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1. Correct option is (1)
Solution:
\[
\begin{align*}
T_1 \cos \theta &= T_2 \\
T_1 \sin \theta &= W/2
\end{align*}
\]
solving \( T_2 = \frac{W \cot \theta}{2} \)

2. \( V_R^2 + V_C^2 = (2 \theta)^2 \)

3. Impulse = change in momentum
\[
= 0 - MV
\]
\[
= 0 - (0.1) 2 = -0.2 \text{ kg m/s}
\]

4. Correct option is (1)
Solution:
\( V \propto T \Rightarrow \text{isobaric process.} \)
\( \Rightarrow dQ = nC_v dT \)
and \( dW = PdV = nRdT \)
Therefore \( \frac{dQ}{dW} = \frac{C_v}{R} = \frac{\gamma}{\gamma - 1} \)

5. \( B = -\frac{\partial \rho V}{\partial V} \)

6. Correct option is (3)
(2 \( n + 1 \) \( f = 20000 \), here \( n \) is overtone number

7. central maxima will shift

8. Correct option is (4)
Solution:
\[ I = I_{cm} + M d^2 \]
\[ I = \frac{MR^2}{2} + MR^2 \]
\[ I = \frac{3}{2} \cdot MR^2 \]

now, \[ I = 2\pi R \Rightarrow R = \frac{I}{2\pi} \]
and \[ M = \lambda L \]
\[ \Rightarrow I = \frac{3\lambda L^3}{8\pi^2} \]

9. Correct option is (2)
Solution:
\[ B_0 = \frac{\mu_0 i}{2R} \]
\[ B = \frac{\mu_0 i}{2(R^2 + x^2)^{3/2}} = \frac{B_0}{8} \]
\[ \Rightarrow x = \sqrt{3R} \]

10. Correct option is (2)
Solution:
Electrical pressure \[ P = \frac{1}{2} \varepsilon_0 E^2 \]
as \[ E = \frac{V}{r} \Rightarrow P = \frac{1}{2} \varepsilon_0 \frac{V^2}{r^2} \]

11. Correct option is (2)
Solution:
13. Solution:
\[ \frac{GM}{r^2} = m \cdot r \cdot \omega^2 \]
\[ \frac{GM}{r^3} = \frac{4\pi^2}{T^2} \]
\[ \frac{GMK}{r^3} = 4\pi^2 \]

14. Total distance travelled = 12 \cdot R - 3R = 9R

Displacement of C.M. = 0

\[ M_1 \cdot x_1 = M_2 \cdot x_2 \quad \text{(1)} \]
\[ x_1 + x_2 = 9R \quad \text{(2)} \]

15. Correct option is (2)
Solution:

16. Correct option is (2)
Solution:
\[ e = \frac{v/3}{v} = \frac{1}{3} \]

\[ P = kT^3 \]

\[ \Rightarrow P = k \left( \frac{PV}{nR} \right)^3 \]

\[ \Rightarrow \rho^2 v^3 = \text{const} \]

\[ \Rightarrow \rho v^{3/2} = \text{const} \]

\[ V = \frac{nR}{\rho} \cdot T \]

\[ \Delta \text{lope} = \frac{nR}{\rho} \]

As \( \theta_2 > \theta_1 \)

\[ \Rightarrow \rho_2 < \rho_1 \]

\[ = n c_v \Delta T \]

\[ = \frac{1}{4} \cdot \left( \frac{3}{2} R \right) \cdot (T_2 - T_1) \]

\[ = \frac{3}{8} \cdot R (T_2 - T_1) = \frac{3}{8} \lambda \delta K_b (T_2 - T_1) \]

20. Correct option is (1)

Solution:
Voltage gain \( A_v = \beta \frac{R_o}{R_i} = 50 \Rightarrow \beta = 25 \)

Power gain \( A_p = \beta^2 \frac{R_o}{R_i} = (25)^2 \times 2 = 1250 \)

21. Correct option is (4)
   Solution:
   When key is closed, behaviour of L behave as short circuit.

   ![Circuit Diagram](image)

