organism

- 2) Morphology of the organism
- 3) Morphology and physiology of the organism
- 4) The organism's habitat, physiology and genetic makeup

113. Select the option that is correct with respect to Trypanosoma.

- 1) They are flagellated protozoans.
- 2) They are parasites.
- 3) They cause sleeping sickness.
- 4) All of the above

114. Given below is the diagram of the embryo sac with certain labels (A-D). Select the option that correctly identifies the labels.



- 1) A – Three antipodal cells, B – Two polar nuclei, C – Two synergid, D – Egg cell
- 2) A – Three antipodal cells, B – Two polar nuclei, C – Egg cell, D – Two synergid
- 3) A – Two antipodal cells, B – Three polar nuclei, C – Two synergid, D – Egg cell
- 4) None of these

115. Select the correct statement regarding post-transcriptional modification.

- 1) In capping, methyl guanosine triphosphate is added at the 3' end.
- 2) In tailing, adenylate residues (200-300) are added at 3'-end template-dependent manner.
- 3) It is a process of conversion of mRNA to hnRNA
- 4) It involves removal of introns and joining of exons.

116. When food energy passes from herbivores to carnivorous,

- 1) Some energy is increased
- 2) Some energy is decreased
- 3) Remain unchanged
- 4) Not relevant

117. Select the incorrect statement.

- 1) The countercurrent mechanism changes the isotonic glomerular filtrate into hypertonic urine by increasing salt concentration around the nephron and collecting tubule.
- 2) The wall of collecting tubule is permeable to water whereas, ascending limb is impermeable to water
- 3) The absorption of water in DCT is facultative.
- 4) As the filtrate passes through the ascending limb, sodium is transported passively in the ascending thick segment.

118. In an organism, enzymes generally have

- 1) Same pH and temperature optima
- 2) Same pH but different temperature optima
- 3) Different pH but same temperature optima
- 4) Different pH and different temperature optima

119. The statements given below describe certain features that are observed in the pistil of flowerd.

- i. A pistil may have many carpels.
- ii. Each carpel may have more than one ovule.
- iii. Each carpel has only one ovule.
- iv. A pistil has only one carpel.

Choose the statements that are true from the options

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

120. Read the following statements for lac operon:

- i. Each operon has its specific operators and specific repressor.
 - ii. The y gene codes for permease, which increases the permeability of the cell to beta-galactosides.
 - iii. Regulation of lac operon can be visualized as regulation of enzyme synthesis by its substrate.
- Select the option with the correct statements.

- 1) All statements are correct
- 2) All statements are incorrect
- 3) Only I is correct and ii & iii are incorrect
- 4) Only I & iii are correct

121. Which type of population interaction is found between clown fish and sea anemone?

- 1) Brood parasitism
- 2) Parasitism
- 3) Mutualism
- 4) Commensalism

122. In vertebrates, the notochord is modified into

- 1) Vertebral column
- 2) Centrum of vertebrae
- 3) Body of vertebrae
- 4) Transverse process of vertebrae

123. The hormone released during post-ovulatory phase helps in

- 1) Maintenance of pregnancy
- 2) Development of secondary sexual characters
- 3) Ovulation
- 4) Increase in production of FSH and LH

124. In _____ resistance to yellow mosaic virus and powdery mildew induced by mutations.

- 1) Wheat
- 2) Mung bean
- 3) Bhindi
- 4) Chilli

125. Given below is an incomplete table about hormones, their source glands and one major effect of each on the body in humans. Identity the correct option for the three blanks A, B, and C.

Source gland	Hormone	Function
A	Oestrogen	Maintenance of secondary character
Alpha cells of islets of Langerhans	B	Raises blood sugar level
Anterior pituitary	C	Over secretion leads to

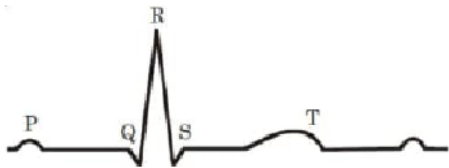
- 1) A-Ovary; B-Glucagon; C-Growth hormone
- 2) A-Placenta; B-Insulin; c-Vasopressin
- 3) A-Ovary; B-Insulin; C-Calcitonin
- 4) A-Placenta; B-Glucagon; C-Calcitonin

126. One set of plants was grown at 12 hours day and 12 hours night period cycles, and it flowered. While in the other set, the night phase was interrupted by the flash of light and did not produce flowers. Under which one of the following categories will you place this plant?

- 1) Long-day
- 2) Darkness neutral
- 3) Day-neutral
- 4) short-day

127. What is the correct regarding ecological succession?

- 1) The decrease in biodiversity at each transitional level.
 - 2) Primary succession is faster than secondary succession
 - 3) Change to environmental condition extreme to mesic
 - 4) The climax community is most stable with the environment as the niche and food web complexity is less
128. A taxon, which is facing an extremely high risk of extinction in the wild in immediate future is known as
- 1) Exotic
 - 2) Vulnerable
 - 3) Endangered
 - 4) Critically endangered
129. One of the most important consequences of geographical isolation is
- 1) Preventing speciation
 - 2) Speciation through reproductive isolation
 - 3) Random creation of new species
 - 4) No change in the isolated fauna
130. Given below is the ECG of a normal human. Which one of its components is correctly interpreted below?



- 1) Peak P- Initiation of left atrial contraction only
 - 2) Peak T – Initiation of total cardiac contraction
 - 3) Peak P and Peak R together – Systolic and diastolic blood pressure
 - 4) Complex QRS – One complete pulse.
131. Which of the following is categorised as a parasite in true sense?
- 1) The female Anopheles bites and sucks blood from humans
 - 2) Human foetus developing inside the uterus draws nourishment from the mother
 - 3) Head louse living on the human scalp as well as laying eggs on human hair
 - 4) The cuckoo (koel) lays its eggs in crow's nest
132. Many freshwater animals cannot live for long in sea water and vice versa mainly because of the
- 1) Change in nitrogen levels
 - 2) Change in the levels of thermal tolerance
 - 3) Variations in light intensity
 - 4) Osmotic problems
133. Which of the following is the most abundant protein in animals?
- 1) Haemoglobin
 - 2) Keratin
 - 3) RuBisCo
 - 4) Collagen
134. Select the incorrect statement
- 1) Every 100 ml of deoxygenated blood, delivers approximately 4 ml of CO_2 to the alveoli
 - 2) Carbonic anhydrase is present in very high concentration in RBC
 - 3) High $p\text{CO}_2$ and low $p\text{O}_2$ in tissue help in binding of carbon dioxide
 - 4) CO_2 is carried in haemoglobin as carboxyhemoglobin
135. During the resting state of the neural membrane, if diffusion occurs due to concentration gradients, it would drive
- 1) K^+ into the cell
 - 2) K^+ and Na^+ out of the cell
 - 3) Na^+ into the cell
 - 4) Na^+ out of the cell
136. Cold-blooded animals fall under the category of
- 1) Ectotherms
 - 2) Psychrotherms
 - 3) Endotherms
 - 4) Thermophiles

