17/03/2026

Code-B

Aakash
Medical | IIT-JEE | Foundations

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MM : 720

Final Test Series(P1)_NEET2026_Test-01B

Time : 180 Min.

PHYSICS

1. (3)
2. (1)
3. (4)
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CHEMISTRY

46. (2)
69. (3)

47. (2)
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BOTANY

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122. (2)
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124. (2)

102. (2)

103. (3)

104. (1)

105. (3)

106. (4)

107. (3)

108. (2)

109. (1)

110. (1)

111. (2)

112. (1)

113. (2)

125. (3)

126. (4)

127. (1)

128. (3)

129. (1)

130. (2)

131. (1)

132. (3)

133. (1)

134. (3)

135. (3)

ZOOLOGY

136. (1)

137. (4)

138. (1)

139. (3)

140. (2)

141. (3)

142. (3)

143. (2)

144. (4)

145. (2)

146. (1)

147. (2)

148. (4)

149. (1)

150. (4)

151. (2)

152. (4)

153. (3)

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156. (2)

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160. (4)

161. (3)

162. (4)

163. (3)

164. (2)

165. (2)

166. (3)

167. (3)

168. (4)

169. (3)

170. (2)

171. (3)

172. (2)

173. (3)

174. (1)

175. (2)

176. (1)

177. (3)

178. (2)

179. (3)

157. (3)

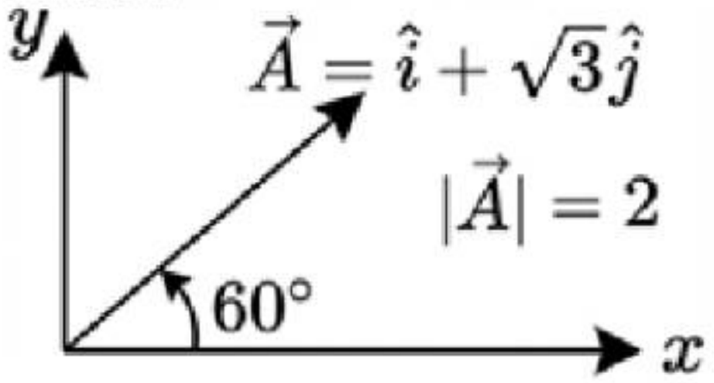
158. (1)

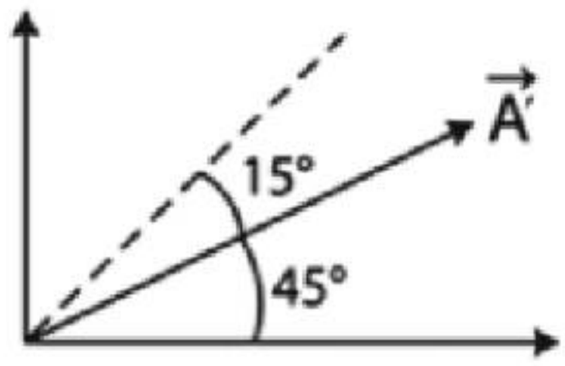
180. (2)

Hints and Solutions

PHYSICS

(1) Answer : (3)
Solution:





$A_x = 2\cos 45^o$

$A_y = 2\sin 45^o$

New vector $\overrightarrow{A'} = \frac{2}{\sqrt{2}}\hat{i} + \frac{2}{\sqrt{2}}\hat{j} = \sqrt{2}\hat{i} + \sqrt{2}\hat{j}$.

$\frac{\vec{A'}}{|\vec{A'}|} = \hat{A} = \frac{\sqrt{2}\hat{i}+\sqrt{2}\hat{j}}{2} = \frac{1}{\sqrt{2}}\hat{i} + \frac{1}{\sqrt{2}}\hat{j}$.

(2) Answer : (1)
Solution:

$\frac{dy}{dx} = 2x + 3 = 0$

$\Rightarrow x = -\frac{3}{2}$

(3) Answer : (4)
Solution:

Stopping distance = $\frac{u^2}{2a} = \frac{(20)^2}{2\times 5} = 40$ m

(4) Answer : (2)
Solution:

$\tan\theta = \frac{A_y}{A_x}$

Step-1: $\tan\theta = \frac{8}{7}$

$\theta = \tan^{-1}\left(\frac{8}{7}\right)$

(5) Answer : (2)
Solution:

LC = 1 MSD – 1 VSD

50 VSD = 48 MSD

So, 1 VSD = $\frac{48}{50} = \frac{24}{25}$ MSD

Now,

Least count = 1 MSD – 1 VSD

= 1 MSD – $\frac{24}{25}$ MSD

= $\frac{1}{25}$ MSD = $\frac{1}{25} \times 0.5$ mm

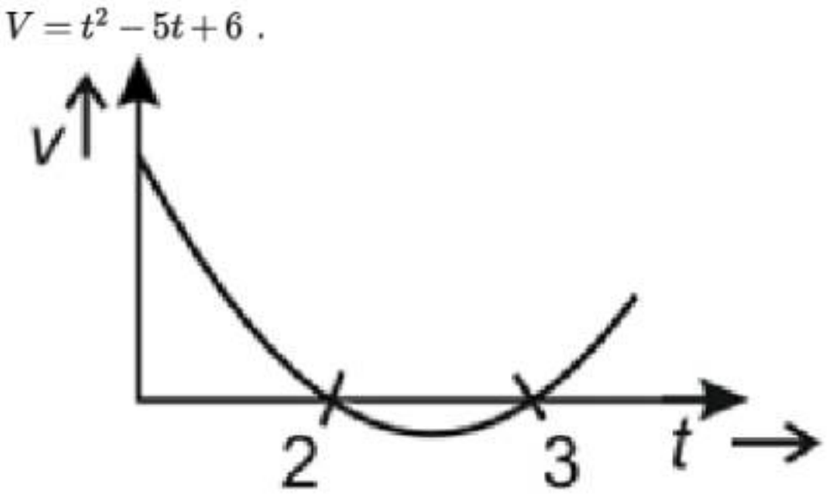
= 0.02 mm

(6) **Answer :** (3)
Hint:
In uniform circular motion, $\omega = \frac{2\pi}{T}$
Solution:
Since time period is same for both
$\therefore \omega_1 = \omega_2$

(7) **Answer :** (2)
Hint:
$y = x\tan\theta\left(1-\frac{x}{R}\right)$
Solution:
Since trajectory of a projectile in *x-y* plane is given by
$y = x\tan\theta\left(1-\frac{x}{R}\right)$
$5 = 4\tan\theta\left(1-\frac{4}{R}\right)$ ...(i)
$4 = 5\tan\theta\left(1-\frac{5}{R}\right)$ ...(ii)
$\frac{5}{4} = \frac{4}{5}\frac{(R-4)}{(R-5)}$
$\frac{25}{16} = \frac{R-4}{R-5}$
$25R - 125 = 16R - 64$
$9R = 61$
$R = \frac{61}{9}$ m

(8) **Answer :** (3)
Solution:
Speed $v = \sqrt{v_x^2 + v_y^2}$
$v^2 = v_x^2 + v_y^2$
$2v\frac{dV}{dt} = 2v_x\frac{dV_x}{dt} + 2v_y\frac{dV_y}{dt}$
$\frac{dv}{dt} = \frac{v_x a_x + v_y a_y}{v} = \frac{\vec{v}\cdot\vec{a}}{v}$
i.e. component of $\vec{a}$ parallel to $\vec{v}$

(9) **Answer :** (4)
Solution:
$x = \frac{t^3}{3} - \frac{5t^2}{2} + 6t + 2$
$V = t^2 - 5t + 6$.



$t^2 - 5t + 6 = 0 \Rightarrow t = 2, 3$
Velocity-time graph is upward parabola.

(10) **Answer :** (4)
Solution:
Precision is related to least count.

(11) **Answer :** (1)
Solution:
T = Total distance / Speed
=1000 / 25
= 40 s

(12) Answer : (2)
Solution:

$\sigma = \frac{F}{\pi r^2}$

Maximum percentuge error in $\sigma(\%\ \sigma) = 1 \times \%F + 2 \times \%r$

$\%F = \frac{0.005}{5} \times 100 = 0.1\%$

$\%r = \frac{0.01}{2} \times 100 = 0\ .5\%$

$\therefore\ \%P = 0.1 + 2(0.5) = 1.1\%$

(13) Answer : (4)
Solution:

$x = 4 + 3t + 6t^2$

$v = \frac{dx}{dt} = 3 + 12t$

at $t = 1$ s, $v = 15$ m/s

(14) Answer : (1)
Solution:

Equation of straight line

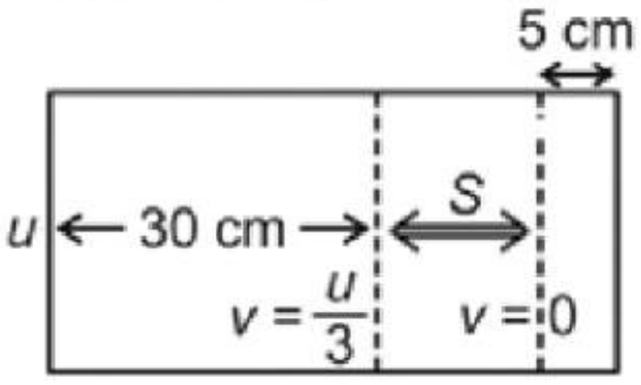
$y = mx + c$

Here $m = 1$ and $c = 2$

$\therefore y = x + 2$

(15) Answer : (2)
Solution:

Using $v^2 - u^2 = 2\,\mathrm{aS}$.