   Current in 10\(\Omega\) = zero

22. Correct option is (3)
   Solution:

   \[
   1 \times \sin 45^\circ = \mu \times \sin (90 - \theta) \\
   \frac{1}{\sqrt{2}} = \mu \cos \theta \Rightarrow \cos \theta = \frac{1}{\sqrt{2}\mu} \\
   \sin \theta \geq \frac{1}{\mu} \\
   \Rightarrow \sqrt{1 - \cos^2 \theta} \geq \frac{1}{\mu} \\
   \Rightarrow \sqrt{1 - \frac{1}{2\mu^2}} \geq \frac{1}{\mu} \Rightarrow \mu \geq \sqrt{\frac{3}{2}}
   \]
\[ E = - \nabla V \]
\[ = - \left( \frac{2V}{\partial x} \mathbf{i} + \frac{2V}{\partial y} \mathbf{j} + \frac{2V}{\partial z} \mathbf{k} \right) \]
\[ = - \left[ (6-8y) \mathbf{i} + (-8x+8z) \mathbf{j} + 6y \mathbf{k} \right] \]
\[ = -2\mathbf{i} + 10\mathbf{j} - 6\mathbf{k} \hspace{1cm} \text{(at } (1,1,1)) \]
\[ F = qE = 4\mathbf{i} + 20\mathbf{j} - 12\mathbf{k} \]
\[ |F|^2 = \sqrt{4^2 + 20^2 + 12^2} = 4\sqrt{35} \hspace{1cm} \text{N} \]

26. Correct option is (3)

27. Correct option is (4)

Solution:
\[ M = IA \]
\[ M = 1 \times \pi R^2 \]
\[ B = \frac{\mu_0 I}{2R} \Rightarrow I = \frac{2BR}{\mu_0} \]
So, \[ M = \frac{2BR}{\mu_0} \times \pi R^2 \]

28. Correct option is (1)

Solution:
\[ \frac{1}{\lambda} = R \left[ \frac{1}{(1)^2} - \frac{1}{(5)^2} \right] \]
\[ \frac{1}{\lambda} = \frac{24}{25} R \]
\[ P = mv = \frac{h}{\lambda} \]
\[ v = \frac{h}{m\lambda} = \frac{24hR}{25m} \]
29. Correct option is (2)
   Solution:
   \[ \text{T.P.D = E - 1r} \Rightarrow 12 = E - 2r \quad (1) \]
   \[ \text{T.P.D = E + 1r} \Rightarrow 15 = E + 3r \quad (2) \]
   Solve eqs \( (1) \) & \( (2) \)

30. Correct option is (4)
   Solution:
   \[ K = \frac{1}{2} mu^2 \]
   Thus, \( v = \sqrt{\frac{2K}{m}} \)
   \[ \vec{F} = q(\vec{v} \times \vec{B}) \]
   \[ F = quB \sin \theta \]
   \( \vec{v} \perp \vec{B} \), then \( \theta = 90^\circ \)
   \[ \therefore F = quB = qB \sqrt{\frac{2K}{m}} \]
   \[ a = \frac{F}{m} = \frac{qB \sqrt{2K}}{(m)^{3/2}} \]

31. Correct option is (1)
   Solution:
   \[ i = \frac{2}{100} = 20 \text{mA} \]
   \[ R = \frac{\rho l}{A} = \frac{\rho l^2}{Al} \]
   \[ \Rightarrow 3 \sigma m = \frac{\rho l^2}{3} \]
   \[ \Rightarrow l = \frac{3}{\sqrt{8}} \]

34. Solution:
   Resistance of the electric bulb is \( R = \frac{(220V)^2}{(100)} \)
   Power consumed by the bulb when connected to 110 V is
   \[ P = \frac{(110V)^2}{R} = 25 \text{ watt} \]

35. Correct option is (4)
   Solution:
   \[
   \begin{array}{c}
   \begin{align*}
   & 21A \quad 13A \quad 9A \quad 5A \quad 3A \quad 2A \quad 1A \\
   \text{V = 34V} & 1 \Omega \quad 5 \Omega \quad 1 \Omega \quad 2 \Omega \quad 1 \Omega \\
   \text{V = 13V} & \text{V = 5V} & \text{V = 2 Volt}
   \end{align*}
   \end{array}
   \]
36. Correct option is (2)  
Solution:  
\[ v_e = \sqrt{2} v_0 = 1.414 \ v_0 \]
Fractional increase in orbital velocity  
\[ \frac{\Delta v}{v} = \frac{v_e - v_0}{v_0} = 0.414 \]
Percentage increase = 41.4%

37. Correct option is (3)  
Solution:  
\[ X_C = 5\Omega \]
\[ R = 4\Omega \]
\[ \Rightarrow \]
\[ X_L = 8\Omega \]
\[ X_C - X_L = 3\Omega \]
\[ \tan \phi = \frac{X_C - X_L}{R} = \frac{3}{4} \]
\[ \phi = \tan^{-1} \left( \frac{3}{4} \right) \]
\[ X_C > X_L \] so current lead voltage.