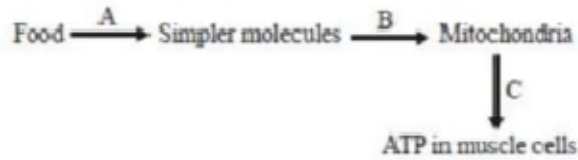
137. In the F₂ generation, genotypic and phenotypic ratios are identical in case of
- 1) Complementary genes
 - 2) Mendelian dihybrids
 - 3) Mendelian monohybrids
 - 4) Incomplete dominance
138. Which of the following is a macronutrient?
- 1) Molybdenum
 - 2) Calcium
 - 3) Zinc
 - 4) Manganese
139. Which of the following is correct with respect to tools of RDT?
- 1) Presence of more than one recognition site for one enzyme, within a vector, generate several fragments, which will complicate gene cloning
 - 2) Ligation of alien DNA is carried out at a restriction site present in 'Ori'.
 - 3) In pBR322, two antibiotic resistance gene helps in selection of transformants, whereas the other helps in cloning
 - 4) Rop codes for proteins involved in ligation of foreign DNA
140. Which one of the following systems is commonly used in alcoholic fermentation?
- 1) Bacterial system
 - 2) Algal system
 - 3) Fungal system
 - 4) Viral system
141. The movement of mineral ions into plant root cells as a result of diffusion is called
- 1) Osmosis
 - 2) Active absorption
 - 3) Passive absorption
 - 4) Endocytosis
142. In which of the following, do both the names refer to the same thing?
- 1) Tricarboxylic acid cycle and urea cycle
 - 2) Krebs cycle and Calvin cycle
 - 3) Tricarboxylic acid cycle and citric acid cycle
 - 4) Citric acid cycle and Calvin cycle
143. A small protein that is attached to the outer surface of the inner membrane of mitochondria and acts as a mobile carrier for electron transfer in oxidative phosphorylation is
- 1) Ubiquinone that receives electron from complex I only
 - 2) Cytochrome c₁ between complex III and complex IV
 - 3) Cytochrome c between complex III and complex IV
 - 4) Plastocyanin
144. Find the odd one out, with respect to Chargaff's rule
- 1) A + T = C + G
 - 2) A + G = C + T
 - 3) $\frac{A+G}{C+T} = 1$
 - 4) Base ration A/T is close to unity and C/G is also close to unity
145. Maximum trapping of solar energy is observed in,
- 1) Planting trees
 - 2) Cultivating crops
 - 3) Growing algae in tanks
 - 4) Growing grasses
146. Homeothermy is found in
- 1) Rat
 - 2) Fish
 - 3) Frog
 - 4) Lizard
147. Which of the following disease is called kusht rog?
- 1) Whooping cough
 - 2) Plague
 - 3) Diphtheria
 - 4) Leprosy
148. Which of the following feature of halophiles, is used to differentiate them eubacteria?
- 1) Having different cell wall and cell membrane structure
 - 2) They survival in extreme conditions
 - 3) They belong to archaebacteria
 - 4) All are correct

149. Which of the following factors regulate human life with reference to population density?
- 1) Availability of food, housing and health facilities
 - 2) Urbanisation
 - 3) Climatic conditions
 - 4) All the above
150. Which of the following is correct regarding the separation of DNA fragments during gel electrophoresis?
- 1) Smallest fragment will move to the farthest point towards cathode
 - 2) Smallest fragment will move to the farthest point towards anode
 - 3) Largest fragment will move to the farthest point towards anode
 - 4) Largest fragment will move to the farthest point towards cathode
151. Endosperm is consumed by developing embryo in the seed of
- 1) Pea
 - 2) Maize
 - 3) Coconut
 - 4) Castor
152. In a cell, the number of chromosomes is the same, but the amount of DNA content has changed from C to 2C. Also, the amount of histones in the cell becomes double. In which stage of the cell cycle, the process could have happened?
- 1) G_1 phase
 - 2) S phase
 - 3) G_2 phase
 - 4) G_0 phase
153. Which of the following statement is correct?
- 1) Extensive use of chemical fertilizers may lead to eutrophication of nearby water bodies
 - 2) Both Azotobacter and Rhizobium fix atmospheric nitrogen in root nodules of plants
 - 3) Cyanobacteria such as Anabaena and Nostoc are important mobilizers of phosphates and potassium for plant nutrition in the soil
 - 4) At present, it is not possible to grow maize without chemical fertilizers
154. Erythroblastosis foetalis can be seen in marriage between
- 1) Rh-ve male and Rh+ve female
 - 2) Rh+ve male and Rh-ve female
 - 3) Rh-ve male and Rh-ve female
 - 4) Rh+ve male and Rh+ve female
155. The situation where indigenous knowledge of nature, originating with indigenous people, is used by other for profit, without taking proper permission from them and with little or no compensation or recognition to the indigenous people themselves is known as
- 1) Biopatents
 - 2) Biopiracy
 - 3) Biological diversity
 - 4) Ethical issues
156. The region of chromatin that is stained lightly is
- 1) Heterochromatin
 - 2) Transcriptionally inactive region
 - 3) Centromere
 - 4) Transcriptionally active region
157. Select the correct option regarding respiratory volumes
- 1) Total capacity of lungs = Vital capacity + Tidal air
 - 2) Vital capacity of lungs = Total lung capacity – Residual air
 - 3) Vital capacity of lungs = Tidal air + Complemental air
 - 4) Total capacity of lungs = Tidal air + Complemental air + Supplemental air
158. In photosynthesis, the light-independent reactions take place in
- 1) Photosystem I
 - 2) Photosystem II
 - 3) Stromal matrix
 - 4) Both (1) and (2)
159. In microsporangium, cells of which layer have more than one nucleus?
- 1) Epidermis
 - 2) Tapetum
 - 3) Middle layers
 - 4) Endothecium

160. If a female has a rudimentary ovary but can provide a suitable environment for the growth of the foetus, the ART technique that can be used is
- 1) IVF - ET
 - 2) Artificial insemination
 - 3) GIFT
 - 4) ICSI
161. Which of the following is correct about association areas of brain?
- 1) They are large regions that are neither clearly sensory nor motor in function
 - 2) They are responsible for communication and memory
 - 3) They control several emotional reactions
 - 4) Both (1) and (2)
162. Which of the following option explains the correct function of cortisol?
- 1) Reabsorption of Na^+ and water and excretion of K^+ and phosphate ions
 - 2) To produce anti-inflammatory reactions
 - 3) To carry out glycolysis, lipogenesis, and proteolysis
 - 4) To increase cellular uptake and utilization of amino acids
163. In which class of fungi, asexual spores are produced exogenously, while sexual spores are produced endogenously?
- 1) Deuteromycetes
 - 2) Ascomycetes
 - 3) Phycomycetes
 - 4) Basidiomycetes
164. In a prokaryotic cell, mesosomes functions is
- 1) DNA replication and distribution to daughter cells
 - 2) Formation of cell wall, increase the surface area of the plasma membrane and enzymatic content
 - 3) Respiration and secretion processes
 - 4) All of these
165. In Spirogyra, meiosis occurs during
- 1) Vegetative reproduction
 - 2) Zoospore formation
 - 3) Zygospore formation
 - 4) Gamete formation
166. Amnion helps in
- 1) Exchange of gases and respiration in the foetus
 - 2) Excretion of waste material produced by the foetus
 - 3) Provide nourishment to the foetus
 - 4) Protection of the foetus from mechanical shock
167. In stems, the protoxylem lies towards the center (pith) and the metaxylem lies towards the periphery of the organ. This type of primary xylem is called
- 1) Exarch
 - 2) Endarch
 - 3) Both (1) and (2)
 - 4) None of these
168. Which of the following correctly characterizes the plant body of Funaria?
- 1) Predominantly gametophyte with dependent sporophyte
 - 2) Completely gametophyte
 - 3) Predominantly sporophyte with dependent gametophyte
 - 4) Completely sporophyte
169. Plants can be cultivated in soil less medium where all required nutrients are supplied from the outside in water solution, this method comes under