$\frac{u^2}{9} - u^2 = 2a\left(30\right) \quad \ldots\left(1\right)$

$0 - \frac{u^2}{9} = 2a\left(S\right) \quad \ldots\left(2\right)$

$-\frac{8u^2}{9} = 30$

$-\frac{u^2}{9} = S$

$\Rightarrow S = \frac{30}{8} = 3.75$

$\therefore$Total length of the block $= 30 + 3.75 + 5$

$= 38.75$ cm

(16) Answer : (4)
Solution:

Surface tension = $\frac{\text{Force}}{\text{Length}}$

(17) Answer : (4)
Solution:

$R_{max} = A + B = 7$

$R_{min} = |A - B| = 1$

$R_{min} \le R \le R_{max}$

(18) Answer : (4)
Solution:

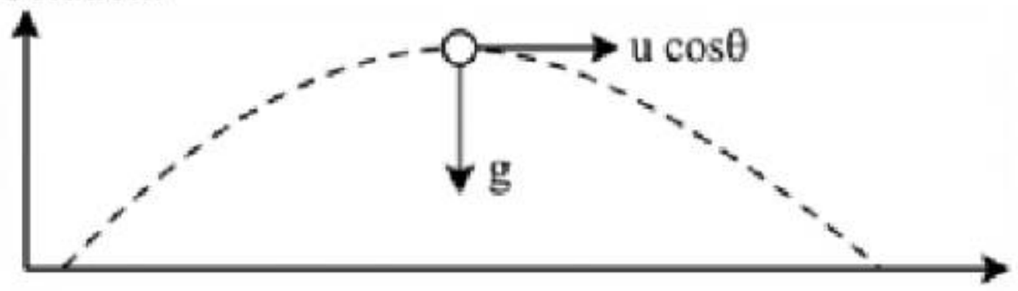
Angular momentum, $L = \frac{nh}{2\pi}$

$\therefore$ Unit of angular momentum (L) is same as Planck's constant.

$E = hf \Rightarrow h = \frac{E}{f}$

$\therefore$ Unit of $\frac{\text{Energy}}{\text{Frequency}}$ is same as Planck's constant.

(19) Answer : (3)
Solution:



$r = \frac{u^2 \cos^2 \theta}{g} = \frac{(u \cos\theta)^2}{g} = \frac{a^2}{g}$

(20) Answer : (3)
Solution:
If $a_X \neq 0$, v_X will change
If $a_Y \neq 0$, v_Y will change

(21) Answer : (4)
Solution:
Distance travelled in last second $s_{nth} = u + \frac{a}{2}(2n-1)$, hence distance travelled in last second of the journey depends on initial speed also.
Distance covered in last second of upward journey before coming to rest = $\frac{1}{2}g(1)^2 = \frac{g}{2}$.

(22) Answer : (1)
Hint:
L.C. of screw gauge = $\frac{\text{Pitch}}{\text{Number of divisions on circular scale}}$
Solution:
L.C. of screw gauge = $\frac{1 \text{ mm}}{100}$ = 0.01 mm

(23) Answer : (4)
Solution:
If velocity of particle is *u* at point of projection then
At the highest point velocity is = *u*cosθ
= *u*cos60°
$= \frac{u}{2}$

(24) Answer : (2)
Solution:

$$\left|\vec{P} + \vec{Q}\right| = \left|\vec{R}\right| \Rightarrow R^2 = P^2 + Q^2 + 2PQ\cos\theta \quad \ldots(1)$$

$$\left|\vec{P} + 2\vec{Q}\right| = 2\left|\vec{P} + \vec{Q}\right| \Rightarrow 4R^2 = P^2 + 4Q^2 + 4PQ\cos\theta \quad \ldots(2)$$

$$\left|\vec{P} - \vec{Q}\right| = 2\left|\vec{P} + \vec{Q}\right| \Rightarrow 4R^2 = P^2 + Q^2 - 2PQ\cos\theta \quad \ldots(3)$$

Solving (1) and (3)

$$R^2 = P^2 + Q^2 + 2PQ\cos\theta$$
$$4R^2 = P^2 + Q^2 - 2PQ\cos\theta$$
$$5R^2 = 2P^2 + 2Q^2 \quad \ldots(4)$$

Solving (2) and (3)

$$4R^2 = P^2 + 4Q^2 + 4PQ\cos\theta$$
$$8R^2 = 2P^2 + 2Q^2 - 4PQ\cos\theta$$
$$12R^2 = 3P^2 + 6Q^2$$
$$4R^2 = P^2 + 2Q^2 \quad \ldots(5)$$

Solving (4) and (5)

$$R^2 = P^2$$
$$R^2 = \frac{2}{3}Q^2$$
$$P^2 = \frac{2}{3}Q^2$$

$\therefore \quad P : Q : R$

$\sqrt{2} : \sqrt{3} : \sqrt{2}$

(25) Answer : (2)

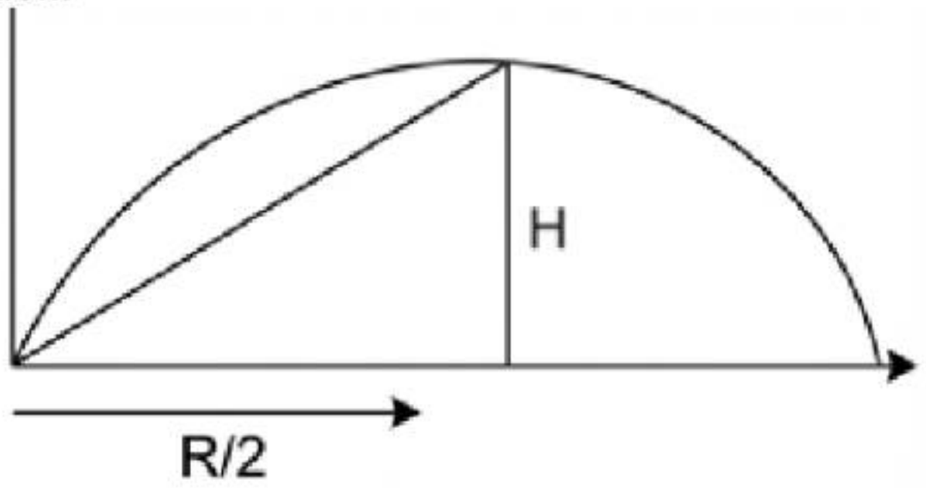
Solution:

$$V_{(\text{avg})} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{40+40}{15} = \frac{80}{15} = 5.33 \text{ m/s}$$

(26) Answer : (3)

Solution:



Average velocity = $\frac{\text{displacement}}{\text{time}}$

$$= \frac{\sqrt{H^2 + \frac{R^2}{4}}}{T/2}$$

$$H = \frac{v^2 \sin^2\theta}{2g}, \qquad R = \frac{v^2 2 \sin\theta\cos\theta}{g}$$

$$\rightarrow T = \frac{2v\sin\theta}{g}$$

$$= \frac{\sqrt{\left(\frac{v^2\sin^2\theta}{2g}\right)^2 + \frac{1}{4}\left(\frac{v^2 2\sin\theta\cos\theta}{g}\right)^2}}{\frac{v\sin\theta}{g}}$$

$$= \frac{\sqrt{\frac{v^4\sin^4\theta}{4g^2} + \frac{4v^4\sin^2\theta\cos^2\theta}{4g^2}}}{\frac{v\sin\theta}{g}}$$

$$= \frac{\sqrt{\frac{v^4\sin^2\theta}{4g^2}\left(\sin^2\theta + 4\cos^2\theta\right)}}{\frac{v\sin\theta}{g}}$$

$$= \frac{\frac{v^2\sin\theta}{2g}\sqrt{\sin^2\theta + \cos^2\theta + 3\cos^2\theta}}{\frac{v\sin\theta}{g}}$$

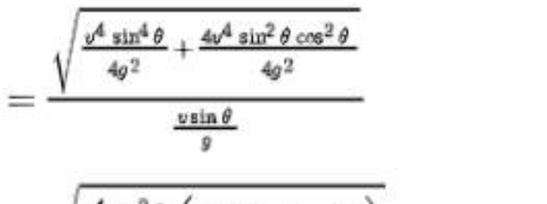
$$= \frac{v}{2}\sqrt{1 + 3\cos^2\theta}$$

(27) Answer : (3)

Solution:

Let velocity of man in still water be *v* and that of water with respect to ground be *u*.