38. Correct option is (1)  
Solution:  
\[ v = 3t^2 + 1; \]
\[ a = \frac{v(5) - v(2)}{5-2} = \frac{76 - 13}{3} \]
\[ a = 21 \text{ m/s}^2 \]

39. \[ I \propto n^2 \]  
\[ \Rightarrow \frac{n_1}{n_L} = \frac{10}{1} \]
\[ \frac{I_{max}}{I_{min}} = \left( \frac{10 + 1}{10 - 1} \right)^2 = \frac{121}{81} \]
42. Correct option is (4)

43. Solution:
\[ H = \frac{u^2 \sin^2 \theta}{2g} \]
\( H \) is directly proportional to \( u^2 \)

44. Solution:
Electric field intensity in between the plates of the capacitor is \( E = \frac{\sigma}{\varepsilon_0} \)
Force acting on the charged particle when it is in between the plates of the capacitor is
\[ F = qE = q \frac{\sigma}{\varepsilon_0} \]
Due to a single charged plate, electric field intensity is \( E = \frac{\sigma}{2\varepsilon_0} \)
Force acting on charged particle now becomes \( F' = q \frac{\sigma}{2\varepsilon_0} = F/2 \)

46. (4)

\[
\begin{align*}
4\text{NaCl} + K_2\text{Cr}_2\text{O}_7 + 6\text{H}_2\text{SO}_4 \rightarrow & 2\text{CrO}_3\text{Cl}_2 \\
\text{(Clorotrioxochrome)}
\end{align*}
\]
\[
\begin{align*}
+4\text{NaHSO}_4 + 2\text{KHSO}_4 + 3\text{H}_2\text{O} \\
\text{CrO}_3\text{Cl}_2 + 4\text{NaOH} \rightarrow & \text{Na}_2\text{CrO}_4 + 2\text{NaCl} + 2\text{H}_2\text{O} \\
\text{(yellow solution)}
\end{align*}
\]
47. (2)

\[
\begin{align*}
\text{CH}_3\text{CH}=\text{CH}-\text{CH}_2\text{OH} & \xrightarrow{\text{Br}^-} \text{CH}_3\text{CH} = \text{CH} - \text{CH}_2\text{OH} \\
\text{Carbonium ion} & \text{stable due to resonance} \\
\text{Br}^- & \text{Fast, Step II} \\
\end{align*}
\]

48. (2)

Anilinium hydrochloride gives the white ppt. of AgCl with AgNO₃.

\[
\text{C}_6\text{H}_5\text{NH}_3\text{Cl} + \text{AgNO}_3 \rightarrow \text{C}_6\text{H}_5\text{NH}_2\text{NO}_3 + \text{AgCl} \downarrow
\]

No such precipitate is formed with p-chloroaniline.

49. (3)

Sodium nitrate on decomposition upto 500°C to give NaNO₂ and oxygen.

\[
2\text{NaNO}_3 \xrightarrow{\Delta} 2\text{NaNO}_2 + \text{O}_2 \uparrow
\]

While at higher temperature i.e. above to 800°C NaNO₂ is decomposed into N₂O, N₂ and O₂.

\[
2\text{NaNO}_2 \xrightarrow{800°C} \text{Na}_2\text{O} + \frac{3}{2}\text{O}_2 \uparrow + \text{N}_2 \uparrow
\]

50. (3)

Potassium hexa cyanoferrate (II) i.e. K₄[Fe(CN)₆] gives the maximum number of ions on ionisation hence it has the highest molar conductivity.

\[
\text{K}_4[\text{Fe(CN)}_6] \rightarrow 4\text{K}^- + [\text{Fe(CN)}_6]^{4-}
\]

51. (3)

According to Markownikoff's rule, the addition of a unsymmetrical reagent to an unsymmetric alkene takes place in such a way that the negative part of the reagent will be attached to the carbon atom which containing lesser number of H-atom.