- 1) Aeroponics 2) Hydroponics 3) Hybrid culture 4) Critical culture media

170. The correct sequence of processes represented by A, B and C are



- 1) Diffusion → Synthesis → Active transport 2) Digestion → Excretion → Cellular respiration
 3) Synthesis → Active transport → Excretion 4) Digestion → Diffusion → Cellular respiration
171. Identify the correct sequence through which the inhaled air moves?
- 1) Trachea – lungs- larynx – pharynx - alveoli
 2) Nose – larynx – pharynx – bronchus – alveoli – bronchioles
 3) Nostrils – pharynx – larynx – trachea – bronchi – bronchioles – alveoli
 4) Nose – mouth – lungs
172. Which of the following features is not present in the phylum Arthropoda?
- 1) Chitinous exoskeleton 2) Metameric segmentation
 3) Parapodia 4) Jointed appendages
173. Cytochromes are found in
- 1) Matrix of mitochondria 2) Outer wall of mitochondria
 3) Cristae of mitochondria 4) Lysosomes
174. Path of water movement from soil to exarch xylem is
- 1) Soil → root hair → cortex → pericycle → endodermis → metaxylem → protoxylem
 2) Soil → root hair → cortex → endodermis → pericycle → protoxylem → metaxylem
 3) Soil → root hair → epidermis → endodermis → phloem → xylem
 4) Soil → root hair → epidermis → cortex → phloem → xylem
175. Which of the following is incorrectly paired?
- 1) Homo sapiens – Mammalia 2) Musca domestica – Insecta
 3) Triticum aestivum – Dicotyledonae 4) Mangifera indica – Dicotyledonae
176. Which of the following technique is not required for DNA fingerprinting?
- 1) Polymerase chain reaction 2) ELISA
 3) Restriction enzymes 4) DNA-DNA hybridization
177. Transgenic plants are the one that is
- 1) Generated by introducing foreign DNA into a cell and regenerating a plant from that cell
 2) Produced after protoplast fusion in artificial medium
 3) Grow in artificial medium after hybridization in the field
 4) Produced by a somatic embryo in artificial medium
178. Which of the following flowers is unisexual?
- 1) Cucumber 2) China rose 3) Onion 4) Pea
179. The process of development of the more than one embryo in seeds of citrus fruits is called
- 1) Apospory 2) Polyembryony 3) Apogamy 4) Vegetative reproduction
180. Pneumatophores are seen in
- 1) Sweet potato 2) Turnip 3) Rhizophora 4) Carrot

NTA NEET MOCK TEST - 7

PHYSICS KEY

1-10	2	1	3	2	2	4	2	1	3	1
11-20	1	4	1	2	1	2	2	1	4	1
21-30	1	3	2	1	3	3	1	3	3	4
31-40	2	3	3	1	1	1	1	4	2	3
41-45	3	3	3	4	3					

CHEMISTRY KEY

46-55	3	4	2	4	1	3	4	2	4	3
56-65	2	2	1	4	4	3	3	3	2	4
66-75	1	2	4	1	2	1	1	2	1	3
76-85	3	2	3	1	1	1	2	1	4	4
86-90	3	2	2	1	2					

BIOLOGY KEY

91-100	2	1	2	1	1	2	4	2	4	3
101-110	3	3	2	4	1	4	3	4	3	4
111-120	3	4	4	2	4	2	4	3	1	1
121-130	3	1	1	2	1	4	3	4	2	1
131-140	3	4	4	4	3	1	4	2	1	3
141-150	3	3	3	1	3	1	4	4	4	2
151-160	1	2	1	2	2	4	2	3	2	3
161-170	4	2	2	4	3	4	2	1	2	4
171-180	3	3	3	2	3	4	1	1	2	3

PHYSICS SOLUTIONS

1. The given relation is $p \propto V$

Therefore, $p \propto V$

When V changes from V to 2V, pressure p is also doubled.

For an ideal gas, $\frac{pV}{T} = \text{constant}$

$\therefore T \propto pV$. Hence, T becomes $2 \times 2 = 4$ times

i.e., $4 \times 300K = 1200K$

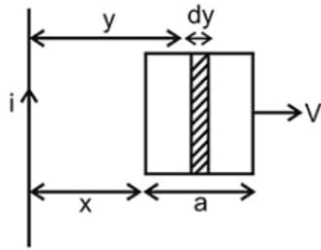
2. For stable equilibrium

$$U = -MB$$

$$= -(0.4)(0.16) = -0.064 \text{ J}$$

3. Viscous force, $F = 6\pi\eta rv$

$$\therefore \eta = \frac{F}{6\pi rv} [\eta] = \frac{[F]}{[r][v]} \text{ or } [\eta] = \frac{[MLT^{-2}]}{[L][LT^{-1}]}$$



4.

$$d\phi = \frac{\mu_0 i}{2\pi y} a dy$$

$$\phi = \frac{\mu_0 i a}{2\pi} \int_x^{x+a} \frac{dy}{y}$$

$$= \frac{\mu_0 i a}{2\pi} [\ln(x+a) - \ln x]$$

$$E.m.f = -\frac{d\phi}{dt} = -\frac{\mu_0 i a}{2\pi} \left[\frac{1}{x+a} \frac{dx}{dt} - \frac{1}{x} \frac{dx}{dt} \right]$$

$$= \frac{\mu_0 i a}{2\pi} \frac{a \cdot v}{x(x+a)} = \frac{\mu_0}{2\pi} \cdot \frac{ia^2 v}{x(x+a)} = 2 \times 10^{-7} \times \frac{1 \times (0.1^2 \times 10)}{0.1 \times 0.2} = 1 \mu V$$

5. Horizontal velocity remains same $30^\circ \cos 60^\circ = v \cos 45^\circ$

$$\Rightarrow v = 15\sqrt{2} \text{ m/s}$$

6. $P = \frac{v^2}{R}$ so, $R = \frac{v^2}{P}$

$$\therefore R_1 = \frac{v^2}{100} \text{ and } R_2 = R_3 = \frac{v^2}{60}$$

$$\text{Now, } W_1 = \frac{(250)^2}{(R_1 + R_2)^2} \cdot R_1$$

$$W_2 = \frac{(250)^2}{(R_1 + R_2)^2} \cdot R_2 \text{ and } W_3 = \frac{(250)^2}{R_3}$$

$$W_1 : W_2 : W_3 = 15 : 25 : 64 \text{ or } W_1 < W_2 < W_3$$

7. The slope of the curve is $\frac{F}{x} = -\frac{0.5}{5} = -0.1 \frac{N}{cm} = -10 N/m$

$$\text{But } F = -m\omega^2 x \text{ or } F/x = -m\omega^2$$

$$\text{So, } -m\omega^2 = -10 \text{ or } \omega^2 = \frac{10}{m}$$

$$\therefore \omega^2 = \frac{10}{4 \times 10^{-1}} \Rightarrow \omega = \frac{10}{2} = 5$$

$$\therefore f = \frac{\omega}{2\pi} = \frac{5}{2\pi} \text{ s}^{-1}$$

8. Energy gained by water (in 1s) = Energy supplied – energy lost
 $= (1000 \text{ J} - 160 \text{ J}) = 840 \text{ J}$

Total heat required to raise the temperature of water from 27°C to 77°C is $ms\Delta\theta$. Hence, the required time,

$$t = \frac{ms\Delta\theta}{\text{rate by which energy is gained by water}} = \frac{(2)(4.2 \times 10^3)((50))}{840} = 500 \text{ s} = 8 \text{ min } 20 \text{ s}$$

$$9. \quad \omega = \frac{\theta}{t} = \frac{360^\circ}{12 \times 360} = \frac{1}{12 \times 10} = \frac{1}{120} \text{ deg/sec}$$

10. A good absorber is also a good emitter. So blackbody absorbs all the light but also emits whereas but black holes do not emit 99% of radiations.

$$11. \quad \text{As } n \propto \sqrt{T}$$

$\therefore$ To produce octave of the note (of double the frequency), T has to be made 4 times, i.e.,
weight required = $4 \times 4 \text{ kg} = 16 \text{ kg}$

12. Radius (R) of nucleus is related with mass number (A) as $R \propto A^{1/3}$.

Now, volume $\propto R^3 \propto A$

$$13. \quad \text{Poisson's ratio} = \frac{\text{Lateral strain}}{\text{Longitudinal strain}}$$

$$\text{i.e., } 0.4 = \frac{0.01 \times 10^{-3}}{\frac{l}{L}}$$

$$\text{or } \frac{L}{l} = \frac{0.4}{0.01 \times 10^{-3}} = 4 \times 10^4$$

Young's modulus

$$Y = \frac{FL}{Al} = \frac{100}{0.025} \times 4 \times 10^4 = 1.6 \times 10^8 \text{ Nm}^{-2}$$

$$14. \quad \text{Power} = \frac{\text{Work}}{\text{Time}} = \frac{\text{Force} \times \text{distance}}{\text{Time}} = \text{Force} \times \text{velocity}$$

$$\therefore \text{force} \times \text{velocity} = \text{constant}(K)$$

$$\text{Or } (ma)(mt) = K$$

$$\text{Or } a = \left(\frac{K}{mt} \right)^{1/2}$$

$$\therefore s = \frac{1}{2} at^2$$

$$\therefore s = \frac{1}{2} \left(\frac{k}{mt} \right)^{1/2} t^2 = \frac{1}{2} \left(\frac{k}{m} \right)^{1/2} t^{3/2}$$