Velocity of man perpendicular to river flow with respect to ground = $\sqrt{v^2 - u^2}$



Velocity of man downstream = $v + u$

As given, $\sqrt{v^2 - u^2}\, t = (v + u)\, T$

$\Rightarrow (v^2 - u^2)t^2 = (v + u)^2 T^2$

$\Rightarrow (v - u)t^2 = (v + u)T^2$

$\therefore \quad \frac{v}{u} = \frac{t^2 + T^2}{t^2 - T^2}$

(28) Answer : (1)

Solution:

$y = x - x^2$

$y = x[1 - x]$

On comparing it with $y = x\tan\theta\left[1 - \frac{x}{R}\right]$

$\theta = 45^\circ$

$R = 1$

Also $y = x\tan\theta - \frac{1}{2}\frac{gx^2}{u^2\cos^2\theta}$

$y = x - \frac{5}{u_x^2}x^2$

$\frac{u_x^2}{5} = 1 \Rightarrow u_x = \sqrt{5}$

$u\cos 45^\circ = \sqrt{5} \quad \therefore \; u = \sqrt{10} = 3.16\ \text{m/s}$

$T = \frac{2u\sin\theta}{g} = 2 \times \frac{\sqrt{10}}{10} \times \frac{1}{\sqrt{2}} = \sqrt{\frac{2}{10}} = \sqrt{0.2} = 0.447\ \text{s}$

$H = \frac{u^2\sin^2\theta}{2g} = \frac{10}{2\times 10} \times \frac{1}{2} = \frac{1}{4} = 0.25\ \text{m}$

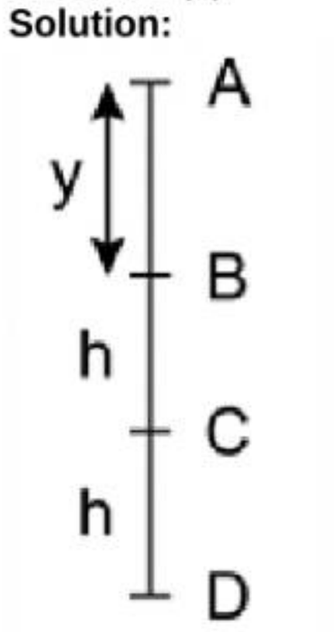
(29) Answer : (1)

Solution:

Trailing zero(s) in a number with a decimal point are significant.

(30) Answer : (2)

Solution:



Let $AB = y$

$BC = CD = h$

$t_{AB} = t$

$y = \frac{1}{2}gt^2 \quad \ldots(1)$

$y + h = \frac{1}{2}g\left(t+2\right)^2 \quad \ldots\left(2\right)$

$y + 2h = \frac{1}{2}g\left(t+3\right)^2 \quad \ldots(3)$

solving $(1)$and (2)

$h = \frac{g}{2}\left[4 + 4t\right] \quad \ldots\left(4\right)$

solving $(2)$and (3)

$h = \frac{g}{2}\left[5 + 2t\right] \quad \ldots\left(5\right)$

Solving $(4)$and (5)

$4 + 4t = 5 + 2t$

$2t = 1$

$t = 0.5\ \text{s}$

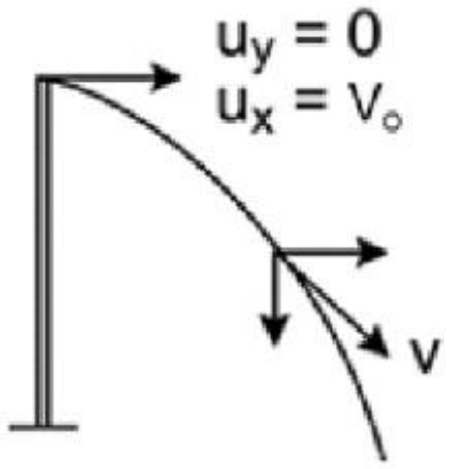
(31) Answer : (4)
Solution:
$F = A^2$
$MLT^{-2} = A^2$
$\therefore A = M^{½} L^{½} T^{-1}$
$\sqrt{B}x$ and ct are dimensionless.
$\frac{\sqrt{B}}{C} = \frac{t}{x} = L^{-1}T^{1}$
$B = L^{-2}$
$c = T^{-1}$

(32) Answer : (1)
Solution:
(1) Force = $\rho^a f^b V^c$
$MLT^{-2} = (ML^{-3})^a (T^{-1})^b (LT^{-1})^c$
Solving, we get $a = 1, b = -2, c = 4$
$\therefore$ [Force] = $\rho^1 f^{-2} V^4$
2. Angular momentum
$ML^2T^{-1} = (ML^{-3})^a (T^{-1})^b (LT^{-1})^c$
Solving, we get $a = 1, b = -4, c = 5$
[Angular momentum] [$\rho^1 f^{-4} V^5$]
3. Mass
$ML^0T^0 = (ML^{-3})^a (T^{-1})^b (LT^{-1})^c$
$a = 1, b = -3, c = 3$
[Mass] = [$\rho^1 f^{-3} V^3$]
4. Length
$M^0L^1T^0 = (ML^{-3})^a (T^{-1})^b (LT^{-1})^c$
$a = 0, b = -1, c = 1$
[Length = $\rho^0 f^{-1} V^1$]

(33) Answer : (1)
Solution:
$\because l^2 = A \Rightarrow l = \sqrt{A} = 10\ \text{m}$
$\Rightarrow \frac{\Delta l}{l} = \frac{1}{2}\frac{\Delta A}{A} \Rightarrow \Delta l = \frac{l\Delta A}{2A} = \frac{0.4\times 10}{2\times 100} = 0.02\ \text{m}$
$\therefore$ side = $(10 \pm 0.02)\text{m}$

(34) Answer : (2)
Solution:
6.03587
odd (increment it by 1)
6.04

(35) Answer : (3)
Solution:



$S_x = S_y$

$u_x t = \frac{1}{2} g t^2$.

$V_0 t = \frac{1}{2} g t^2$.

$t = \frac{2V_0}{g}$.

After time t, $V_x = V_0$.

$V_y = gt = g\frac{2V_0}{g} = 2V_0$.

$\therefore$Speed $= \sqrt{V_x^2 + V_y^2} = \sqrt{V_0^2 + (2V_0)^2} = \sqrt{5} V_0$.

(36) Answer : (2)
Solution:

$\tan\theta = \frac{u_y}{u_x} = \sqrt{3}$, $\theta = 60^\circ$.

$R = \frac{2u_x u_y}{g} = \frac{2\times(1)\times\sqrt{3}}{10} = \frac{\sqrt{3}}{5}$

Equation of trajectory is

$y = x\tan\theta\left[1 - \frac{x}{R}\right]$

$y = x\sqrt{3}\left[1 - \frac{5x}{\sqrt{3}}\right]$

$y = \sqrt{3}x - 5x^2$

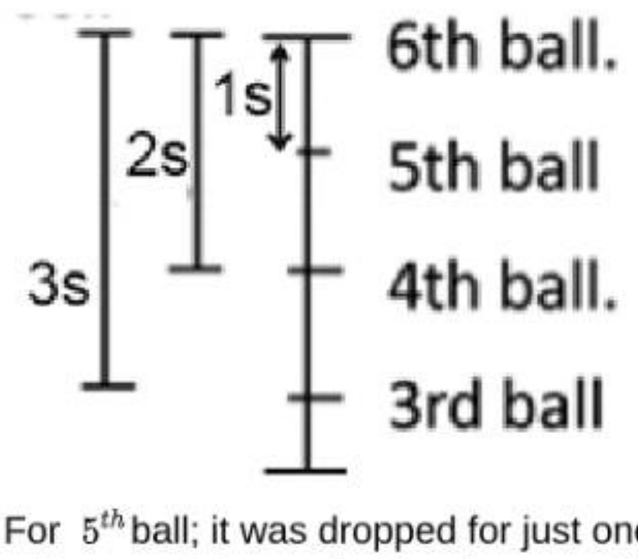
(37) Answer : (4)
Solution:
The angle is 90° for uniform circular motion only. For circular motions with increasing and decreasing speeds, the angle is acute and obtuse respectively.

(38) Answer : (1)
Solution:
If a particle has non-zero acceleration, its velocity has to vary either in magnitude or in direction or in both.
Acceleration is defined as rate of change of velocity.

(39) Answer : (1)
Solution:
According to principle of homogeneity, [A] = [B] = [C].

(40) Answer : (4)
Solution:
In 4 minutes 10 seconds, boy will complete 5 revolutions. Therefore displacement will be zero.

(41) Answer : (3)
Solution:



For 5^{th} ball; it was dropped for just one second before.

$\therefore$distance fallen $= \frac{1}{2} g t^2 = \frac{1}{2} \times 10 \times 1^2 = 5$ m.

For 4^{th} ball, it was dropped for two second before

$\therefore$distance fallen $= \frac{1}{2} \times 10 \times 2^2 = 20$ m

For 3^{rd} ball, distance fallen $= \frac{1}{2} \times 10 \times 3^2 = 45$ m

$\therefore$ Required ratio of positions of $3^{rd} : 4^{th} : 5^{th}$ balls.