Hence it is best applicable to the reaction between C₄H₆ and HBr

\[
\text{CH}_3\text{CH} = \text{CH} + \text{HBr} \rightarrow \text{CH}_3 - \text{CH} - \text{CH}_2\text{Br}
\]

52. (1)

\[
\text{CH}_3\text{C}=\text{CH}_2 + \text{D}_2\text{O} \rightarrow \text{CH}_3\text{C}=\text{OD}
\]

enol form of acetone
53. (2) 
\[ P_{3\text{H}_2\text{O}} = X_p\text{H}_2\text{O}P_{\text{total}} \]
\[ = 0.0287 \times 0.977 = 0.028 \text{ atm} \]
\[ P_{\text{total}} = P_{\text{dissolv}} + P_{3\text{H}_2\text{O}} \]
\[ P_{\text{dissolv}} = P_{\text{total}} - P_{3\text{H}_2\text{O}} \]
\[ = 0.977 - 0.028 = 0.949 \text{ atm} \]

54. (3) 
Sulphanilic acid exists as Zwitter ion

It exists as a dipolar ion which has acidic and basic groups in the same molecule.

55. (4) 

Possible number of optical isomers = \(2^1 = 2^2 = 4\)

56. (3) 
\[ \text{Hg}_2\text{Cl}_4 \rightarrow \text{Hg}^{2+}_\text{s} + 2\text{Cl}^- \]
\[ K_{\text{sp}} = \left[ \text{Hg}^{2+}_\text{s} \right] \left[ \text{Cl}^- \right]^2 = (S)(2S)^2 \]
\[ K_{\text{sp}} = 4S^3 \]
\[ S = \left( \frac{K_{\text{sp}}}{4} \right)^{\frac{1}{3}} \]

57. (2) Adsorption is an exothermic process and hence \(\Delta H\) is \(-ve\) for adsorption. On the other hand the molecules of the adsorbate are held on the surface of the adsorbant and therefore they have lesser tendency to move freely. In other words entropy decreases i.e. \(\Delta S\) is \(-ve\). According to Gibbs Helmholtz equation \(\Delta G = \Delta H - T \cdot \Delta S\) Thus for the process of adsorption to occur \(\Delta G\) must be negative. Hence, for adsorption \(\Delta G < 0; \Delta S < 0; \Delta H < 0\)
58. \( \frac{3}{4} \) is the mass of adsorbate per unit mass of adsorbent. \( P \) is the pressure of the adsorbate gas and \( b' \) and \( b' \) are constant. Then Langmuir adsorption isotherm is given as:
\[
\frac{x}{m} = \frac{aP}{1 + bP} \\
1 = \frac{1}{1 + bP} \\
\frac{\%_a}{a} = \frac{aP}{b} \\
= \frac{1}{a} + \frac{b}{a}
\]

59. (1) Hybrid propellants consist of solid fuel (acrylic rubber) and liquid oxidizer (liquid nitrogen tetraoxide, \( \text{N}_2\text{O}_4 \)).

60. (4) Boric acid is used in carom boards for smooth gliding of pawns because H-bonding in \( \text{H}_3\text{BO}_3 \) gives it a layered structure.

61. (2) Erythromycin is a bacteriostatic (inhibits the growth of organisms) antibiotic.

62. (3) \[
\begin{align*}
\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6e^- & \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} \\
(2l^- \rightarrow 1a + 2e^-) \times 3 & \\
\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6l^- & \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} + 3l_2
\end{align*}
\]
Hence, number of moles of \( l_2 \) liberated = 3

63. (3)

64. (2) \[
0.5 \text{ mol } \text{HNO}_3 = 0.5 \text{ mol } \text{H}^+ \text{ and } 0.3 \text{ mol } \text{OH}^- \\
0.5\text{H}^+_{(aq)} + 0.3\text{OH}^-_{(aq)} \rightarrow 0.3\text{H}_2\text{O}_{(l)}
\]
\( \Delta H = 0.3 \times 57.1 = 17.1 \text{ KJ} \)

65. (3) At equilibrium the concentrations of \( A \) and \( C \) are equal.
\[
1 - x = 4x \\
x = \frac{1}{5}
\]