Or s is proportional to $t^{3/2}$

15. Since resistance connected in arms CE, ED, CF and FD will form a balanced Wheatstone bridge, therefore, the resistance of arm EF becomes ineffective. Now resistance of arm CED or CFD = $2 + 2 = 4 \Omega$

$$\text{Effective resistance of these two parallel arm} = \frac{4 \times 4}{4 + 4} = 2 \Omega$$

Now resistance of arm ACDB = $2 + 2 + 2 = 6 \Omega$ in parallel with resistance arm AB = 2Ω . Thus,

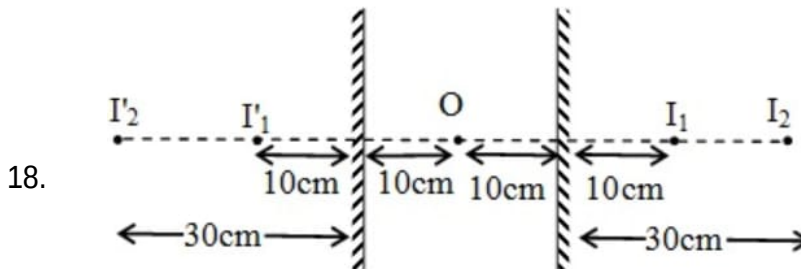
$$\text{effective resistance between A and B} = \frac{6 \times 2}{6 + 2} = \frac{3}{2} \Omega$$

$$16. \quad \text{As } E = -\frac{dV}{dr}$$

$$\therefore +E_0 = -\frac{[V(x) - 0]}{x}$$

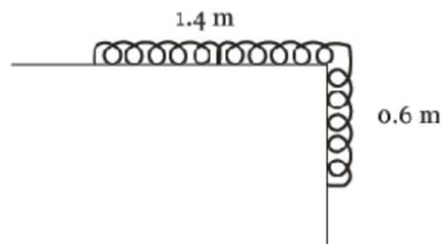
$$\text{or } V_x = -E_0 x$$

17. In case of non-conservative forces, the work done is dissipated as heat, sound, etc., it does not increase the potential energy. But in case of conservative forces, work done is responsible for increasing or decreasing the potential energy.



From the diagram it is clear that Distance between I_2 & $I_2' = (30+20+30)\text{cm}=80\text{cm}$

19. The center of mass of the hanging part is at 0.3 m from table



$$\text{Mass of hanging part} = \frac{4 \times 0.6}{2} = 1.2 \text{ kg}$$

$$\therefore W = mgh$$

$= 1.2 \times 10 \times 0.3$ (Centre of hanging part distance from top is taken as several points are located at different distance from top)

$$= 3.6 \text{ J}$$

20. The rms speed of N_2 , $v_{rms, N_2} = \sqrt{\frac{3RT}{M_{N_2}}}$

$$\text{For } O_2, v_{rms, O_2} = \sqrt{\frac{3RT}{M_{O_2}}}$$

$$\text{Thus, } \frac{v_{rms, N_2}}{v_{rms, O_2}} = \sqrt{\frac{M_{O_2}}{M_{N_2}}} = \sqrt{\frac{32}{28}}$$

$$v_{rms, N_2} = 572 \text{ m/s}$$

21. For an isothermal process

$$PV = \text{constant} \therefore PV = P_1 2V$$

$$P_1 = \frac{P}{2} \dots \dots \dots (i)$$

For an adiabatic process

$$PV^\gamma = \text{constant} \therefore PV^\gamma = P_A (2V)^\gamma \text{ or } P_A = \frac{P}{2^\gamma} \dots \dots (ii)$$

Divide (i) by (ii), we get

$$\frac{P_1}{P_A} = \frac{2^\gamma}{2} = 2^{\gamma-1}$$

22. $f = \mu mg = 0.8 \times 4 \times 10 = 32 \text{ N}$

Applied force $F < f$ therefore, the force acting on the block will be 19N.

23. Initial momentum = E/c

Final momentum = $-E/c$

$$\therefore \text{Change of momentum} = \frac{E}{c} - \left(-\frac{E}{c}\right) = \frac{2E}{c}$$

$$\therefore \text{Momentum transferred to surface} = \frac{2E}{c}$$

24. Let velocity at surface = $v_s = \eta v_e$

Velocity at orbit = v_0

By conservation of mechanical energy

$$\frac{1}{2}mv_s^2 + \left(-\frac{GMm}{R}\right) = \frac{1}{2}mv_0^2 - \frac{GMm}{r} \dots (1)$$

By Newton's law,

$$\frac{GMm}{r^2} = \frac{mv_0^2}{r} \dots (2)$$

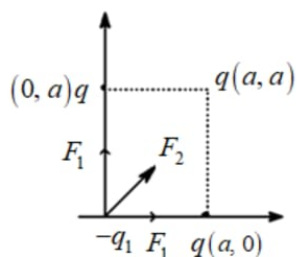
Solving (1) & (2)

$$v_0 = v_e \sqrt{1-\eta^2}$$

25. The values of relative permeability of diamagnetic materials are slightly less than 1 and ϵ_r is quite high. According to the table given, one takes

$\epsilon_r = 1.5$ and $\mu_r = 0.5$. The choice ($\epsilon_r = 1.5$, $\mu_r = 0.5$) is correct.

26.



$$F_1 = k \frac{qq_1}{a^2}; F_2 = k \frac{kqq_1}{(\sqrt{2}a)^2}$$

$$\text{Resultant force } F = \sqrt{2}F_1 + F_2$$

$$= \sqrt{2} \frac{kqq_1}{a^2} + \frac{kqq_1}{2a^2}$$

$$= \frac{kqq_1}{a^2} \left(\sqrt{2} + \frac{1}{2}\right)$$

$$= \frac{qq_1}{4\pi\epsilon_0 a^2} \left(\sqrt{2} + \frac{1}{2}\right)$$

27. Angular magnification of telescope is 20. So tree appears to the observer is 20 times taller.

28. Emission of one alpha and two beta particles won't change the atomic number and hence same element will be the final product.

29. Electric displacement, $D = \epsilon E$

$$\text{Unit of } D = \frac{C^2}{Nm^2} \frac{N}{C}$$

$$\therefore [D] = \left(\frac{C}{m^2} \right) = \frac{[AT]}{[L^2]} = [L^{-2}TA]$$

30. The mean kinetic energy of one mole of gas n degree of freedom.

$$E = \frac{n}{2} RT$$

The mean kinetic energy of one mole of gas per degree of freedom.

$$E' = \frac{E}{n} = \frac{\frac{n}{2} RT}{n}$$

$$E' = \frac{1}{2} RT$$

31. Given $\lambda = 600m = 600 \times 10^{-9} m = 6 \times 10^{-7} m$

$$\therefore a \frac{x}{d} = n\lambda$$

$$a = \frac{n\lambda D}{x} = \frac{2 \times 6 \times 10^{-7} \times 0.8}{1.5 \times 10^{-3}} = \frac{9.6 \times 10^{-4}}{1.5} = 6.4 \times 10^{-4} m$$

32. Let after t time two bodies are 40m apart.

Then according to the problem

$$\frac{1}{2} gt^2 - \frac{1}{2} g(t-2)^2 = 40$$

$$\text{or } \frac{1}{2} \times 10(2t-2)(2) = 40$$

$$\text{or } 2t-2 = 4 \text{ or } t = 3s$$

33. For both the particle of collide at point, their time of flight should be same

$$T = \frac{2u \sin \theta}{g} = \frac{2(10) \sin 60}{10} = 2 \frac{\sqrt{3}}{2}$$

Time of flight of particle thrown from above

$$t = \frac{\sqrt{2h}}{g}$$

Equation we get,

$$\frac{\sqrt{2h}}{g} = \sqrt{3}$$

$$h = 15m$$

34. +ve charge diverts in the direction of field.