$45 : 20 : 5$

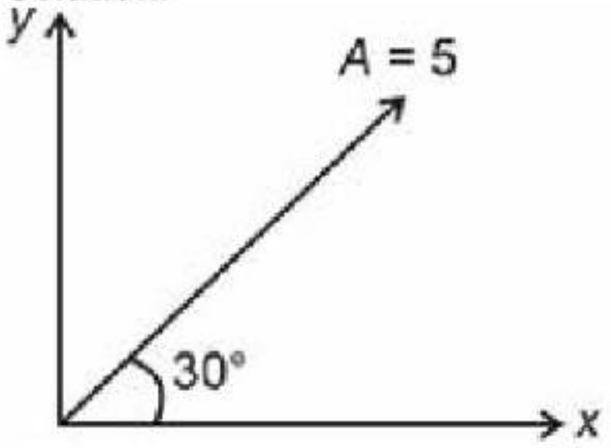
$9 : 4 : 1$

(42) Answer : (2)
Hint:

$\vec{A} = A_x\hat{i} + A_y\hat{j}$

$= A\cos\theta\hat{i} + A\sin\theta\hat{j}$

Solution:

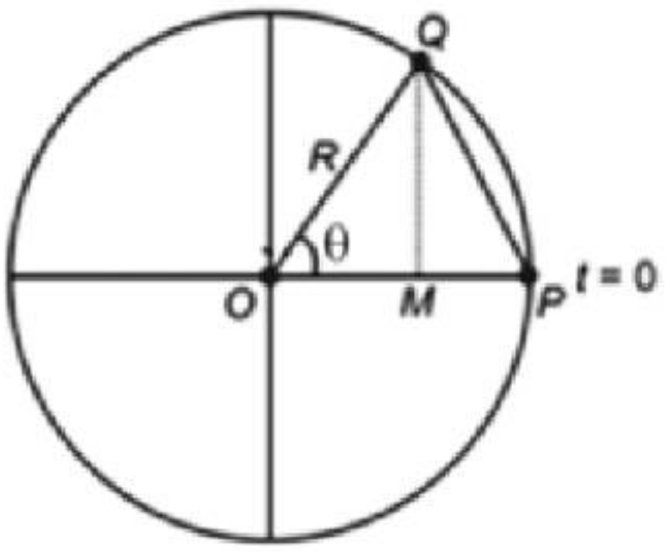


$A_x = 5\cos 30^\circ = 5\frac{\sqrt{3}}{2}$ m

$A_y = 5\sin 30^\circ = \frac{5}{2}$ m

(43) Answer : (3)

Solution:



In time t, particle has rotated an angle $\theta = \omega t$.

$\therefore$ Displacement $PQ = \sqrt{QM^2 + PM^2}$

$QM = R\sin\theta = R\sin\omega t$

$PM = \mathrm{OP} - OM$

$= R - R\cos\theta = R(1 - \cos\omega t)$

$\therefore \mathrm{PQ} = \sqrt{(R\sin\omega t)^2 + R^2(1-\cos\omega t)^2}$

$\mathrm{PQ} = \sqrt{R^2\sin^2\omega t + R^2 + R^2\cos^2\omega t - 2R^2\cos\omega t}$

$= \sqrt{2R^2(1-\cos\omega t)}$

$= \sqrt{2R^2 \cdot 2 \cdot \sin^2\frac{\omega t}{2}}$

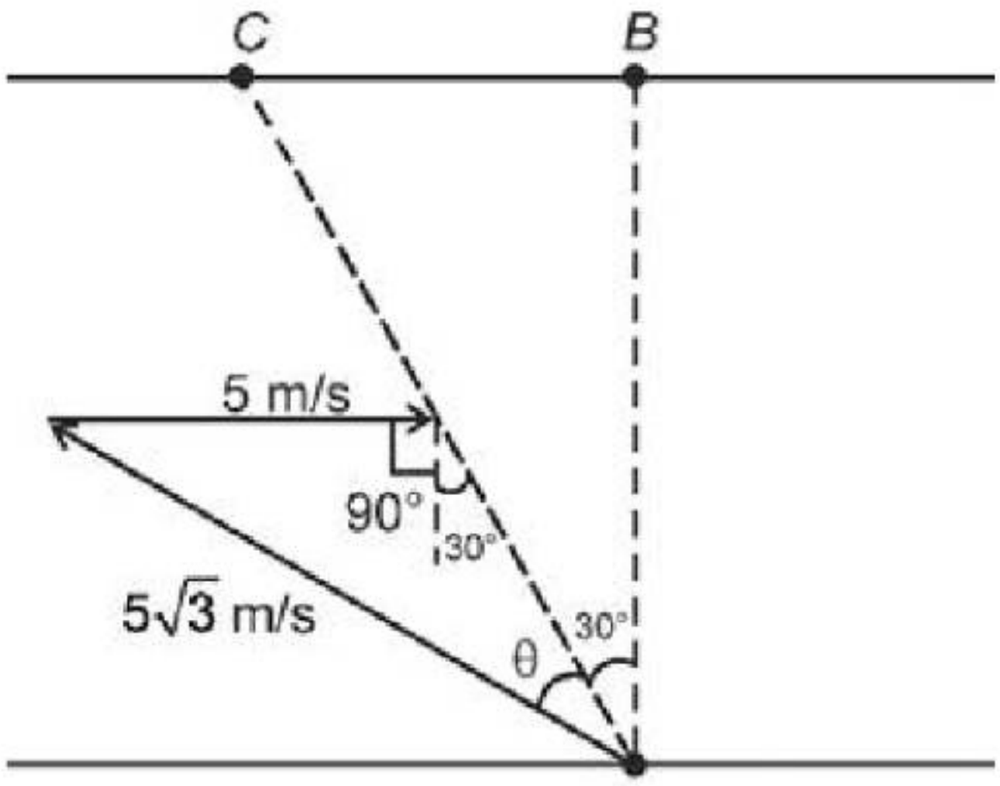
$= 2R\sin\frac{\omega t}{2}$

(44) Answer : (2)

Hint:

Make proper figure and apply sine rule.

Solution:



Apply sine rule :

$$\frac{\sin\left(90^\circ + 30^\circ\right)}{5\sqrt{3}} = \frac{\sin\theta}{5}$$

$$\frac{\cos 30^\circ}{\sqrt{3}} = \sin\theta \Rightarrow \sin\theta = \frac{1}{2}$$

$\Rightarrow \theta = 30^\circ$

Angle with respect to the direction of flow = 90° + 30° + 30° = 150°

(45) Answer : (3)

Solution:

$10\ \mathrm{N} = x$ units

$$10\left[M_1L_1T_1^{-2}\right] = x\left[M_2L_2T_2^{-2}\right]$$

$$x = 10\left[\left(\frac{M_1}{M_2}\right)\left(\frac{L_1}{L_2}\right)\left(\frac{T_1}{T_2}\right)^{-2}\right]$$

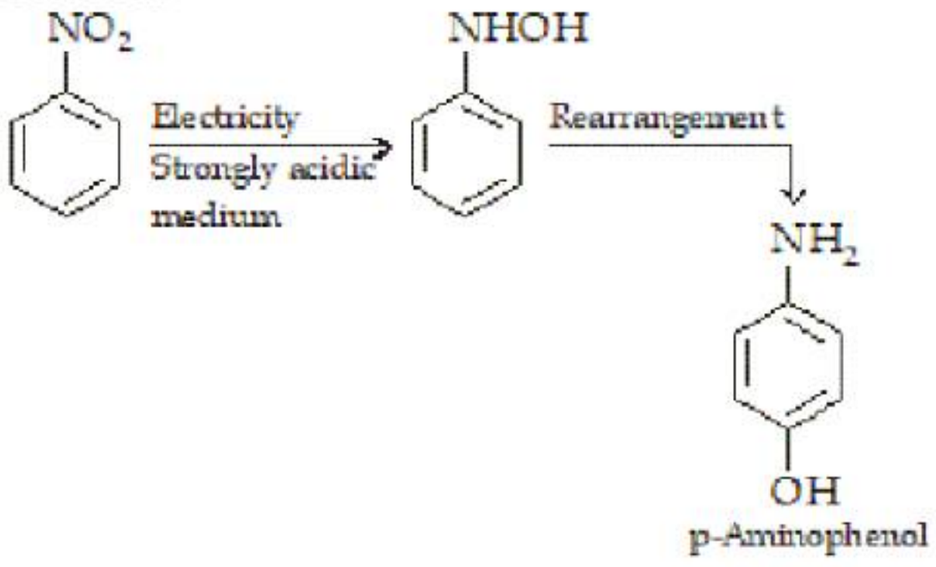
$$= 10.\left[\left(\frac{1}{10}\right)\left(\frac{1}{100}\right)\left(\frac{1}{30}\right)^{-2}\right]$$

$$= \frac{10\times 900}{10\times 100} = 9 \text{ units}$$

CHEMISTRY

(46) Answer : (2)