For above reaction,
\[
K_v = \frac{[C]^4}{[A][B]^3} = \frac{(4x)^4}{(1-x)(1-3x)^3} \\
K_v = \frac{\left(\frac{4}{5}\right)^4}{\left(1-\frac{1}{5}\right)(1-\frac{3}{5})^3} = 8.0
\]
66. (2)

Number of moles of \( \text{PCl}_3 \) dissociated at equilibrium

\[
\begin{align*}
\text{PCl}_3 & \rightleftharpoons \text{PCl}_2^+ + \text{Cl}_2^- \\
2 \text{mol} & \rightarrow 0 \text{ mol} + 0.8 \text{ mol} \\
2 - 0.8 = 1.2 \text{ mol} & \rightarrow 0.8 \text{ mol} \text{ at equilibrium}
\end{align*}
\]

\[
\begin{align*}
[\text{PCl}_3] &= \frac{1.2}{2} = 0.6 \text{ M} \\
[\text{PCl}_2^+] &= \frac{0.8}{2} = 0.4 \text{ M}
\end{align*}
\]

\[
\chi = \frac{[\text{PCl}_2^+][\text{Cl}_2^-]}{[\text{PCl}_3]} = \frac{0.4 \times 0.4}{0.6} = 0.267 \text{ mol m}^{-3}
\]

67. (3)

68. (1)

\[
\begin{align*}
\text{BaCl}_2 & \rightarrow \text{Ba}^{2+} + 2\text{Cl}^- \\
0.01 \text{ M} & \rightarrow x \text{ M} \\
(0.01 - x) \text{ M} & \rightarrow 2x \text{ M}
\end{align*}
\]

\[
\begin{align*}
i &= \frac{(0.01 - x) + x + 2x}{0.01} \\
&= \frac{0.01 + 2x}{0.01} = 1.98 \\
x &= 0.0049
\end{align*}
\]

\[
\chi = \frac{x}{0.01} \times 100 = \frac{0.0049 \times 100}{0.01} = 49\%
\]

69. (2)

Benzaldehyde, formaldehyde and 2, 2-dimethyl propanal do not have \( \alpha \)-hydrogen atom hence they give Cannizzaro's reaction. On the other hand, propanal has a \( \text{H} \)-atom hence it does not undergo Cannizzaro's reaction.

70. (2)

Magnetic moment \((\mu) = \sqrt{n(n+2)}\)

Where \( n \) is number of unpaired electron. In \( \text{Sc}^{3+} \) there is no unpaired electron hence its effective magnetic moment is zero.
71. (4) In acidic medium

\[ \text{KMnO}_4 \rightarrow \text{MnSO}_4 \]

In weak basic medium

\[ \text{KMnO}_4 \rightarrow \text{MnO}_2 \]

72. (4) The half reactions are

\[ \text{Fe}_3(\text{g}) \rightarrow \text{Fe}^{2+}(\text{aq}) + 2e^- \times 2 \]

\[ \text{O}_3(\text{g}) + 4\text{H}^+ + 4e^- \rightarrow 2\text{H}_2\text{O} \]

\[ 2\text{Fe}^{3+}(\text{aq}) + \text{O}_3(\text{aq}) + 4\text{H}^+ \rightarrow 2\text{Fe}^{2+}(\text{aq}) + 2\text{H}_2\text{O} \]

\[ E = E^o - \frac{0.059}{4} \log \left( \frac{(10^{-3})^3}{(10^{-3})^4(0.1)} \right) = 1.57 \text{ V} \]

73. (1) Ca has a total of 14 electrons and CN\(^-\) also has 14 electrons hence they are isoelectronic.

\[ \text{C}(6e^-) + \text{N}(7e^-) + e^- \rightarrow \text{CN}^- (14e^-) \]

74. (4) \[ \text{Ba}(\text{N}_3)_2 \rightarrow \text{Ba}^{2+} + 3\text{N}_2(\text{g}) \]

Azide salt of barium can be obtained in purest form as well as the decomposition product contain solid Ba as by product along with gaseous nitrogen hence no additional step of separation is required.

75. (3) In the reaction \( \text{NaNO}_3(\text{s}) \rightarrow \text{Na}_2(\text{aq}) + \text{NO}_3^- (\text{aq}) \)

\( \Delta S^o > 0 \) because ions in the aqueous solution have greater randomness than the solid.