$\therefore$ Field must be toward top particle (2) deflects down, (3) top (4) deflects down.

35. Our eye lens has a power to adjust its focal length to see the nearer and farther objects, this process of adjusting focal length is called accommodation. However, if the object is brought too close or bring too far from the eye, the focal length cannot be adjusted to form the image on the retina. Thus, there is minimum or maximum distance for the clear vision of an object. For a normal eye, near point or least distant vision $D = 25 \text{ cm}$ and far point $= \infty$.

36. As, normal force and friction force are the two electromagnetic force acting on the body.

$$\text{The net electromagnetic force} = \sqrt{N^2 + f^2}$$

$$\text{But } N = mg, f = \mu mg$$

$$\text{Force} = mg\sqrt{1+\mu^2}$$

37. Tension in the string

$$\text{Initial } T_1 = m(\omega^2)r$$

$$\text{Finally, } T_2 = m\left(\frac{r}{2}\right) \cdot (2\omega)^2 = 2mr\omega^2$$

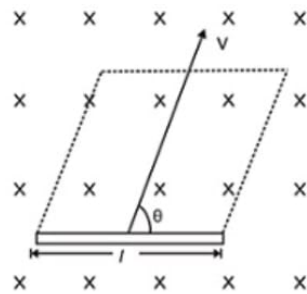
$$\frac{T_2}{T_1} = 2$$

38. If a rod of length l is moved with velocity $\vec{v}$ at an angle θ to the length of the rod in a filled $\vec{B}$ which is perpendicular to the plane of motion, the flux linked with the area generated by the motion of rod in time t .

$$\phi = Bl(v\sin\theta)t$$

$$\text{So, } e = \frac{d\phi}{dt} = Bvl\sin\theta$$

This will be maximum when



$$\sin\theta = \max = 1$$

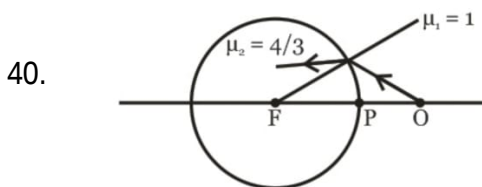
i.e., the rod is moving perpendicular to its length and then

$$(e)_{\max} = Bvl$$

$$\therefore e = 0.9 \times 7 \times 0.4 = 2.52V$$

$$39. \frac{H_1}{H_2} = \frac{m_1 C_1}{m_2 C_2} = \frac{\frac{4}{3}\pi r_1^3 \cdot \rho_1 \cdot C_1}{\frac{4}{3}\pi r_2^3 \cdot \rho_2 \cdot C_2}$$

$$= \frac{r_1^3}{r_2^3} \times \frac{\rho_1}{\rho_2} \times \frac{C_1}{C_2} = \left(\frac{1}{2}\right)^3 \times \left(\frac{2}{1}\right) \times \left(\frac{1}{3}\right) = \frac{1}{12}$$



40.

$$\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R} \Rightarrow \frac{4}{3v} - \frac{1}{-R}$$

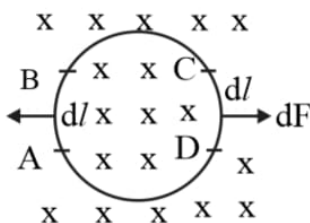
$$= \frac{\frac{4}{3} - 1}{R} \Rightarrow \frac{4}{3v} = \frac{1}{3R} - \frac{1}{R}$$

$$\frac{4}{3v} = \frac{1-3}{3R} \Rightarrow v = -\frac{4R}{2} \Rightarrow v = -2R$$

Distance of image from centre = $3R$

41. The magnetic field is perpendicular to the plane of the paper. Let us consider two diametrically opposite elements. By Fleming's Left hand rule on element AB the direction of force will be Leftwards and the magnitude will be

$$dF = Idl B \sin 90^\circ = IdlB$$



On element CD, the direction of force will be towards right on the plane of the paper and the magnitude will be $dF = IdlB$

42. $KE_1 = \frac{1}{2}(4)v_1^2$

$$KE_2 = \frac{1}{2}(1)v_2^2$$

$$KE_1 = KE_2 \Rightarrow \frac{v_1}{v_2} = \frac{1}{2}$$

$$\frac{P_1}{P_2} = \frac{2}{1}$$

43. CM rises through height h , so its velocity after collision = $\sqrt{2gh}$

Apply conservation of linear momentum.

$$0.01 \times 400 = 2 \times \sqrt{2gh} + 0.01 \times v \Rightarrow v = 120 \text{ m/s}$$

44. $x = \frac{B}{M} = \left(\frac{\mu_0 i}{2r} \right) \left(\frac{1}{i\pi r^2} \right) \text{ or } x \propto \frac{1}{r^3}$

i.e., x will become $\frac{x}{8}$ when radius and current both are doubled.

45. The power loss in an a.c. circuit will be minimum when resistance is low so that inductor is dominating the circuit.

CHEMISTRY SOLUTIONS

46. $PM = dRT$

$$M = \frac{dRT}{P}$$

$$d = 1.964 \text{ g/dm}^3 = 1.964 \times 10^{-3} \text{ g/cc}$$

$$P = 76 \text{ cm Hg} = 1 \text{ atm}$$

$$R = 0.0821 \text{ L atm K}^{-1} \text{ mol}^{-1} = 82.1 \text{ cc atm K}^{-1} \text{ mol}^{-1}$$

$$T = 273 \text{ K}$$

$$M = \frac{1.964 \times 10^{-3} \times 82.1 \times 273}{1} = 44 = \text{CO}_2$$

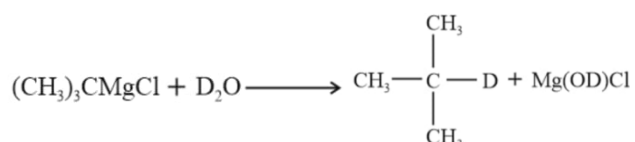
47. In a metal carbonyl, the metal-carbon bond possesses both σ and π characters. A σ bond between metal and carbon atom is formed when a vacant hybrid orbital of the metal atom overlaps with an orbital of C atom of carbon monoxide containing a lone pair of electrons

Formation of π -bond is caused when a filled orbital of the metal atom overlaps with a vacant antibonding π^* orbital of C atom of CO. This overlap is also called back donation of electrons by metal atom to carbon.

48. Nylon-6, 6 is made from adipic acid. Nylon 6, 6 is synthesized by polycondensation of hexamethylenediamine and adipic acid. Equivalent amounts of hexamethylenediamine and adipic acid are combined with water in a reactor.

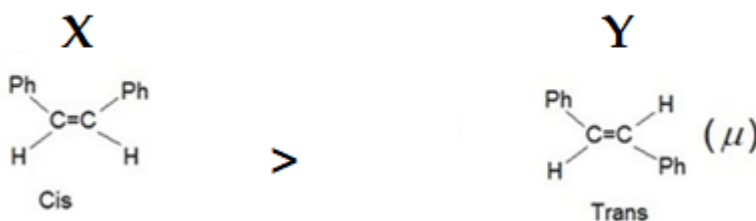
49. The physical adsorption isobar shows a decrease in x/m throughout with rise in temperature.

50. The reaction is as follows



D_2O has D^+ it will react with alkyl part (-ve) of Grignard reagent.

51. Levigation or gravity separation is used when the ore particles are heavier than the earthy or rocky gangue particles.



52. Cis form is more polar than trans form, that's why greater boiling point.

↑ *polarity*

↑ *solubility*

↑ *Boiling point*

More polar the compound more is soluble in water

53. Sodium nitrate is NaNO_3 . Its salt is known as Chile saltpetre or Peru saltpetre (due to large deposits found in the Atacama desert in these countries).