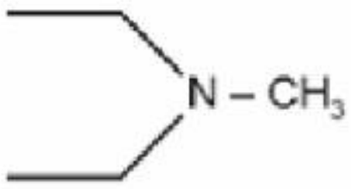
Solution:



p-Aminophenol

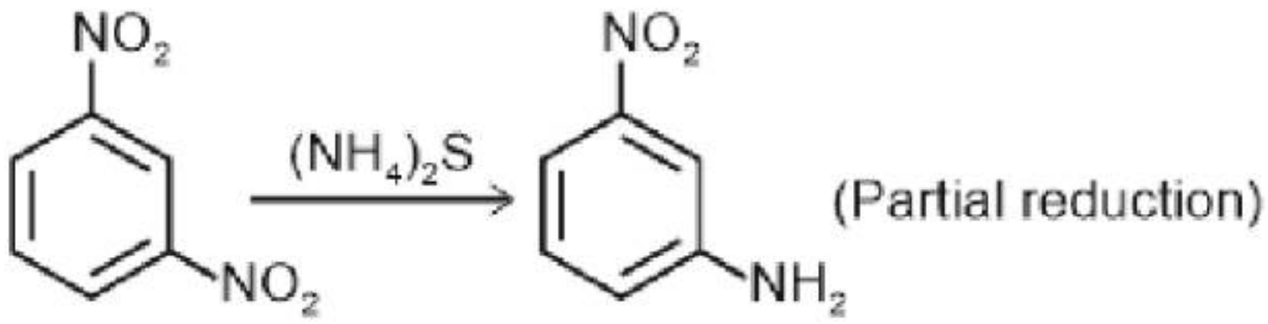
(47) Answer : (2)

Solution:

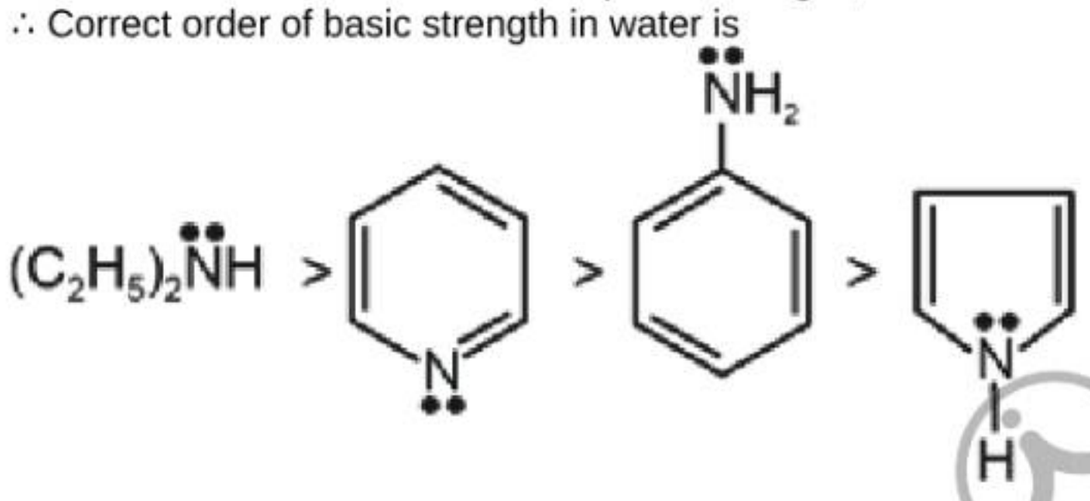


N-Ethyl-N-methylethanamine

(48) Answer : (1)
Solution:

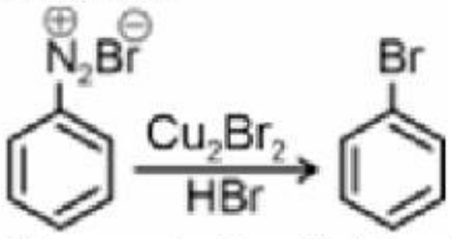


(49) Answer : (1)
Solution:
⇒ As electron density increases on nitrogen atom, its basic strength increases.
⇒ Due to delocalisation of electron pair of nitrogen, its basic strength decreases.
∴ Correct order of basic strength in water is



(50) Answer : (2)
Solution:
The synthesis of amides from amines with acyl halides or anhydrides in the presence of aqueous base is known as the Schotten-Baumann reaction.

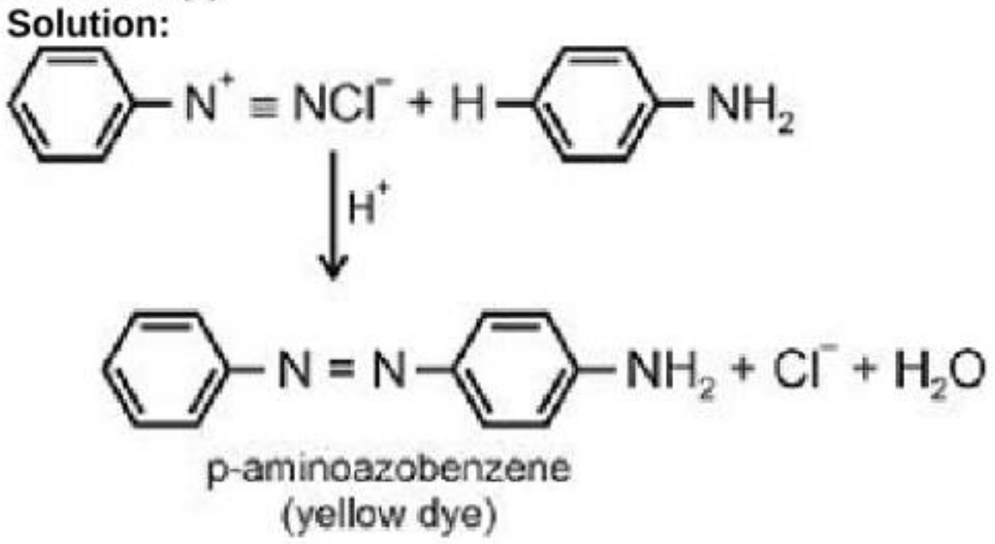
(51) Answer : (3)
Solution:



The reaction is called Sandmeyer reaction.

(52) Answer : (2)
Solution:
Aniline or vinyl amine cannot be synthesised by Gabriel phthalimide synthesis.

(53) Answer : (1)
Solution:



p-aminoazobenzene
(yellow dye)

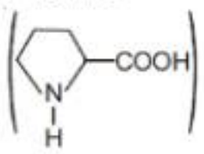
The above reaction is an example of electrophilic substitution reaction.

(54) Answer : (1)
Hint:

Amino acid containing five membered ring.

Solution:

Proline



is a cyclic amino acid.

(55) Answer : (3)

Hint:

Uracil is present in RNA

Solution:

Nitrogenous bases in RNA are
Adenine, Guanine, Cytosine and Uracil

(56) Answer : (1)

Solution:

Glucose $\xrightarrow[\Delta]{NaHSO_3}$ No reaction

Glucose $\xrightarrow[\Delta]{HNO_3}$ Saccharic acid

Glucose $\xrightarrow[\Delta]{HI}$ n-hexane

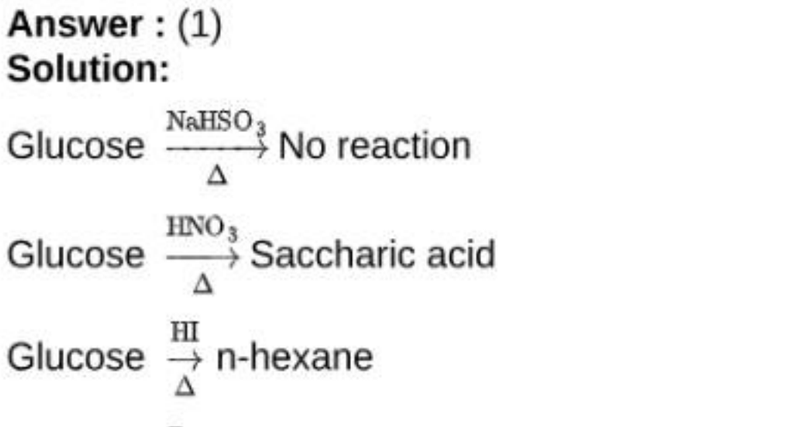
Glucose $\xrightarrow[\Delta]{Br_2}$ Gluconic acid

(57) Answer : (1)

Hint:

Lactose is commonly known as milk sugar

Solution:



(58) Answer : (1)

Solution:

Melting point of α-form of glucose is 419 K while that of β-form of glucose is 423 K.

(59) Answer : (2)

Solution:

In Mohr's salt, iron is in +2 oxidation state & $KMnO_4$ oxidises it to +3.

(60) Answer : (4)

Solution:

Phenolphthalein is colourless in acidic medium.

(61) Answer : (1)

Solution:

Proline and serine are non-essential amino acids.