76. (3) Solubility of a gas in a liquid increases with decrease in temperature.

77. (3) For a body centered cubic (BCC) the packing fraction is 0.68.

78. (2) PbS turns white on treatment with hydrogen peroxide due to the formation of PbSO\(_4\).

\[ \text{PbS} + 4\text{H}_2\text{O}_2 \rightarrow \text{PbSO}_4 + 4\text{H}_2\text{O} \]

79. (1) Potassium super oxide is used in oxygen cylinders in space and submarines because it absorbs CO\(_2\) and increases O\(_2\) contents.

\[ 4\text{KO}_2 + 2\text{CO}_2 \rightarrow 2\text{K}_2\text{CO}_3 + 3\text{O}_2 \]

80. (4) Carbogen is a mixture of 95% O\(_2\) and 5% CO\(_2\). It is used as antidote for CO poisoning.
81. **2**

\begin{align*}
\text{HOOC-CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{COOH} \\
\text{COOH}
\end{align*}

3-Carboxyhexane-1, 6-dicarboxylic acid

82. **2** Ionization energy increases in a period on moving left to right while it decreases in a group on moving downward. The I.E. of Be is greater than B due to completely filled s-orbital. Therefore the order of first ionization energies is as: Be > B > Li > Na

83. **4**

\[ E = \frac{hc}{\lambda} \]

\[
\frac{E_1}{E_2} = \frac{\lambda_2}{\lambda_1} = \frac{16000}{8000}
\]

\[
E_1 = \frac{2}{1} E_2 
\]

84. **4** Alkanes are all less dense than water, floats over water. Hence, when cyclohexane is poured on water, it floats because it is less dense than water.

85. **3**

\[
\text{CH}_3\text{CH}_2\text{COONH}_4 \xrightarrow{\text{H}_2\text{O}} \text{CH}_3\text{CH}_2\text{CN} \xrightarrow{\text{H}_2\text{SO}_4} \text{CH}_3\text{CH}_2\text{COOH}
\]

86. **3**

\[ X \xrightarrow{\text{Na}_2\text{CO}_3} \text{CO}_2 \]

Hence, compound X has -COOH group.

87. **4** 40% aqueous solution of formaldehyde (methanal) is known as formalin. It is used as disinfectant and preservative for biological specimens.

88. **4**
91. A museum has collection of dead remains of plant and animals in preserved form for study and reference.

92. Viruses have a protein coat (Capsid) that protects the nucleic acids i.e DNA or RNA

93. NCERT pg 21

94. In bryophytes, male sex organ is globular called antheridium and produces biflagellated sperms (antherozoids). Both flagella are similar attached apically and are whiplash type

95. NCERT pg 39

96. Plants growing in swampy areas, Marshy places and salt lakes are called halophytes many halophyte develop respiratory roots or pneumatophores pneumatophores are negatively geotropic and are provided with pores called lenticels since they grow in oxygen – deficient soil, their seeds germinate inside the fruit, when it is still attached with the parents, exhibiting vivipary

97. Rhizome → underground stem modification stolon, sucker → sub- aerial stem modification stolon, sucker → sub – aerial stem medication

98. NCERT pg 78

99. NCERT pg 88

100. In dicot root, pith is small or inconspicuous where as in monocot root, pith is large and well developed dicot root has fewer xylem bundles, whereas monocot roots usually have more than six(polyarch) xylem bundles

101. NCERT pg 81

102. NCERT pg 79
The Spindle fibres of mitotic and meiotic spindle consists of bundles of microtubules

103. NCERT pg 128

104. NCERT pg 128
105. Haploid content of a cell is called Genome

106. When the ring of bark is cut from the stem it also removes the phloem thus the transport of food via phloem occurs only up to the ring part where the bark swells. Tissues below the ring shrivel thereby starving the root.

107. Osmotic pressure is numerically equivalent to the osmotic potential but the sign is opposite. Osmotic pressure is the positive pressure applied, while osmotic potential is negative. Thus, if a system has osmotic potential of \(-150 \text{kPa}\), then its osmotic pressure will be \(+150 \text{kPa}\).