54. Osmotic Pressure = $\pi = iCRT$

Concentration is same so $\pi \propto i$

For different solvents, value of K_f is also different. So for two different solvents the extent of depression may vary even if same number of solute particles be dissolved in them.

55. Earlier Rate = $k[\text{A}]^n[\text{B}]^m$

New Rate = $k[2\text{A}]^n[\frac{1}{2}\text{B}]^m$

$$\frac{\text{New Rate}}{\text{Earlier Rate}} = [2]^n \left[\frac{1}{2}\right]^m = [2]^{n-m}$$

56. 1 mole of $C_6H_6O_6 = N_A \times 6$ Carbon atoms

0.35 mole of $C_6H_6O_6 = 0.35 \times N_A \times 6 = 1.26 \times 10^{24}$ atoms

57. d^4 : Forms outer complex in high spin and forms inner complex in low spin. It cannot form octahedral complex.

d^6 : In low spin it forms inner octahedral complex and in high spin forms outer octahedral complex.

d^8 : Forms only outer high spin octahedral complex.

58. These drugs produce sleep and are habit forming common example of hypotonic drug Luminal and Saconal.

59. $Cr \rightarrow_{18} [Ar]4s^1 3d^5$. (due to stable configuration filled (half filled))

$m \rightarrow -l, \dots, -1, 0, +1, \dots, +l$ (Possible values)

$_{47}[Ag] = _{36}[Kr]5s^2 4d^9 \Rightarrow _{36}[Kr]5s^1 4d^{10}$ (Actual)

Number of electrons with parallel spin = $(36/2) + 1 + (10/2) = 24$.

Number of electrons with anti-parallel spin = $(36/2) + 0 + (10/2) = 23$.

60. Lanthanoids are $_{58}Ce - _{71}Lu$ (14 elements)

Electronic configuration of $_{57}La = [Xe]6s^2 5d^1$ and is a d-block element.

$$61. \frac{n' He}{n' CH_4} = \frac{1}{2} \sqrt{\frac{16}{4}} = \frac{1}{1}$$

$$\frac{n' He}{n' SO_2} = \frac{1}{3} \sqrt{\frac{64}{4}} = \frac{4}{3}$$

So, $n' He : n' CH_4 : n' SO_2 = 4 : 4 : 3$

62. Molecular weight of compound = 108

$$C^{12} \rightarrow 12 \times 6 = 72$$

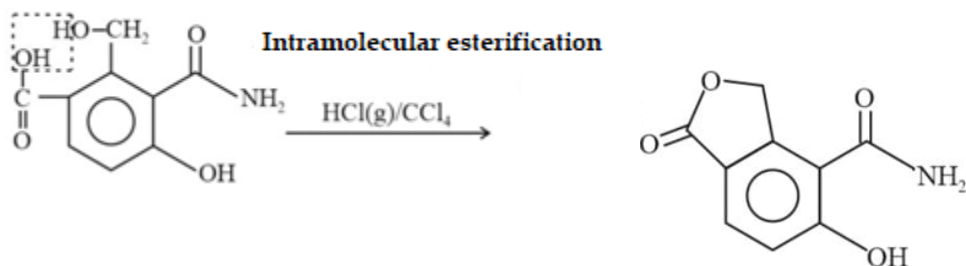
$$H^1 \rightarrow 1 \times 8 = 8$$

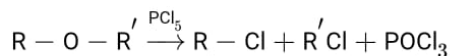
$$N^{14} \rightarrow 14 \times 2 = 28$$

Total molecular weight = 108

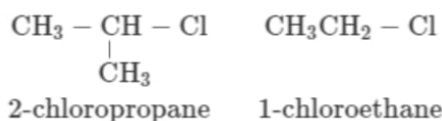
$\therefore$ Molecular formula = $C_6H_8N_2$ atom ration $\frac{72}{8} : \frac{8}{8} : \frac{28}{8} = 9 : 1 : 3.5$

63.



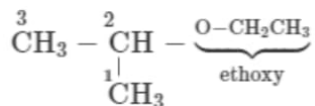


64.

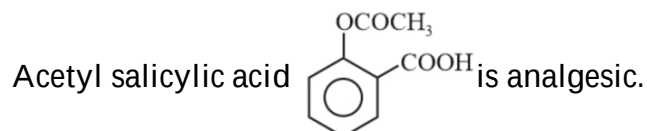


O is replaced by two Cl-atoms one each on alkyl group.

Thus, $C_5H_{12}O$ is



65.



66.

Given that $\rho = 2.75 \text{ g cm}^{-3}$

We need to find type of unit cell.

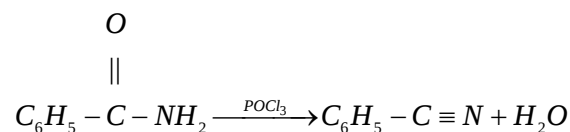
$$\therefore \rho = \frac{Z \times M}{N_A a^3}$$

$$\therefore Z = \frac{\rho \times N_A \times a^3}{M} = \frac{2.75 \times 6.023 \times 10^{23} \times (654 \times 10^{-10})^3}{119}$$

$\therefore Z \approx 4$ So fcc unit cell

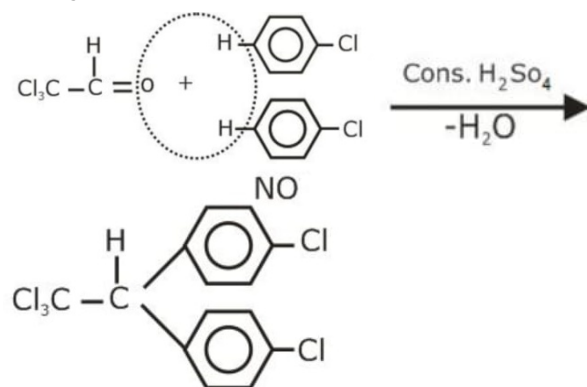
In fcc 1 atom is surrounded by 6 atoms so coordination number is 6.

67.



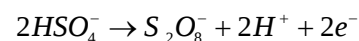
POCl_3 brings about dehydration of primary amide.

68.



DDT (Dichlorodipethyltrichloroethene)

69.



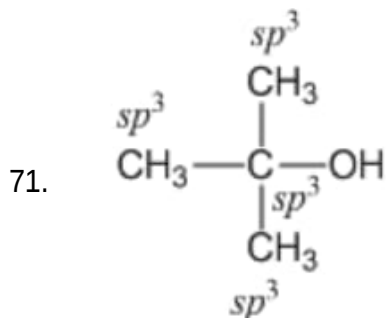
So, required rate = 1 mol / hr of $\text{S}_2\text{O}_8^{2-} = 2 \text{ moles of } \text{HSO}_4^-$

$$= \frac{2 \times 96500 \text{ C}}{3600 \text{ s}} = \frac{2 \times 965}{36} \text{ A} \approx 53.6 \text{ A}$$

$$\text{So required current} = \frac{4}{3} \times 53.6 \text{ A} = 71.47 \text{ A}$$

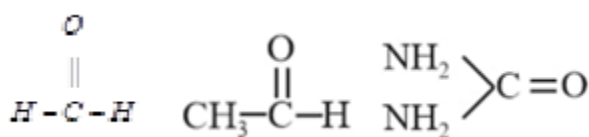
70. Hydration energy evolved during dissolution in the water while lattice energy gives the energy to break the crystal so, for a compound to be soluble, the solvation energy must be greater than the lattice energy. Since, NaCl is soluble in water but insoluble in benzene.

$$\Delta H_{\text{Solvation}} > \Delta H_{\text{Lattice energy}} \text{ in water and } \Delta H_{\text{Solvation}} < \Delta H_{\text{Lattice energy}} \text{ in benzene}$$

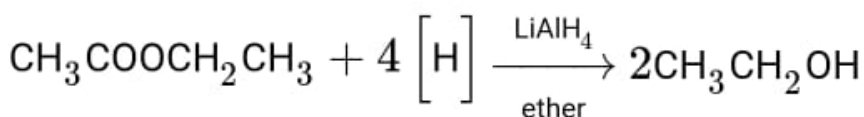


All bonds are σ - bonds hence C uses only its sp^3 - hybrid orbitals.