(62) Answer : (4)

Hint:

1º structure remains unaltered during denaturation of proteins.

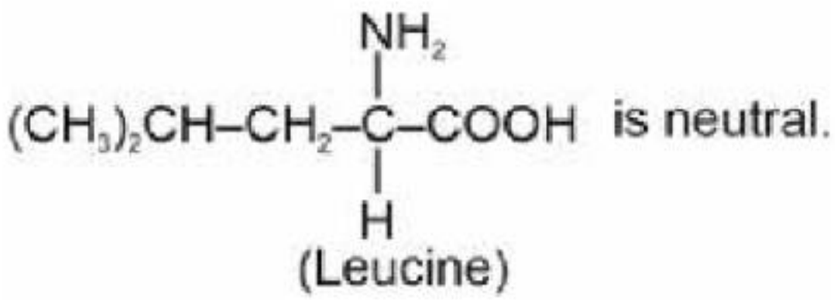
Solution:

Proteins loses its biological activity after denaturation.

(63) Answer : (3)

Solution:

Equal number of amino and carboxyl group makes amino acid molecule as neutral.



is neutral.

(64) Answer : (2)
Solution:
If adrenal cortex does not function properly then one of the results may be Addison's disease which is characterised by hypoglycemia, weakness and increased susceptibility to stress.

(65) Answer : (2)
Solution:

$$6\,CN^- + Fe^{2+} \rightarrow [Fe(CN)_6]^{4-}$$

$$3[Fe(CN)_6]^{4-} + 4\,Fe^{3+} \rightarrow \underset{\text{Prussian blue}}{Fe_4[Fe(CN)_6]_3}$$

(66) Answer : (1)
Solution:
Some of the heat released during neutralisation is used for ionisation of weak acid when strong base and weak acid undergoes neutralization.

(67) Answer : (2)
Solution:

$CH_3 - C \equiv N \xrightarrow{Ni/H_2} CH_3 - CH_2 - NH_2$ Product

(68) Answer : (4)
Hint:
Group reagents are used for the separation of cation due to their selective precipitation.
Solution:

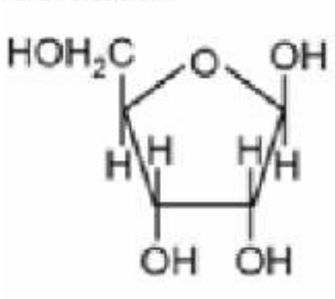
Group	Group resent
Group-I	Dilute HCl
Group-II	H_2S gas in presence of dil.HCl
Group-III	NH_4OH in presence of NH_4Cl
Group-IV	H_2S in presence of NH_4OH

(69) Answer : (3)
Solution:
Amylopectin is a branched chain polymer of α-D-glucose units in which chain is formed by $C_1 - C_4$ glyosidic linkage whereas branching occurs at $C_1 - C_6$ glyosidic linkage.

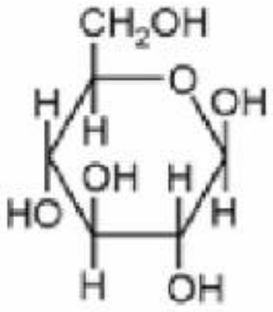
(70) Answer : (2)
Solution:
Insulin is an example of globular protein.

(71) Answer : (1)
Solution:
Rickets and scurvy are caused by the deficiency of vitamin D and vitamin C respectively.

(72) Answer : (4)
Solution:



β-D-ribose



β-D-glucose

(73) Answer : (4)

Solution:
Thyroxine produced in thyroid glands is an iodinated derivative of amino acid tyrosine.

(74) Answer : (1)
Solution:
Cellulose is a straight chain polysaccharide composed of only β-D-glucose units.

(75) Answer : (2)
Solution:

	Compounds	pK_b in aqueous medium
(a)	Benzenamine	9.38
(b)	N, N-Dimethylaniline	8.92
(c)	N-methylaniline	9.30
(d)	Phenylmethanamine	4.70

(76) Answer : (1)
Solution:
• Cytosine, thymine and uracil are pyrimidine bases.
• Adenine and guanine are purine bases.

(77) Answer : (3)
Solution:
Aliphatic and aromatic primary amines on heating with chloroform and ethanolic KOH form isocyanides.

(78) Answer : (4)
Solution:
Aniline does not undergo Friedel-crafts reaction due to salt formation with aluminium chloride which is used as catalyst.

(79) Answer : (4)
Solution:
Three degree amines do not react with benzenesulphonyl chloride.

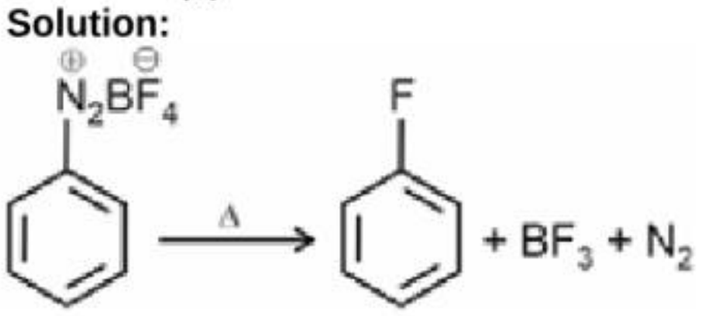
(80) Answer : (4)
Solution:

Compounds	Boiling point (K)
n-C_4H_9OH	390.3
n-$C_4H_9NH_2$	350.8
$(C_2H_5)_2NH$	329.3
$C_2H_5N(CH_3)_2$	310.5

(81) Answer : (2)
Solution:

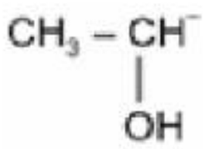
$$CH_3\,CN \xrightarrow[(ii)H_2O/\Delta]{(i)\,SnCl_2\,/\,HCl} CH_3\,CHO$$

(82) Answer : (3)
Solution:

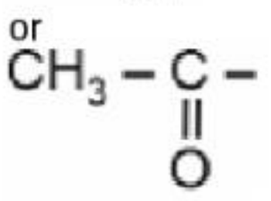


(83) Answer : (4)
Solution:
3° alcohols give immediate turbidity on reaction with Lucas reagent ($ZnCl_2$ and Conc. HCl).

(84) Answer : (2)
Solution:
Iodoform test is given by the compounds containing



or



groups.

(85) Answer : (2)
Solution:

Metal cations	Colour of the flame observed by naked eye
Cu^{2+}	Green flame with blue centre
Sr^{2+}	Crimson red
Ba^{2+}	Apple green
Ca^{2+}	Brick red

(86) Answer : (3)
Solution:
PbS is black in colour while $PbCrO_4$ is yellow colour compound.

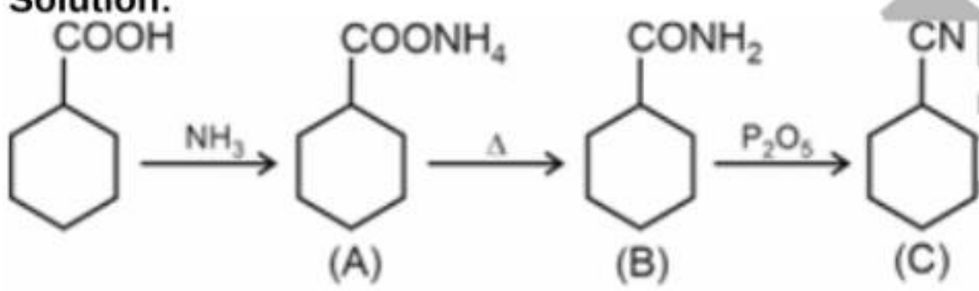
(87) Answer : (4)
Solution:

$$AgCl + 2NH_4OH \rightarrow [Ag(NH_3)_2]Cl + H_2O$$

$$CrO_4^{2-} + 2H^+ + 2H_2O_2 \rightarrow CrO_5 + 3H_2O$$

(88) Answer : (2)
Solution:
Tollens' test is given by both aliphatic and aromatic aldehydes.

(89) Answer : (2)
Solution:



(90) Answer : (2)
Solution:

$$C_2H_5 - N \equiv C \xrightarrow[H_2O]{H^+} C_2H_5NH_2 + HCOOH$$

BOTANY

(91) Answer : (1)
Hint:
Occurrence of food webs provide stability to the ecosystem.
Solution:
The network of interconnected food chains at different trophic levels in a biotic community is termed as food web.

(92) Answer : (3)
Solution:
In ecological pyramids, energy at a lower trophic level is always more than that at a higher level. Trophic level represents a functional level, not a species as such. A given species may occupy more than one trophic level in the same ecosystem at the same time.

(93) **Answer :** (4)
Solution:
The food chain Trees → Birds → Lice → Bacteria, represents a parasitic food chain.

(94) **Answer :** (2)
Solution:
Deep sea is the least productive ecosystem among the given options.

(95) **Answer :** (3)
Solution:
Productivity, nutrient cycling, energy flow and decomposition are the functional aspects of an ecosystem.