108. Nitrogen, potassium, and calcium are required in meristematic tissues.

109. NCERT pg 201

110. CH\(_3\) – CO – COOH is the formula for pyruvic acid, which is end product of glycolysis.

114. \[ \text{RQ} = \frac{102 \text{ CO}_2}{145 \text{ O}_2} = 0.7 \]

116. Abscisic acid inhibits seed germination and seedling growth, while gibberellic acid promotes seed germination and seedling growth.

118. Short day plants require uninterrupted long dark period for blooming.

120. Dioecious plants are unisexual. Either they bear staminate (male) flower or pistillate flower and flowers can be produced only from pistillate.

121. Female gametophyte are 7-celled 8 nucleated structure, shows free nuclear division; it is situated inside nucellus and egg apparatus are situated towards microphyle end.

122. 12, 36, 24 because pollen grains are haploid while endosperm has triploid chromosome number; an integument is diploid in nature.

123. The test cross ratio is 1 : 1.

124. Purine and pyrimidine pairing maintains the diameter of DNA.

125. Aneuploidy is abnormal number of chromosomes in a haploid set. While polyploidy is a numerical change in a whole set of chromosome.

126. Successive nucleotides in same strand are linked by 3 – 5 phosphodiester bond in which 5 – phosphate of one nucleotide is joined to 3 – OH of successive nucleotide.

127. Distance between successive nucleotides of a DNA strand is 0.34 nm. DNA not following Chargaff’s rule, it is single stranded DNA.

129. In somatic hybridization cells of different species varieties or genera are treated with cellulose and pectinase to dissolve cell wall; hybrid protoplast mostly contains characters of both parents. Protoplast. Eg: Tomato.

130. NCERT pg 174

131. NCERT pg 187

132. BOD is the amount of dissolved oxygen needed by aerobic organisms to break down organic material present in water; it is directly proportional to the amount of impurities present in water.

133. NCERT pg 226
134. NCERT pg 249

135. NCERT pg 246

136. NCERT pg 265

137. NCERT pg 267

138. NCERT Pg 276

139. NCERT pg 274

140. NCERT pg 276

141. (4)

142. (2)

143. (3)

144. (3) Ventral diaphragm is between perivisceral and perineural sinuses.

145. (3) Fifth month

146. (3)

147. (3)

148. (2) Antitoxin and serum contain antibodies

149. (1)

150. (4)

151. (2) Deuterostome in which the first opening becomes anus and indeterminate in which fate of cells in not determined is in echinoderms and chordates.

152. (2) Pg 48,2nd para

153. (4) Birds due to there volant adaptation have pneumatic bones

154. (2) Corpora striata is present at the ventrolateral wall of forebrain.It is the part of basal ganglia.

155. (1) Telencephalon is an embryonic name of cerebrum.Amygdala is a part of limbic system which is present in cerebrum.

156. (3) Occulomotor,3rd cranial nerve supplies extraocular muscles which is responsible for movement of eyeball.

157. (2) Hypersecretion of growth hormone causes gigantism in which gorilla like appearance of hands and legs are there.
158. (3) Milk ejection is stimulated by oxytocin. Milk production by prolactin and FSH stimulates growth of ovarian follicles.

159. (3) Pg 338, 2nd para

160. (2) Hilsa is a marine fish. Rest all are freshwater.

161. (1) Pg 306 NCERT XI

162. (3)

163. (3)

164. (2)

165. (3)

\[
p + q = 1
\]
\[
p = 0.7 \therefore q = 0.3
\]
\[
p^2 + 2pq + q^2 = 1
\]
\[
q^2 = (0.3)^2 = 0.09
\]

166. (2)

167. (1)

168. (1)

169. (4)

170. (2) C-peptide containing 30 AA is removed

171. (4) Methionine and cysteine are sulphur containing amino acids

172. (3)

173. (3) Residual volume is left after forceful exhalation.

174. (1)

175. (1)

176. (1) Tripalmitin is a triglyceride containing glycerol (C\(_3\) H\(_8\) O\(_3\)) and three palmitic acids (C\(_{16}\) H\(_{32}\) O\(_2\)). When the formation takes place 3 water molecules are removed. Thus molecular formula of tripalmitin is C\(_3\) H\(_8\)O\(_3\) + 3 (C\(_{16}\) H\(_{32}\) O\(_2\)) – 3 H\(_2\) O = C\(_{51}\) H\(_{98}\) O\(_6\)

177. (2)

178. (2)

179. (4)

180. (2)