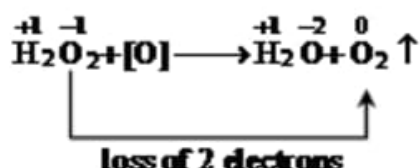
In all other compounds there is one C = O double bond, therefore, this carbon is sp^2 - hybridized.



72. This ester undergoes reduction with $LiAlH_4$ to give only ethyl alcohol, other esters given in option on reduction gives a mixture of alcohols.



73. Oxidation involves loss of electrons.



Oxygen in H_2O_2 is losing $2e^-$ to form O_2 . Therefore oxidized product is O_2 .

74. $92 + 0 = Z + 36 + 0 \Rightarrow Z = 56$ (Sum total atomic numbers)

$$235 + 1 = A + 92 + 3 \text{ (Sum total mass numbers)}$$

$$\therefore A = 141$$

Missing nuclide is ${}_{56}^{141}Ba$

75. $[OH^-] = 0.1 \times \frac{20}{100}$

$$[OH^-] = 0.1 \times 0.2 = 2 \times 10^{-2}$$

$$pOH = -\log[OH^-] = 2 - \log 2$$

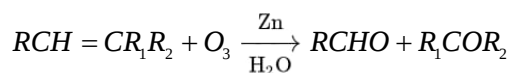
$$pOH = 1.7, pH = 14 - pOH = 14 - 1.7 = 12.3$$

76. $CoSO_4$ has d^7 configuration because ($CO^{2+} = 3d^7 4s^0$), thus it is both paramagnetic as well as coloured.

$K_2Cr_2O_7$ and $KMnO_4$ are coloured due to change spectra.

77. The alkali metal hydride stability $\propto$ lattice energy. On moving top to bottom the lattice energy decreases hence, the thermal stability of hydrides decreases.

78. The reaction of ozonolysis of $RCH = CR_1R_2$ is



79. According to Raoult's law relative lowering of vapour pressure = mole fraction of solute

Thus, mole fraction of solute = 0.0125

Mole fraction of solvent = $1 - 0.0125$

Conc. of solvent = $(1 - 0.0125) \times 18 \text{ gm}$

$$\text{Molality} = \frac{\text{moles of solute}}{\text{weight of solvent}}$$

$$m = \frac{(0.0125 \times 1000)}{(1 - 0.0125) \times 18} = 0.70$$

80. 'Ba' gives characteristic green flame in Bunsen burner.

81. At the electronegativity differences increases electron density increase at toward the more electronegative atoms as the polarity reduces.

$$82. \quad ds = \frac{dq_{rev}}{T} \Rightarrow 75 = \frac{30 \times 10^3}{T} \Rightarrow T = 400K$$

Hence (2) is correct option.

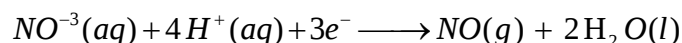
83. Lanthanide contraction is caused due to poor screening effect of 4f orbitals.

84. We know that q(heat) and w(work) are not state functions but $dv = dq + dw$ is a state function. H-TS (i.e. G) is also a state function. Thus II and III are not state functions so the correct answer is option (4).

85. Phosphorous being a non-metal always forms acidic oxides like P_4O_6, P_4O_{10} , etc, whereas Al, Sn and Sb are amphoteric elements.

Al_2O_3, SnO and Sb_2O_3 are amphoteric oxides i.e., they can react with both acids as well as bases.

After the addition Cd it oxidises to Cd^{+2}



$$0.1 - x \quad 0.4 - 4x$$

$$x = 0.06$$

$$NO^{-3} \text{ remaining} = 0.1 - 0.06 = 0.04$$

$$[H^{+}] \text{ remaining} = 0.4 - 4 \times 0.06 = 0.16 M$$

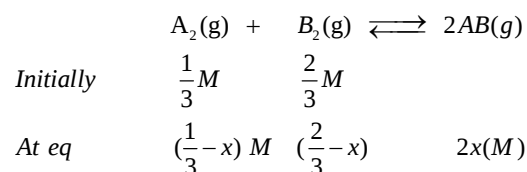
$$E_{NO_3^-/NO} = E_{NO_3^-/NO}^0 - \frac{0.059}{3} \log \frac{1}{[NO^{-3}][H^{+}]^4}$$

$$86. \quad = 0.95 - \frac{0.059}{3} \log \frac{1}{[4 \times 10^{-2}][0.16]^4} \quad .$$

$$= 0.95 - \frac{0.059}{3} \times 4.582$$

$$= 0.95 - 0.09 = 0.86 V$$

87. α -carbon is achiral, hence retention of configuration will be observed at chiral β -carbon. Configuration by substitution changes at α, C atom but β, C atom is chiral so configuration to be retained by β, C atom.
88. According to Rutherford's model, there is a heavily positively charged nucleus and negatively charged electrons occupies space around it in order to maintain electro-neutrality of atom.
89. $\therefore$ In the given complexes, central metal element (Fe) is attached through N and O respectively. Thus, these are linkage isomers.
 $\therefore$ Linkage isomerism is the correct option.



$$90. \quad K_{eq} = 50 = \frac{4x^2}{\left[\left(\frac{1}{3}-x\right)\right]\left[\left(\frac{2}{3}-x\right)\right]}$$

$$x = \frac{+450 - \sqrt{(450)^2 - 4 \times 414 \times 100}}{2 \times 414}$$

$$x = 0.31M$$

$$\therefore \text{Number of AB produced} = 0.31 \times 6 = 1.86$$

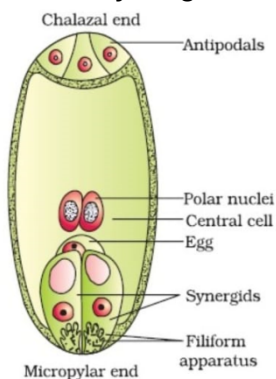
BIOLOGY SOLUTIONS

91. Fructose, amino acids are absorbed through intestinal mucosa with the help of Na^+ . About 40% starch is hydrolyzed by ptyalin. Chilomicrans are transported in to Lacteals.
92. The basic unit of study in ecology is population.
93. In contraception, combined pill inhibit ovulation, implantation and thickness cervical mucosa. Physical barriers prevent physical meeting of sperm and ovum.
94. Oral administration of small doses of either progestogens or progestogen –estrogen combinations inhibit ovulation and implantation as well as alter the quality of cervical mucus to prevent / retard entry of sperms.
95. In 1963, several varieties such as Sonalika and kalia sona, which were high yielding and disease resistant, were introduced all over the wheat – growing belt of India.
96. No, of betas = 75 / minute, stroke volume = 70, cardiac output = $75 \times 70 = 5250$ ml.
97. In Amoeba, contractile vacuole help osmo regulation and excretion: Food vacuole is formed when the prey is engulfed.

98.