(96) **Answer :** (4)
Solution:
Trees occupy the top vertical layer of a forest, shrubs occupy the second layer and herbs and grasses occupy the bottom layer.

(97) **Answer :** (3)
Solution:
Humus is dark coloured amorphous substance.

(98) **Answer :** (1)
Solution:
Sparrow is a primary consumer when it eats seeds, fruits, etc. and a secondary consumer when it eats insects and worms.

(99) **Answer :** (4)
Solution:
Vertical distribution of different species occupying different levels is called stratification.

(100) **Answer :** (2)
Solution:
A much larger fraction of energy flows through DFC than through GFC in terrestrial ecosystems.
GFC is the major conduit of energy flow in an aquatic ecosystem.

(101) **Answer :** (3)
Solution:
Nice Perch was responsible for the extinction of more than 200 species of Cichlid fish.

(102) **Answer :** (2)
Solution:
In India,
Wild life sanctuaries are 448,
Biosphere reserves are 14 and
National parks are 90

(103) **Answer :** (3)
Solution:
India has more than 50,000 genetically different strains of rice, and 1,000 varieties of mango, showing genetic diversity.

(104) **Answer :** (1)
Solution:
Khasi and Jaintia hills are the sacred groves in Meghalaya.

(105) **Answer :** (3)
Solution:
Some recent extinctions include Quagga from Africa, Thylacine from Australia, Dodo from Mauritius and Steller's sea cow from Russia.

(106) **Answer :** (4)
Solution:

Taxa	Number of species in Amazonian rain forest
Birds	1300
Reptiles	378
Fishes	3000
Mammals	427

(107) **Answer :** (3)
Solution:

The regression coefficient (z) values are in the range of 0.6 to 1.2 for very large areas.

(108) Answer : (2)
Solution:
Species diversity increases from pole to equator. Passenger pigeon became extinct due to over-exploitation by humans.

(109) Answer : (1)
Solution:
Critically Endangered category represents that a species is facing an extremely high risk of extinction in the wild in the immediate future.

(110) Answer : (1)
Solution:
Increased diversity contributes to more productivity. More diverse communities show less year to year variation in biomass production. Productivity decreases with decrease in biodiversity.

(111) Answer : (2)
Solution:
When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate, this exemplifies co-extinctions.

(112) Answer : (1)
Solution:
An analogy used by Stanford ecologist Paul Ehrlich suggested that rivets on the wings of a plane represents key species.

(113) Answer : (2)
Solution:
Ecosystem-1 has more species diversity as compared to ecosystem-2. Complexity of food web in ecosystem-1 is greater than ecosystem-2 thus the ecosystem-1 is more stable than ecosystem-2. The given food chains are of terrestrial habitat and major conduit of energy flow in such ecosystem is DFC.

(114) Answer : (3)
Solution:
GPP – R = NPP
NPP is the available biomass for the consumption to herbivores and decomposers.

(115) Answer : (3)
Solution:
According to the first law of thermodynamics, energy can neither be created nor destroyed, only converted from one form to another.

(116) Answer : (3)
Solution:
Detritus food chain may be connected with the grazing food chain at some level.
Pyramid of number in tree ecosystem can be inverted, while in a grassland ecosystem, it is always upright.

(117) Answer : (2)
Solution:
The % of solar energy used for GPP $= \frac{34580}{600000} \times 100 \approx 5.8\%$.
Respiratory loss by consumer $= \text{GPP} - \text{NPP} = 305 - 81 \text{ kcal m}^{-2}\text{yr}^{-1}$

(118) Answer : (2)
Solution:
Primary productivity depends on the plant species inhabiting a particular area. It also depends on a variety of environmental factors, the availability of nutrients and the photosynthetic capacity of plants; thus, sunlight and the availability of nutrients are major limiting factors for the low productivity of oceans.

(119) Answer : (4)
Solution:
Primary producers convert only 1% of the trapped solar energy and utilize it for production of biomass (GPP).

(120) Answer : (2)
Solution:

	T1 →	T2 →	T3 →	T4
	Producer	Primary consumer	Secondary consumer	Tertiary consumer
GPP (kcal m^{-2} yr^{-1})	4000x	400x	40x	4x
NPP (kcal m^{-2} yr^{-1})	400x	40x	4x	0.4x

(121) Answer : (1)
Solution:
Each trophic level has a certain mass of living material at a particular time, called as the standing crop. Decomposition is an oxygen-requiring process.

(122) Answer : (2)
Solution:
Inverted pyramid of biomass is seen in an aquatic ecosystem.
Pyramid of energy is always upright for any ecosystem.
Tree ecosystem can be spindle-shaped or inverted w.r.t. number.

(123) Answer : (3)
Solution:
Productivity of tropical environments is higher than the temperate environments because there is more solar energy available in the tropics.

(124) Answer : (2)
Solution:
Alexander von Humboldt was the German naturalist and geographer. On log scale, the relationship is a straight line, described by the equation logS=log C + Z logA

(125) Answer : (3)
Solution:
According to the IUCN Red list, amphibians appear to be more vulnerable to extinction. Colombia has nearly 1400 species of birds. The Tropical Amazon forest is home to 378 reptile species.

(126) Answer : (4)
Solution:
Formation of fruits or seeds in nature is a broadly utilitarian service, but their use by humans is a narrowly utilitarian service.

(127) Answer : (1)
Solution:
The Earth Summit was held in 1992.
World Summit on sustainable development was held in 2002 in Johannesburg.
IUCN Red list (2004) documented the extinction of 784 species.

(128) Answer : (3)
Solution:
The transition zone surrounds the buffer zone. The buffer zone surrounds the core area and is managed to accommodate greater research and educational activity.

(129) Answer : (1)
Solution:
Many nations find *in-situ* conservation unrealistic and economically not feasible to conserve all their biological wealth.
Invariably, the number of species waiting to be saved from extinction far exceeds the conservation resources available.

(130) Answer : (2)
Solution:
Predators keep the prey population under control. Water hyacinth, introduced in India, did not have its natural predator.

(131) Answer : (1)
Solution:
Sacred groves have special religious importance to a particular culture.

(132) Answer : (3)
Solution:
Converter or transducer are the producers that convert solar energy into chemical energy.

(133) Answer : (1)
Solution:
Estuary is an aquatic ecosystem.

(134) Answer : (3)
Solution:
Due to low species diversity, the anthropogenic ecosystem is not considered as stable ecosystem.

(135) Answer : (3)
Solution:
Total 34 biodiversity hotspots have been identified globally.

ZOOLOGY

(136) Answer : (1)
Solution:
Limulus is also known as king crab.

(137) Answer : (4)
Solution:
Ctenoplana belongs to the phylum Ctenophora, in which fertilisation is external with indirect development.

(138) Answer : (1)
Solution:
In echinoderms, digestive system is complete with mouth on the lower (ventral) side and anus on the upper (dorsal) side.

(139) Answer : (3)
Solution:
Perforated gill slits are characteristic feature of chordates which persist usually in fishes from embryonic to adult stages. In urochordates, cyclostomes and cartilaginous fishes, notochord is not completely replaced by vertebral column. The four chambered heart found in birds and mammals is associated with pulmonary and systemic circulation.

(140) Answer : (2)
Solution:
Corvus is a bird and is a homeotherm.

(141) Answer : (3)
Solution:
Sharks are cartilaginous fishes (Chondrichthyes). In cartilaginous fishes, skin is tough and covered with placoid scales; swim bladder or air bladder is absent. So, they have to swim continuously. Tail or caudal fin is heterocercal in members of the class Chondrichthyes. They possess 5-7 pairs of gills slits, without operculum.

(142) Answer : (3)
Solution:
Arthropods have an open circulatory system and three germ layers. Insects have Malpighian tubules as their excretory structures. Green glands are present in crustaceans for excretion. Arthropods are segmented animals.

(143) Answer : (2)
Solution:
In molluscs, the space between the visceral hump and the mantle is called the mantle cavity in which feather-like gills are present.

(144) Answer : (4)
Solution:
Sponges are hermaphrodites *i.e.,* male and female gametes are produced by the same individual. Most of the sponges are marine and asymmetric animals. Both sexual and asexual reproduction occur in them.
Sponges have intracellular digestion as food is digested within food vacuoles inside the cells. There is no extracellular digestion in sponges.

(145) Answer : (2)
Solution:
Meandrina belongs to the phylum Coelenterata. Coelenterates are multicellular animals, which are radially symmetrical and have tissue level of organization.

(146) Answer : (1)
Solution:
Frogs show external fertilisation and indirect development. Their skin is moist without scales. Their body is divided into head and trunk. Their eyes have eyelids.

(147) Answer : (2)
Solution:
The forelimbs of birds are modified into wings. The hind limbs generally have scales and are modified for walking, swimming and clasping the tree branches.

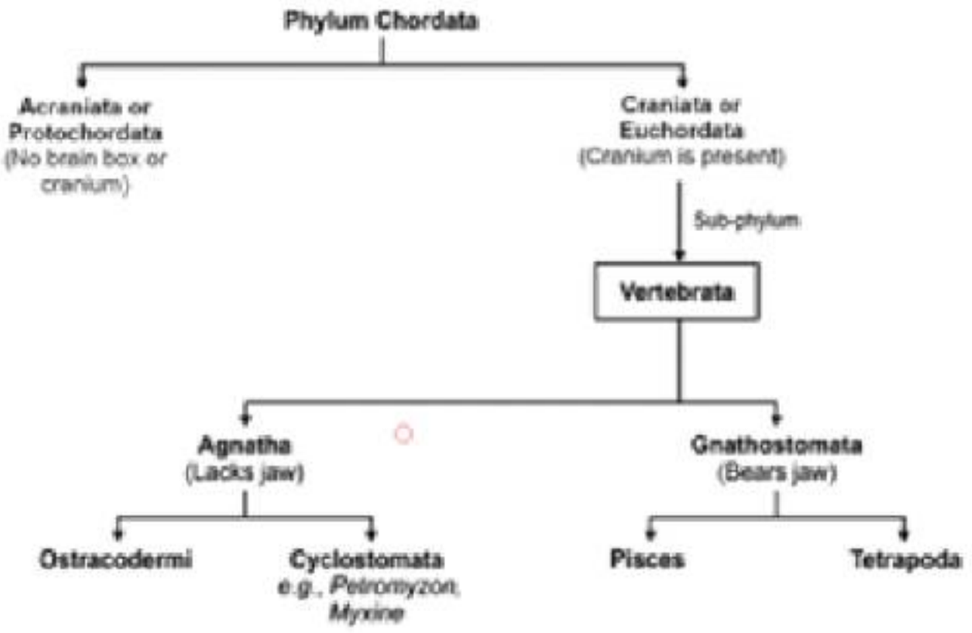
(148) Answer : (4)
Solution:
Carcharodon is a cartilaginous fish and they have gill slits without operculum.
Fishes respire through gills.
Struthio (Ostrich) is a flightless bird.

External ear openings are absent in snakes.

(149) Answer : (1)

Solution:

Myxine belongs to the class Cyclostomata.



(150) Answer : (4)

Solution:

Nereis, an aquatic annelid, is dioecious.

(151) Answer : (2)

Solution:

Sea cucumber, sea urchin, sea-pen and sea-fan are found in the marine habitat.
Adult echinoderms are radially symmetrical but their larvae are bilaterally symmetrical.

(152) Answer : (4)

Solution:

- Hookworm *i.e., Ancylostoma*, belongs to the phylum Aschelminthes.
- Earthworm is a coelomate and monoecious organism.
- Silkworm is a coelomate and dioecious organism.
- Tapeworm is an acoelomate and monoecious organism.

(153) Answer : (3)

Solution:

Balanoglossus – Belongs to the phylum Hemichordata.
Anopheles – Belongs to the phylum Arthropoda
Laccifer – Belongs to the phylum Arthropoda
Both hemichordates and arthropods have an open circulatory system.

(154) Answer : (3)

Solution:

Pennatula (Sea-pen), *Adamsia* (Sea-anemone) and *Gorgonia* (Sea-fan) belong to the phylum Coelenterata. *Aplysia* (Sea-hare) is a mollusc.

(155) Answer : (3)

Solution:

The body of arthropods is covered by a hard and water-proof exoskeleton made up of chitin. This chitinous exoskeleton is one of the reasons of successful existence of arthropods on land.

(156) Answer : (2)

Solution:

In hemichordates, circulatory system is of open type. They have proboscis gland for excretion.
In echinoderms, no excretory structure is present. Echinoderms are characterized by calcareous ossicles.

(157) Answer : (3)

Solution:

In cnidarians, two basic body forms are seen, called polyp and medusa. Former is a sessile and cylindrical form like *Hydra*, whereas the latter is umbrella-shaped and free-swimming. Alternation of generation between these two body forms is called metagenesis.

(158) Answer : (1)

Solution:

Except cephalopods, molluscs have an open type of circulation. *Sepia* (cephalopod) has closed type of circulatory system.
Pila, *Pinctada*, *Dentalium* and *Chaetopleura* have an open circulatory system.
Bombyx has an open circulatory system. *Pristis* is a chordate and chordates have closed circulatory system.

(159) Answer : (3)

Solution:

Malpighian tubules of arthropods and nephridia of annelids are excretory in function, hence these are functionally similar. Book gills, trachea and gills structures are respiratory structures.

(160) Answer : (4)

Solution:

Aurelia (Jelly fish) is a cnidarian and it exhibits tissue level of organisation. It has two germ layers and shows radial symmetry.

(161) Answer : (3)

Solution:

Ctenophores have eight comb plates. Special sense organs called statocysts are present in ctenophores. They lack nematocysts. Sexes are not separate, *i.e.*, they are monoecious.

(162) Answer : (4)

Solution:

Urochordates have an open circulatory system. They are chordates but not vertebrates. Pisces is a super-class under the division Gnathostomata (that includes all true fishes). All vertebrates do not bear jaw. Cyclostomes fall under the division Agnatha and the sub-phylum Vertebrata; they are jawless.

(163) Answer : (3)

Solution:

Reptiles show incomplete double circulation as their ventricle is incompletely divided, allowing mixing of oxygenated and deoxygenated blood.

(164) Answer : (2)

Solution:

Amphibia	–	Cutaneous respiration in addition to pulmonary respiration
Reptilia	–	Tympanum represents ear
Aves	–	Only one pair of walking limbs, air sacs present
Mammalia	–	Diaphragm and only pulmonary respiration

(165) Answer : (2)

Solution:

Ascaris uses excretory tube for excretion. Water vascular system is present in echinoderms. *Euspongia* (sponges) have a water canal system. Green gland is an excretory structure in prawn.

(166) Answer : (3)

Solution:

Correct trend w.r.t. the body organisation from simple to complex forms:

Porifera → Cnidaria → Platyhelminthes → Annelida → Arthropoda →Mollusca → Echinodermata → Chordata

(167) Answer : (3)

Solution:

Both hemichordates and chordates show bilateral symmetry, triploblasty and have true coelom.

Ventral heart is present in chordates.

(168) Answer : (4)

Solution:

Platyhelminths are acoelomates, *i.e.*, body cavity is absent in them.

(169) Answer : (3)

Solution:

The given figure is of *Petromyzon* which belongs to the class Cyclostomata. Cyclostomes have a sucking and circular mouth without jaws . Their body is devoid of scales and paired fins. Cranium and vertebral column are cartilaginous. Circulation is of closed type. Cyclostomes are marine but migrate for spawning to fresh water.

(170) Answer : (2)

Solution:

Evolutionarily, aquatic respiration by gills gave way to cutaneous respiration in amphibians and then to pulmonary respiration in reptiles, birds and mammals.

(171) Answer : (3)

Solution:
The transition from radial to bilateral symmetry is a major evolutionary trend in the animal kingdom, marking the shift from sedentary or passively drifting lifestyle to active and directional mobility.

(172) Answer : (2)
Solution:
In chordates, the notochord lies between the gut and the nerve cord, a key diagnostic feature of chordates. In vertebrates, notochord is replaced by the vertebral column in adults.

(173) Answer : (3)
Solution:
Diploblastic animals like cnidarians lack mesoderm and bilateral symmetry. Between ectoderm and endoderm, an undifferentiated layer called mesoglea is present.

(174) Answer : (1)
Solution:
Roundworms possess pseudocoelom and are unsegmented, bilaterally symmetrical organisms that perform internal fertilisation, while earthworms possess true coelom and are segmented, bilaterally symmetrical organisms that perform external fertilisation.

(175) Answer : (2)
Solution:
Sycon – Porifera – Choanocytes
Pleurobrachia – Ctenophora – Ciliated locomotory structure
Balanoglossus – Hemichordata – Proboscis gland
Physalia – Coelenterata – Metagenesis

(176) Answer : (1)
Solution:
Rana, *Naja* and *Calotes* are tetrapod vertebrates. *Pristis* and *Pterophyllum* are vertebrates that belong to the superclass Pisces and class Chondrichthyes and Osteichthyes, respectively.

(177) Answer : (3)
Solution:
Adult echinoderms are eucoelomates and show radial symmetry in the adult form. Platyhelminths are triploblastic acoelomates. All diploblastic animals (cnidarians and ctenophores) show tissue level of body organisation. *Hydra* is a freshwater diploblastic animal.

(178) Answer : (2)
Solution:
Adult echinoderms are eucoelomates and exhibit radial symmetry. All animals are multicellular. *Amoeba* is a protozoan.

(179) Answer : (3)
Solution:
Amphibians, reptiles, birds and *Ornithorhynchus* (mammal) are oviparous tetrapods. They have a closed circulatory system.

(180) Answer : (2)
Solution:
Presence of hair on skin and presence of mammary glands are unique features of mammals. Birds also have 4-chambered muscular heart.
Birds and mammals are homeotherms, *i.e.,* they are able to maintain a constant body temperature.