	Column I		Column II
(a)	Operator site	(ii)	The binding site for repressor molecule
(b)	Promoter site	(i)	The binding site for RNA polymerase
(c)	Regulator gene	(iv)	Codes for repressor molecule
(d)	Structural gene	(iii)	Codes for protein/enzyme

99. Baculoviruses are pathogens that attack insects and other arthropods. The majority of baculoviruses used as biological control agents are in the genus Nucleopolyhedrovirus.
100. Replication of DNA occurs during S-Phase of interphase.
101. The primary acceptor of CO_2 in C_4 plants is phosphoenolpyruvate or PEP.
102. Flocs are masses of bacteria associated with fungal filaments to form mesh-like structures.
103. Euro III, As per NCERT textbook.
104. Passive immunity is caused by Antibodies in colostrums from mother to foetus of antibodies are transferred and antibodies against snake venom.
105. Cu – Cyt a_3 of respiration, PC
Mn – Photolysis
106. Tunica media is a thin coat and around it elastic lamina exist in Arteries but not veins.
107. Osteoporosis is caused due to the decreased level of estrogen.
108. Transpiration pull and cohesion theory was put forward by Dixon and Jolly in 1894.
According to this theory, the water rises due to the transpiration pull, continuity of the water column, and the cohesive power of water molecules from the lower part of the roots to the higher peaks of the trees.
109. Gametes are always haploid in order to preserve the species genetically, anatomically and morphologically also. The embryo or zygote is formed due to the union of male and female gametes, ($n+n=2n$).
110. Gymnosperms have mainly tracheids.
111. A – RUBP, B – PGA, C – PGAL.
112. The organism's habitat, physiology and several other factors(genetic makeup) are collectively responsible for how it reproduces.
113. Trypanasoma gambiense is a flagellate protozoan parasite causing sleeping sickness.
114. The parts labelled as A, B, C, D in the given figure of female gametophyte are:
A: Three antipodal cells,
B : Two polar nuclei
C : Egg cell
D: Two synergid



115. Splicing is post transcriptional event.
116. In energy transfers, energy decreases at every level as some energy dissipates in the form of heat.
117. Na^+ are absorbed by active method in the thick part of Ascending limb of Henle.

118. In an organism, each enzyme has its own different favourable pH values but generally has the same optimum temperature.
119. * Pistil may have many carpels (multicarpellary pistil like Papaver).
* Each carpel may have more than one ovule (like watermelon, papaya etc).
120. Operon concept is related to gene regulation in prokaryotes.
121. It is mutualism, but not mutation.
122. In vertebrates, notochord of embryo is transformed into vertebral column.
123. The hormone progesterone released during the post ovulatory period thickens the endometrium of uterus and helps in maintaining the pregnancy.
124. In mung bean, resistance to yellow mosaic virus and powdery mildew were induced by mutations.
125. Oversecretion leads to gigantism.
126. Short-day plants require long uninterrupted dark period for flowering.
127. Both hydarch and xerarch successions lead to medium water conditions (mesic) – neither too dry (xeric) nor too wet (hydric).
128. The species going to be extinct in the immediate future is critically endangered species.
129. Geographical isolation leads into speciation via reproductive isolation.
130. Complex QRS represent complete pulse.
131. Human head louse is a true endoparasite as it lives only on blood as its meal.
132. Due to osmotic imbalance, fresh water animals cannot sustain marine water and vice versa.
133. Collagen is the most abundant protein in animals.
134. In blood, CO₂ is carried by haemoglobin as carbamino haemoglobin.
135. During resting stage & Neuron, Na⁺ enters into the cell basing on concentration gradient.
136. Cold blooded animals are otherwise called ectotherms as they depend on external source for their heat requirements.
137. Incomplete or partial or intermediate dominance is observed when a red-flowered plant of *Mirabilis jalapa* is crossed with white-flowered plants.
138. Carbon, hydrogen, nitrogen, oxygen, phosphorus, potassium, calcium, sulfur, and magnesium.
139. The presence of more than one recognition site within will generate several fragments, which will complicate gene cloning.
140. Yeast or *Saccharomyces cerevisiae* is the commonly used micro-organism in fermentation processes in the production of alcohol or ethanol. Yeast has the enzymes which convert sugar, starch, glucose into alcohol under anaerobic condition.
141. A simple process of diffusion aids in the absorption of the mineral salts during its high concentration in the soil / outer solution than in the cell sap of the root cells. Diffusion is a passive absorption because the movement of mineral ions into plant root cells takes place without energy utilization.
142. The TCA cycle is also called the citric acid cycle because the first stable product formed is a tricarboxylic acid molecule that is citric acid. Hence the name citric acid cycle, it is also called the Krebs's cycle.
143. Cyt c is a mobile electron carrier.

144. $A + G = T + C$
145. Algae are useful to man in a variety of ways. Algae are the most efficient photosynthesizing organisms.
146. Homeothermy is found in mammals. Eg. Rat.
147. Leprosy is also called kushtrag.
148. Halophiles, the name comes from the Greek word for "salt-loving" are a special type of bacteria that live in some of the harshest habitats such as extreme salty areas.
149. Food, Housing, health facilities, climate, urbanization all these influence population densities.
150. DNA fragments move towards positive electrode.
151. In some seeds, during the process of the development of the embryo, the food stored up in the endosperm is continuously drawn up by the developing embryo and thus completely exhausted.
152. S-phase is marked by DNA Replication.
153. Eutrophication is caused by nitrogenous fertilization.
154. Erythroblastosis foetalis occurs when the mother is Rh⁻, father is Rh⁺ and child is Rh⁺.
155. Bio piracy is the term used to refer to the use of bio resources by multinational companies and other organizations without proper authorization from the countries and people concerned without compensatory payment.
156. In a typical nucleus, some regions of chromatin are loosely packed (and stains light) and are referred to as euchromatin.
157. $V.C = TLC - R.V$
158. Light – independent reactions or dark reactions occur in the stroma/stomal matrix. During these reactions carbon dioxide is reduced to carbohydrate.
159. The innermost wall layer of microsporangium is the tapetum. It nourishes the developing pollen grains.
160. If female has non functional ovary, but uterus is suitable for conception. Then ART recommended is GIFT.
161. Association areas of cerebrum are neither exactly sensory nor motor but inter sensory is function and controls communication and memory.
162. Cortisol can be given to allergic person as it is anti inflammatory in function.
163. In ascomycetes, the asexual spores are conidia produced exogenously on the special mycelium called conidiophores.
164. A special membranous structure is a mesosome that is formed by the extensions of the plasma membrane into the cell.
165. Sporophytic generation is represented only by the one-celled zygote.
166. Amnion is a shock absorber and protect the embryo from mechanical shock.
167. In stems, the protoxylem lies towards the centre (pith) and the metaxylem lies towards the periphery of the organ. This type of primary xylem is called endarch.
168. The gametophytic generation represents the dominant phase in the life cycle of bryophytes. The sporophyte phase is dependent on the gametophyte. That is why, the plant body of Funaria is predominantly gametophyte with dependent sporophyte.

169. In 1860, Julius von Sachs, a prominent German botanist, demonstrated, for the first time, that plants could be grown to maturity in a defined nutrients solution in the complete absence of soil. This technique of growing plants in a nutrient solutions is known as hydroponics.
170. Food is digested, then carried and then oxidized.
171. Air passes through Nostrils → Pharynx → Larynx → Trachea → bronchus → Bronchioles → Alveoli.
172. Aquatic annelids like Nereis possess lateral appendages, parapodia, which help in swimming.
173. Cytochromes are the iron-containing electron acceptors, which are present on the inner mitochondrial membrane, called cristae, helpful in ETS.
174. The path of water movement from soil to xylem is:
soil → root hair → cortex → endodermis → pericycle → protoxylem → metaxylem
175. Common Name: Wheat
Binomial name: *Triticum aestivum*
Genus: *Triticum*
Family: Poaceae
Order : Poales
Class: Monocotyledonae
Division : Angiosperm.
176. ELISA does not contribute to DNA fingerprinting.
177. Transgenic plants contains a gene or genes which have been artificially inserted of the plants acquiring them through pollination. Inserted gene sequences (transgene) may come from other unrelated plants, or from a completely different species.
178. Flowers are unisexual in cucumber which belongs to the family of cucurbitaceae. The yellow or orange flowers on a cucurbita plant are of female and male types. The female flowers produce the fruit and the male flowers produce pollen.
179. More often, as in many citrus and mango varieties some of the nucellar cells surrounding the embryo sac start dividing, protrude into the embryo sac, and develop into the embryos. In such species each ovule contains many embryos. Occurrence of more than one embryo in a seed is referred to as polyembryony.
180. In some plants such as *Rhizophora*, growing in swampy areas, many roots come out of the ground and grow ventrically upwards. Such roots, called pneumatophores, help to get oxygen for respiration.